
SPECIFICATION

F6879-233504

Search and Rescue (SAR) Exterior Building Replacement

Lark Harbour, NL

Issued for Tender

Prepared For:



Fisheries and Oceans
Canada

Peches et Oceans
Canada

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Part 1 General**1.1 DESCRIPTION OF WORK**

- .1 In general, work under this contract consists of:
 - .1 Selective demolition of existing cladding and openings on the existing building.
 - .2 New cladding, windows and exterior doors. Re-surfacing of the existing roofing membrane.
- .2 Site of work is at: Lark Harbour SAR Centre, located in Lark Harbour, NL

1.2 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 such site inspection.

1.3 CODES AND STANDARDS

- .1 Perform work in accordance with the National Building Code of Canada (2015 ed.) 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.
- .2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.4 INTERPRETATION OF DOCUMENTS

- .1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

1.5 TERM ENGINEER/CONSULTANT

- .1 Unless specifically stated otherwise, the term Engineer/Consultant where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.6 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. 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.

1.7 DOCUMENT REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .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.

1.10 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.

1.11 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 Where elevators exist in building, only those assigned for Contractor's use may be used for moving workers and material within building. Protect walls of passenger elevators, to approval of Departmental Representative prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .4 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.

1.12 ROUGHING-IN

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

1.13 CUTTING, FITTING AND PATCHING

- .1 Ensure that cutting and patching required by all trades is included in total bid price submitted for the work.
- .2 Execute cutting, fitting and patching required to make work fit properly.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good. This includes patching of openings in existing work resulting from removal of existing services.
- .4 Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative.
- .5 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .6 Fit work airtight to pipes, sleeves ducts and conduits.

1.14 CONCEALMENT

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

1.15 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.

1.16 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, 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 tenant'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 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 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.

1.17 BILINGUAL NOTATIONS

- .1 Any items supplied and installed under this contract which have operating instructions on them which can be expected to be used by the building tenants, 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 the Departmental Representative gives prior approval before any such items are ordered.
- .4 Internationally recognized colour coding such as red and blue center pieces for plumbing brass is acceptable.
- .5 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.

- .6 Ensure that all trades are made aware of above requirements.

1.18 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

1.19 ASBESTOS DISCOVERY

- .1 Demolition of spray or trowel-applied asbestos can be hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of work, stop work and notify Departmental Representative immediately. Do not proceed with relevant work until written instructions have been received from Departmental Representative.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 10 10 – General Instructions

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- .2 Access to the area for the Work under this contract shall only be via the routes approved by the Departmental Representative. No other interior access to the work area will be provided without prior approval by the Departmental Representative.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Existing sanitary facilities within the building will not be permitted for use by Contractor's personnel. Contractor shall provide temporary sanitary facilities. Locations for Contractor's temporary sanitary facilities shall be approved by Departmental Representative.
- .5 Use only conveyors existing in building for moving workers and material only where permitted by Departmental Representative.
 - .1 Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Closures: protect work temporarily until permanent enclosures are completed.
- .7 Only one firewall shall be completed at a time, unless otherwise permitted by the Departmental Representative. Where only one firewall is to be completed at a time, all work, including final inspections by the Departmental Representative and outstanding deficiencies, shall be complete before proceeding to the next fire wall.

1.4 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.

1.5 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 50 00 - Temporary Facilities

1.6 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (Gantt) Chart.
- .2 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.
- .4 Ingress and egress of Contractor vehicles at site is limited to routes designated by the Departmental Representative.
- .5 Deliver materials outside of peak traffic hours 7:00 to 9:00 and 15:00 to 17:00 unless otherwise approved by Departmental Representative.

1.7 SECURITY ESCORT

- .1 The use of commissionaire escorts is only required for workers who do not have PWGSC Reliability Security Clearance. As the number and scheduling of workers with and without Reliability clearance is entirely in the control of the general contractor, the contractor will be responsible for carrying the cost for the commissionaires as needed.
- .2 Personnel employed on this project that are without Reliability Security Clearance must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
- .3 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.
- .4 Any escort request may be cancelled free of charge if notification of cancellation is given at least 4 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.
- .5 Calculation of costs will be based on average hourly rate of security officer for minimum of eight hours per day for late service request and of four hours for late cancellations.

1.8 BUILDING SMOKING ENVIRONMENT

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 SUBMITTALS**

- .1 Upon acceptance of bid 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 specified in Section 01 33 00.
 - .3 Waste Management Plan specified in Section 01 74 21.
 - .4 Environmental Plan Specified in section 01 35 43
 - .5 Health and Safety Plan specified in section 01 35 29.
 - .6 Lockout Procedures specified in section 01 35 25.

1.2 WORK SCHEDULE

- .1 Upon acceptance of bid submit:
 - .1 Preliminary work schedule within 7 calendar days of contract award.
 - .2 Detailed work schedule within 21 calendar days of contract award.
- .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 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 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 Work schedule must take into consideration and reflect the work phasing, required sequence of work, special conditions and operational restrictions as specified below and indicated on drawings.
- .6 Schedule work in cooperation with the Departmental Representative. Incorporate within Work Schedule, items identified by Departmental Representative during review of preliminary schedule.

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- .7 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.
- .8 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.
- .9 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.
- .10 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.
- .11 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 PROJECT PHASING

- .1 Be aware that Facility must be kept operational for the full duration of work of this contract. Building services to areas under use by tenants must also be maintained at all times during the Facility's operational hours and as specifically defined in operational restrictions specified in this section.
- .2 Perform Work of this contract in separate phases as indicated by the Departmental Representative.
- .3 Unless indicated or approved otherwise, complete all work of a particular phase (i.e. fire wall) prior to commencement of another phase. Obtain Departmental Representative's permission prior to moving between phases.

1.4 OPERATIONAL RESTRICTIONS

- .1 The Contractor must recognize that building occupants will be affected by implementation of this contract. The Contractor must perform the work with utmost regard to the safety and convenience of building occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the building without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.
- .2 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.

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- .3 To assure that construction work may proceed productively without risk to safety of building occupants and the public, and due to the nature of the tenant's operation be aware that all work of this contract must be carried out during "Off-Hours".
- .4 Off Hours: means a period of time which is outside the daily operational hours of the tenants of the Facility. For the purposes of this contract, Off-Hours are defined as follows:
 - .1 Weeknight Off-Hours: between the hours of 18:00 and 07:00 for each weekday Monday to Thursday inclusive.
 - .2 Weekend Off-Hours: between the hours of 18:00 Friday evening to 07:00 Monday morning.
 - .3 Dependent on the nature and location of the construction activity and due to an unanticipated operational requirement of the Tenant, certain off-hour periods may be redefined by adjusting the start and end time periods or cancellation of a specific off-hour work shift during the course of the Work.
- .5 Departmental Representative reserves the right to stop certain daytime work activities, if the nature of that activity generates excessive noise or dust and have Contractor re-schedule that particular work to be performed during the Off-Hour period.
- .6 Ensure that all trades are aware of the "Off-Hour" requirements of this contract and ensure that any extra costs incurred as a result is included in the Contractor's bid price for the work. No extra cost will be paid due to failure by General Contractor or his sub-contractors to recognize the off-hour requirements and other restrictions specified herein and to include all necessary allowances within their bids.
- .7 Facility circulation maintained:
 - .1 Ensure that entrances, corridors, stairwells, fire exits and other circulation routes are maintained free and clear providing safe and uninterrupted passage for Facility users and public at all times during the entire work.
 - .2 Maintain those areas clean and free of construction materials and equipment. Provide temporary dust barriers and other suitable enclosures to ensure users are not exposed to construction activities and are protected from exposure to dust, noise and hazardous conditions.
 - .3 Provide temporary corridors, walkways, passageways, access to offices, etc... when required due to nature of work. Such circulation routes must be constructed to barrier free requirements unless approved otherwise by Departmental Representative.
 - .4 Maintain fire escape routes accessible and firefighting access open all times for the duration of the project.
 - .5 Do not under any circumstances block fire exit doors. Do not leave construction materials or debris in corridors, stairwells building entrances and exits.
- .8 Safety Signage:
 - .1 Provide on site, and erect as required during progress of work, proper bilingual

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signage, mounted on self-supporting stands, warning the public and building occupants of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility, and directing building occupants through any detours which may be required.

- .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 meters. Number of signs required will be dependent on number of areas in facility under renovation at any one time.
- .4 Include costs for the supply and installation of these signs in the bid price.

.9 Dust and Dirt Control:

- .1 See section 01 50 00 and 01 74 11 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 Immediately remove all debris and dust from within occupied areas as generated by work therein during a given work shift.
- .6 Disconnect and seal-off ductwork of HVAC servicing the construction area to stop spread of dust into other areas of Facility.
- .7 Avoid situations and practices which results in dust and dirt being brought from the construction areas or from the exterior and tracked inside the building, into occupied areas used by tenants and the public.
- .8 Stop workers with soiled footwear from entering building. This includes roofing mechanics and heavy civil workers.
- .9 Inform workers and make them sensitive to the need for dust and dirt control. Stringently enforce rules and regulations, immediately address non-compliance.
- .10 Keep access doors to work areas closed at all times. Use only designated doors for entry or egress.

.10 Work in Occupied Areas:

- .1 Where work must be carried out in an occupied area beyond the boundaries of the enclosed construction site, perform such work during the non-operational off-hour periods of the Facility.
- .2 Ensure that all dust, dirt, debris, construction waste, materials, tools and equipment are completely removed at the end of each "off-hour" work shift. Clean

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and reinstate area ready for daytime use by tenant.

- .3 Provide temporary dust barriers around immediate work areas and place fabric drop sheets over workstations, equipment and other furnishings located immediately adjacent to such work.
 - .4 Conduct work in such a way as to minimize the creation of dust and to avoid contaminating areas beyond the immediate location.
 - .5 Discuss and obtain Departmental Representative's approval beforehand on the type and extent of dust barriers, protective devices and measures needed.
 - .6 Be responsible for temporarily moving office furnishings, workstations, computer equipment and other objects as needed to gain access and conduct work. Reinstall all dislocated items at end of each work shift making the area operational again.
 - .7 Disconnect and reconnect any power and communications systems feeding workstations as required.
 - .8 Clean such areas as well as those corridors and routes used to gain entry and access.
- .11 Cleaning of tenant occupied areas used by Contractor:
- .1 Clean lobbies, corridors, stairs and other circulation routes used by workers to gain access to work by conducting cleaning, vacuuming and washing of floors, walls and other soiled surfaces.
 - .2 Obtain and pay for the services of a professional cleaning company to perform this cleaning. Cleaning staff shall remain on site one hour beyond the end of each off-hour work shifts to address any Tenant complaints or concerns and carryout additional cleaning functions as directed by Departmental Representative or by a pre-designated person(s) representing the tenant(s).
 - .3 Meager attempts at controlling dust and ineffective unprofessional cleaning procedures will not be tolerated.
 - .4 Failure to provide effective dust control, allowing construction dust and dirt to escape beyond construction areas and contaminate occupied areas and building circulation areas will result in Contractor being ordered to immediately provide professional cleaning services without delay to remedy the situation and conduct all cleaning to the extent as determined by Departmental Representative. Alternatively, Departmental Representative may, at certain times and at own discretion, obtain the services of an independent building cleaning agency when cleaning being provided by Contractor is ineffective or tardy in response. Costs of such services will be charged against Contractor in the form of financial penalties or holdback assessments against the Contract.
- .12 Ensure that all sub-trades are made aware of and abide by the contents of this section and in particularly the work restrictions specified herein due to tenant operational requirements.

1.5 PROJECT MEETINGS

- .1 Schedule and administer project meetings, held on a minimum bi-weekly basis, for entire duration of work and more often when directed by Departmental Representative as

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deemed necessary due to progress of work or particular situation.

- .2 Prepare agenda for meetings.
- .3 Notify participants in writing 4 days in advance of meeting date.
 - .1 Ensure attendance of all subcontractors.
 - .2 Departmental Representative will provide list of other attendees to be notified.
- .4 Hold meetings at project site or where approved by Departmental Representative.
- .5 Preside at meetings and record minutes.
 - .1 Indicate significant proceedings and decisions. Identify action items by parties.
 - .2 Distribute to participants by mail or by facsimile within 3 calendar days after each meeting.
 - .3 Make revisions as directed by Departmental Representative.
 - .4 Departmental Representative will advise whether submission of minutes by Email is acceptable. Decision will be based on compatibility of software among participants.

1.6 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 specs 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 work of various trades and distribute to all affected parties including structural trade.
 - .1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
 - .2 Coordination drawings to identify all building elements, services 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 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

1.2 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of testing laboratory except as follows:
 - .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 conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
 - .6 Additional tests specified in the following paragraph.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

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Part 2 **Products (NOT APPLICABLE)**

Part 3 **Execution (NOT APPLICABLE)**

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four five days in advance of meeting date to Departmental Representative.
- .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 five days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .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 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representatives, 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 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
 - .5 Delivery schedule of specified equipment in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

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- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Departmental Representative 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 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.

1.3 PROGRESS MEETINGS

- .1 During course of Work and four weeks prior to project completion, schedule progress meetings monthly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum five days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five 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.

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Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

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

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

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- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.4 MASTER PLAN

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

1.5 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Interior Architecture (Walls, Floors and Ceiling).
 - .6 Electrical modifications.
 - .7 Testing and Commissioning.
 - .8 Supplied equipment long delivery items.

1.6 PROJECT SCHEDULE REPORTING

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

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1.7 PROJECT MEETINGS

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

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 77 00 – Closeout Procedures

1.2 SUBMITTAL GENERAL REQUIREMENTS

- .1 Submit to Departmental Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.
- .2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with work until relevant submissions have been reviewed.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units, provide soft converted values.
- .6 Review submittals prior to submission. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and coordinated with requirements of Work and Contract Documents.
- .7 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.
- .8 Verify field measurements and affected adjacent Work are coordinated.
- .9 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .10 Contractor's responsibility for errors, omissions or deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .11 Submittal format: paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.
- .12 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.

- .13 Keep one reviewed copy of each submittal document on site for duration of Work.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.
- .2 Shop Drawing Quantities: submit sufficient copies required by the General Contractor and sub-contractors plus 3 copies which will be retained by Departmental Representative.
- .1 Ensure sufficient copies are submitted to enable one complete set to be included in each of the maintenance manuals specified in 01 78 00.
- .3 Shop Drawings Format:
- .1 Opaque white prints or photocopies of original drawings or standard drawings modified to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm.
- .2 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project.
- .3 Non or poorly legible drawings, photocopies or facsimiles will not be accepted and returned not reviewed.
- .4 Shop Drawings Content:
- .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work have been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.
- .2 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.
- .3 Delete information not applicable to project on all submittals.
- .5 Allow 14 calendar days for Departmental Representative's review of each submission.
- .6 Adjustments or corrections made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.
- .7 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If shop drawings are rejected and noted to be resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.

- .8 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.
- .9 Accompany each submission with transmittal letter containing:
 - .1 Date.
 - .2 Project title and project number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .10 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and project number.
 - .3 Name and address of:
 - .4 Subcontractor.
 - .5 Supplier.
 - .6 Manufacturer.
- .11 Contractor's stamp, signed by Contractor's authorized Representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .12 Cross references to particular details of contract drawings and specifications section number for which shop drawing submission addresses.
- .13 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .14 After Departmental Representative's review, distribute copies.
- .15 The review of shop drawings by the Departmental Representative or by an authorized Consultant or designate is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same, and

such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of the construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

- .1 Submit for review samples as specified in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples to Departmental Representative's office or to other address as directed. Do not drop off samples at construction site except for pre-approved circumstances previously approved by Departmental Representative.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments will result in a cost increase to the Contract notify Departmental Representative in writing prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Section 01 35 29 Health and Safety Requirements

1.2 REFERENCES

- .1 National Fire Code 2015.
- .2 National Building Code 2015.
- .3 CAN/CSA-W117.2, "Safety in Welding, Cutting and Allied Processes."
- .4 Applicable OHS legislation

1.3 DEFINITIONS

- .1 Hot Work defined as:
 - .1 Welding work
 - .2 Cutting of materials by use of torch or other open flame devices
 - .3 Grinding with equipment which produces sparks.
 - .4 Use of open flame torches such as for roofing work.

1.4 SUBMITTALS

- .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.
- .2 Submit in accordance with Section 01 33 00.

1.5 FIRE SAFETY REQUIREMENTS

- .1 Implement and follow fire safety measures during Work. Comply with following:
 - .1 National Fire Code of Canada, 2015.
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
 - .3 National Building Code of Canada, 2015.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.6 HOT WORK AUTHORIZATION

- .1 Obtain Departmental Representative's written "Authorization to Proceed" before

- conducting any form of Hot Work on site.
- .2 Hot works shall be performed only by personnel trained in the safe use of equipment in conformance with this Section
 - .3 To obtain authorization submit to Departmental Representative:
 - .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
 - .2 Description of the type and frequency of Hot Work required.
 - .3 Sample Hot Work Permit to be used.
 - .4 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
 - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
 - .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
 - .5 Requirement for individual authorization will be based on:
 - .1 Nature or phasing of work;
 - .2 Risk to Facility operations;
 - .3 Quantity of various trades needing to perform hot work on project or;
 - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
 - .6 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.
 - .7 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Departmental Representative's directives in this regard.

1.7 HOT WORK PROCEDURES

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Hot Work Procedures to include:
 - .1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29.
 - .2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.
 - .3 Permit required for each Hot Work event.

- .4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the HotWork.
- .5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
- .6 Site specific rules and procedures in force at the site as provided by the Facility Manager.
- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.
- .4 Procedures shall clearly establish responsibilities of:
 - .1 Worker performing hot work,
 - .2 Person issuing the Hot Work Permit,
 - .3 Fire Safety Watcher,
 - .4 Subcontractor(s) and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.8 HOT WORK PERMIT

- .1 Hot Work Permit to include the following:
 - .1 Project name and project number;
 - .2 Building name and specific room or area where hot work will be performed;
 - .3 Date of issue;
 - .4 Description of hot work type needed;
 - .5 Special precautions to be followed, including type of fire extinguisher needed;
 - .6 Name and signature of permit issuer.
 - .7 Name of worker to which the permit is issued.
 - .8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
 - .9 Worker's signature with time/date of hot work completion.
 - .10 Stipulated time period of safety watch.
 - .11 Fire Safety Watcher's signature with time/date.
- .2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.
- .3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.9 FIRE PROTECTION AND ALARMSYSTEMS

- .1 Fire protection and alarm systems shall not be:

- .1 Obstructed.
- .2 Shut-off, unless approved by Departmental Representative.
- .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.
- .3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.10 DOCUMENTS ON SITE

- .1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.
- .2 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Section 01 35 29 - Health and Safety Requirements

1.2 REFERENCES

- .1 CSA C22.1-21, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
- .2 CAN/CSA C22.3 No.6-13 - Overhead Systems.
- .3 CSA/CSA C22.3 No.6-13 - Underground Systems.
- .4 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .5 Part IX De-Energization and Lockout as per NL Occupational Health and Safety Regulations.

1.3 DEFINITIONS

- .1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
- .2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated.
- .3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
- .4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
- .5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
- .6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is

dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.4 COMPLIANCE REQUIREMENTS

- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
 - .1 Canadian Electrical Code, current edition.
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
 - .3 Regulations and code of practise as applicable to mechanical equipment or other machinery being de-energized.
 - .4 Procedures specified herein.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply.

1.5 SUBMITTALS

- .1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00. Submit within 14 calendar days of acceptance of bid.

1.6 ISOLATION OF EXISTING SERVICES

- .1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.
- .2 To obtain authorization, submit to Departmental Representative the following documentation:
 - .1 Written request to isolate the particular service or facility and;
 - .2 Copy of Contractor's Lockout Procedures.
- .3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:
 - .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
 - .2 Where no form exist, make written request indicating:
 - .1 The equipment, system or service to be isolated and it's location;
 - .2 Duration of isolation period (ie: start time & date and completion time & date).
 - .3 Voltage of service feed to system or equipment being isolated.
 - .4 Name of person making the request.
- .4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorization to proceed with the work.

- .1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.
- .5 Conduct safe, orderly shutdown of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.
- .6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.
- .7 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.
- .8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.

1.8 LOCKOUT

- .1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.
- .2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.
- .3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout its sources of energy.
- .4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
 - .1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.
 - .2 Duties of person managing the permit system to include:
 - .3 Issuance of permits and lockout tags to workers.
 - .4 Determining permit duration.
 - .5 Maintaining record of permits and tags issued.
 - .6 Making a Request for Isolation to Departmental Representative when required as specified above.
 - .7 Designating a Safety Watcher, when one is required based on type of work.
 - .8 Ensuring equipment or facility has been properly isolated.
 - .9 Collecting and safekeeping lockout tags returned by workers as a record of the event.
- .5 Clearly establish, describe and allocate responsibilities of:
 - .1 Workers.

- .2 Person managing the lockout permit system.
- .3 Safety Watcher.
- .4 Subcontractor(s) and General Contractor.
- .6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
 - .1 Incorporate site specific rules and procedures in force at site as provided by Facility Manager through the Departmental Representative.
 - .2 Clearly label the document as being the Lockout procedures applicable to work of this contract.
- .7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .8 Use industry standard lockout tags.
- .9 Provide appropriate safety grounding and guards as required.

1.9 CONFORMANCE

- .1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance. Products

1.10 DOCUMENTS ON SITE

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.
- .3 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

Part 2 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

1.1 RELATED SECTIONS

- .1 Section 01 35 24: Special Procedures on Fire Safety Requirements.
- .2 Section 01 35 25: Special Procedures on Lockout Requirements.

1.2 DEFINITIONS

- .1 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.
- .2 Medical Aid Injury: any 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.
- .3 PPE: personal protective equipment.
- .4 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.
- .5 Incident - occurrence, condition, or situation arising in the course of work that resulted in or could have resulted in injury, illness, property damage, environmental issues or fatality.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit Site-Specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within 7 work days of notification of Bid Acceptance. Allow for 5-10 days for Department review and recommendations prior to the commencement of work. 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 or Provincial authorities within 24 hours after the visit to the Departmental Rep.
 - .7 Submit copies of incident reports (incident, accident, injury, near-miss, fire, explosion, chemical spill or damage to property occurring at the work site) 24 hours after the event to the Departmental Representative.
 - .8 Submit documented plans as prescribed through Public Health requirements, directions, orders and declarations. Include industry best practices when preparing the plan and revise/update accordingly and in a timely manner as per Public Health requirements and recommended industry best practices. (Covid 19 – a source of advice can be found in the link below

<https://www.cca-acc.com/wp-content/uploads/2020/06/CCA-COVID-19-Standardized-Protocols-for-All-Canadian-Construction-Sites-05-26-20.pdf>

1.4 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.
- .2 Comply with Provincial/Federal Public Health requirements, directions, and declarations. Prepare documented plans as prescribed by Public Health and/or industry best practices in consultation with the Departmental Representative.
- .3 Canadian Standards Association (CSA):
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .4 Observe construction safety measures of:
 - .1 NBC 2015, Division B, Part 8.
 - .2 NFC 2015,
 - .3 Municipal by-laws and ordinances.
- .5 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .6 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

- .7 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.5 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.

1.6 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 Departmental Representative 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 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. Maintain records of such orientation on site for review and audit by the DR or their authorized inspector.
- .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. [Provide security guard where adequate protection cannot be achieved by other means].

1.7 PROTECTION

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- .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.

1.8 FILING OF NOTICE

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

1.9 PERMITS

- .1 Is responsible to pay all fees to obtain all permits required to conduct the work.
- .2 Is responsible to provide authorities with plans and information for acceptance certificates and the costs arising from same.
- .3 Is responsible to provide inspections certificates as evidence that work conforms to requirements of Authorities Having Jurisdiction (AHJ)
- .4 Post permits, licenses and compliance certificates, specified in section 01 10 10, at Work Site.
- .5 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.

1.10 HAZARD ASSESSMENTS

- .1 Perform a documented site specific Project hazard assessment for the Work. Include any site issues / hazards / concerns identified arising from the site visit that must be considered.
- .2 Carryout initial assessment prior to commencement of Work with further assessments completed and documented 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 Share information and controls identified from original and updated Project hazard assessments with project workers. Record this information sharing complete with names and dates. Keep documentation on site for entire duration of the Work.

1.11 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 substances or contaminated building materials:
 - .1 Existing hazardous substances or contaminated building materials.
 - .2 Asbestos. Known to exist at Firewall locations.
 - .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.

1.12 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 pre shift tool box talks with the crew and conduct regularly scheduled (minimum bi-weekly) safety meetings during the Work.
- .3 Keep documents on site for review by DR or their authorized rep.

1.13 HEALTH AND SAFETY PLAN

- .1 Prior to commencement of Work, develop a written Site Specific Safety Plan for the Project. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
- .2 Items to include in the Site Specific Safety Plan;
 - a/ Name of the designated Site Safety Rep showing proof of his/her competence and reporting relationship in Contractor's company. This person is expected to be on site during all work execution.
 - b/ A copy of a current WCB Letter of Good Standing
 - c/ Details as to how WHMIS 2015 / GHS will be managed on site.
 - d/ Details as to how the Project work areas will be delineated /protected from other areas of the premises (fences, signs). Must be project specific.
 - e/ Details as to how Safety orientations will be managed. Include a summary of what topics are covered in the safety orientation described in this section?

- f/ A copy of a Notice of Project that was sent to the Provincial OHS regulator.
 - g/ Project site specific hazard assessment.
 - h/ Details as to how tool box and safety meetings will be held and recorded.
 - i/ An organizational chart illustrating supervision and subs (if available) that are assigned to this Project?
 - j/ On-site Emergency Response Plans that cover all potential emergency situations that could arise. This should harmonize with the facility if possible. Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors. (key personnel)
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
 - k/ List of critical work activities which have a risk of endangering health and safety of Facility users and/or others.
 - l/ Details as to how the subcontractors documented safety program will be reviewed and managed prior to allowing them to work on site.
 - m/ Details as to how the site safety inspection program will be managed. Include frequency, assignment of responsibility as well as standard inspection form to be used.
 - n/ Basic PPE requirements as well as specialized PPE requirements; minimum being hard hat, safety footwear, safety glasses and high vis vest.
 - o/ General safety rules as well as the disciplinary protocols to be taken for noncompliance.
 - p/ Details as to how Incident investigations will be managed. Include procedure and incident form.
- .3 Post copy of the Plan, and updates, prominently on Work Site.

1.14 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.

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- .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 weekly basis. Record deficiencies and remedial action taken.
 - .2 Follow-up and ensure corrective measures are taken.
 - .3 Share inspection reports with crews / subs

- .6 Cooperate with the Facility's and / or the PSPC Occupational Health and Safety representative.

- .7 Keep inspection reports and supervision related documentation on site.

1.15 TRAINING

- .1 Use only skilled workers on Work Site who are deemed competent and are trained in occupational health and safety procedures and practices pertinent to their assigned task.

- .2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

- .3 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

- .4 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.

1.16 MINIMUM SITE SAFETY RULES

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; the company shall establish rules to govern the conduct and actions of their employees. These rules should leave no room for discretion and argument. The rules must be enforced and action should be taken every time a rule is violated.

- .2 Brief persons of the documented disciplinary protocols to be taken for noncompliance. Post rules on site.

1.17 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.

1.18 INCIDENT REPORTING

- .1 Investigate and report all incidents to Departmental Representative.
- .2 Notify the Departmental representative as soon as reasonably practicable following the incident.
- .3 Ensure the Authority having Jurisdiction is notified as prescribed by applicable legislation.
- .4 Submit report in writing.

1.19 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 publicly accessible locations.

1.22 CONFINED SPACES

- .1 Abide by occupational health and safety regulations regarding work in confined spaces.
- .2 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
 - .1 Obtain permit from Facility Manager.
 - .2 Keep copy of permit issued.

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- .3 Safety for Inspectors:
 - .1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
 - .2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.

1.23 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.

1.24 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in a conspicuous location on the Work Site in accordance with Acts and Regulations of Province. See local legislation for specifics.
- .2 Post other documents as specified herein, including:
 - .1 Site specific Health and Safety Plan.
 - .2 WHMIS data sheets.

END OF SECTION

Part 1 General**1.1 FIRE DEPARTMENT BRIEFING**

- .1 Departmental Representative will co-ordinate arrangements for contractor for briefing on Fire Safety at pre-work conference by Fire Chief before work is commenced.

1.2 REPORTING FIRES

- .1 Know location of nearest fire alarm box and telephone, including emergency phone number.
- .2 Report immediately fire incidents to Fire Department as follows:
 - .1 Activate nearest fire alarm box; or
 - .2 Telephone.
- .3 Person activating fire alarm box will remain at box to direct Fire Department to scene of fire.
- .4 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.

1.3 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

- .1 Fire protection and alarm system will not be:
 - .1 Obstructed;
 - .2 Shut-off; and
 - .3 Left inactive at end of working day or shift without authorization from Fire Chief.
- .2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Fire Chief.

1.4 FIRE EXTINGUISHERS

- .1 Supply fire extinguishers, as scaled by Fire Chief, necessary to protect work in progress and contractor's physical plant on site.

1.5 BLOCKAGE OF ROADWAYS

- .1 Advise Fire Chief of work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by Fire Chief, erecting of barricades and digging of trenches.

1.6 SMOKING PRECAUTIONS

- .1 Observe smoking regulations.

1.7 RUBBISH AND WASTE MATERIALS

- .1 Keep rubbish and waste materials at minimum quantities.
- .2 Burning of rubbish is prohibited.
- .3 Removal:
 - .1 Remove rubbish from work site at end of work day or shift or as directed.
- .4 Storage:
 - .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
 - .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove specified.

1.8 FLAMMABLE AND COMBUSTIBLE LIQUIDS

- .1 Handling, storage and use of flammable and combustible liquids governed by current National Fire Code of Canada (2015 ed.).
- .2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of Fire Chief.
- .3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.
- .4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.
- .5 Do not use flammable liquids having flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.
- .6 Store flammable and combustible waste liquids, for disposal, in approved containers located in safe ventilated area. Keep quantities minimum and Fire Department is to be notified when disposal is required.

1.9 HAZARDOUS SUBSTANCES

- .1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, in accordance with National Fire Code of Canada (2015 ed.).
- .2 Obtain from Fire Chief a "Hot Work" permit for work involving welding, burning or use of blowtorches and salamanders, in buildings or facilities.
- .3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of Fire Chief. Contractors are responsible for providing fire watch service for work on scale established and in conjunction with Fire Chief at pre-work conference.

- .4 Provide ventilation where flammable liquids, such as lacquers or urethanes are used, eliminate sources of ignition. Inform Fire Chief prior to and at cessation of such work.

1.10 QUESTIONS AND/OR CLARIFICATION

- .1 Direct questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

1.11 FIRE INSPECTION

- .1 Co-ordinate site inspections by Fire Chief through Departmental Representative.
- .2 Allow Fire Chief unrestricted access to work site.
- .3 Co-operate with Fire Chief during routine fire safety inspection of work site.
- .4 Immediately remedy unsafe fire situations observed by Fire Chief.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 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 HAZARDOUSE 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.

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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.
- .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 and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.8 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.

- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial & federal environmental regulations.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or 100 m of spawning beds.
- .8 Do not refuel any type of equipment within 100 meters of a water body. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

1.9 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 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.
- .5 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.
- .6 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 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

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Part 1 General**1.1 GENERAL**

- .1 Due to nature of this Facility, and client operations therein, security regulations pertaining to site will be in place during the work resulting in need for:
 - .1 Control and limit movement of construction workers inside building.
 - .2 Escort and continuous supervision of workers by security personnel.
 - .3 Workers must undergo a security clearance process.
 - .4 Specific rules and regulations as specified in this section and as directed by the Departmental Representative to be stringently followed.
- .2 It is the Contractor's responsibility to:
 - .1 Submit necessary documentation required and obtain security clearances for all workers.
 - .2 Become familiar with and abide by security rules and regulations.
 - .3 Brief all workers and subcontractors in respect of the security regulations and ensure that they abide by all rules and directives.
- .3 The Departmental Representative will coordinate a pre-construction meeting between Contractor, Facility Management and Security Personnel who will provide details and directives on control and movement on site.
- .4 Any infraction of site security regulations on the part of the Contractor, members of work force or any Subcontractor in his employ, could result in:
 - .1 Financial penalties in the form of progress payment reduction or holdback assessments being levied against the Contractor and;
 - .2 Demand immediate removal of offending party from the site.

1.2 SECURITY PERSONNEL

- .1 Obtain and pay for the services of security personnel, employed by the Canadian Corps of Commissionaires to provide escort and security supervision of all workers during off hours work of this contract.
- .2 Commissionaires employed on this project must have a current Enhanced Security Clearance status issued by PWGSC.
- .3 Provide minimum of 1 Commissionaire to be on site at all times when work is carried out during off hours, having the following responsibilities:
 - .1 Limit movement of workers to within the boundaries established by the Departmental Representative for each work phase.
 - .2 Maintain security control list of workers authorized to be on site as determined by Contractor and the Departmental Representative.
 - .3 Manage the distribution and control of worker ID tags.
 - .4 Escort workers who need to circulate on site beyond the established boundaries of work, including the corridors, stairwells and elevators used for access to and from work areas.
 - .5 Escort and supervise short-term visitors who need access to the work site such as for material deliveries or to conduct inspections.

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- .4 Provide additional commissionaires when required to perform supervision or escort function as may be needed due to Contractor's work operations in order that no worker is left unsupervised beyond main lobby.
- .5 Ensure Commissionaire(s) are present on site for entire off hours work shift including work breaks and time period after work shifts until all workers have left site.
- .6 Commissionaire must stay within the actual construction area and provide surveillance of all workers ensuring that security rules and requirements are obeyed and to limit movement to approved work areas of site.
- .7 Commissionaire must also escort workers from approved entrance doors and work area(s).
- .8 Escort and supervision of workers by Commissionaire is required at all times during Facility off hours.
- .9 Commissionaire shall report directly to the Departmental Representative and to the Facility security personnel and ensure that site security directives are obeyed by all workers.
 - .1 Empower Commissionaire with authority to remove any worker deemed non-compliant with security directives.
- .10 Ensure Commissionaire is fitted, and wears approved safety hard hat, safety footwear and other personnel protective equipment appropriate to work in accordance with applicable Occupational Health and Safety requirements specified.

1.3 SECURITY CLEARANCE REQUIREMENTS

- .1 All persons employed by Contractor or by subcontractors who will be working on site must undergo the following check:
 - .1 Apply for PWGSC personnel security clearance screening and obtain a Reliability Status.
- .2 Persons who do not have security clearance, as specified above, will not be allowed to circulate freely in restricted areas of site and must be under constant escort and surveillance by security personnel.
 - .1 Restricted area defined as: all interior areas of building beyond the public lobby.

1.4 SECURITY CLEARANCE APPLICATION

- .1 Within one (1) week following notification of acceptance of bid, submit application form for all workers who require security clearance.
 - .1 Make applications for all workers as one submission to facilitate processing and minimize delays.
- .2 To obtain the PWGSC Reliability Status clearance, the following information is required for

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each applicant:

- .1 "Personnel Screening, Consent and Authorization Form" (Form No. TBS/SCT #330-23E (Rev. 2006/02) completed by each worker, <http://www.tbs-sct.gc.ca/tbsf-fsct/330-23a-eng.asp>
 - .2 Contractor Declaration to Public Works & Government Services Canada (PWGSC Security Form "A") completed by Contractor attesting to having conducted an assessment of reliability for each worker applicant verifying employment and other reference data.
 - .3 Proof of applicant's identity consisting of a picture ID such as a Canadian Motor Vehicle Driver's License or other similar official ID card.
 - .4 Proof of applicant's Canadian citizenship consisting of a provincial issued birth certificate, baptismal certificate, citizenship certificate or passport.
 - .5 Include both forms along with a clear legible photocopy of the citizenship and identity documents submitted as one complete package for each applicant.
- .3 A sample of the abovementioned forms are included at the end of this Specification Manual for reference purposes and marked Appendix "A".
- .1 Information on filling out form TBS/SCT # 330-23E are as follows:
 - .1 Part A: by PWGSC Project Manager.
 - .2 Part B: by applicant. Provide full name, including middle name (not simply and initial). Ensure addresses listed represent last five (5) years of residence and each address is fully completed including postal code. Print data in clear, legible manner.
 - .3 Part C: only boxes 1, 2 & 3 need to be completed, requiring applicant's initials. Name of official requested here can be PWGSC Project Manager or PWGSC Regional Security Agent provided that Contractor submits the PWGSC Security Form "A" specified above.
 - .4 Fingerprinting will also be required if:
 - .1 Applicant indicates that he/she has a previous criminal conviction on Form #330-23E;
 - .2 Security clearance search process results in two persons with same identity and/or same name/initials, such as having the same name.
 - .5 Departmental Representative will provide details as to what procedures, location and time where workers must go should fingerprints are needed.
 - .6 Processing Time:

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- .1 The PWGSC departmental processing time to obtain all security clearances is estimated to be 4 weeks from date of receipt of required documentation.
- .2 To avoid delays, prepare worker documentation as soon as possible, however submit documentation for each applicant as one package and send information for entire workforce as one submission. Ensure forms are fully completed, signed and that all information and photo identification is clear and legible.
- .3 Be aware that processing time for applicants with criminal convictions may take longer and could extend to 6 months duration.
 - .1 An interview with such applicant may also be required as part of the security clearance process.
- .7 Facilitate workers security clearance process as follows:
 - .1 Prepare comprehensive list of workers who will require security clearance throughout project, including those of subcontractors.
 - .2 Provide copy of list to Departmental Representative.
 - .3 Coordinate and expedite submission of various subcontractors.
 - .4 Brief and assist applicants in preparing and submitting documentation.
 - .5 Review documentation of each applicant for completeness before submission.
 - .6 Have each worker keep a copy of their completed application form in case the initial submission gets lost.
 - .7 Submit documentation in an organized manner with transmittal letter clearly identifying project for which worker clearance is required.
- .8 Send submission(s) directly to Departmental Representative or to the approved mailing address as directed by Departmental Representative.
- .9 Persons who have not been successful in obtaining security clearance, upon documentation review by PWGSC, will not be allowed further access on site and cannot work on project any longer.

1.5 SECURITY PASSES

- .1 Visitor or worker ID Tags are required for all personnel requiring access inside the building beyond the main public lobby.
- .2 ID Tags will be provided by the Facility Security, issued to Contractor for distribution to authorized workers which shall also be placed on the Security Control List specified below.
- .3 All persons while on site, must wear the ID Tag issued to him regardless of daytime or nighttime work.

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- .4 Be responsible to obtain ID Tags before work commences, including those required by subcontractors, and continually control their distribution and use by workers. Submit request for tags as early as possible prior to commencement of work.
- .5 For the duration of this contract, anyone not in possession of the ID Tag will not be allowed access on site.
- .6 At end of project, return to Departmental Representative all tags issued to workers and to subcontractors.
- .7 Immediately report any lost, stolen or destroyed ID Tags to the Departmental Representative.

1.6 SECURITY CONTROL LIST

- .1 Provide a list of employee names from workforce and from subcontractors who will be present at site during the course of work.
- .2 List to include each person's name, address and telephone number.
- .3 Submit copy of list to Departmental Representative and to Security Commissionaire for control of workers.
- .4 Update list as work progresses.
- .5 Ensure that each worker can provide proof of identity upon demand, when requested by Facility's Security Personnel, Departmental Representative or by Facility Management.

1.7 BUILDING ACCESS

- .1 Keys and door security access cards necessary for access to restricted areas may be issued at the discretion of the Building Manager and the Departmental Representative. Follow all instructions in regards to use, care and disposition of all keys so issued.
- .2 Keys and security access cards given to the Commissionaire for his sole possession, as determined by Departmental Representative, shall not under any circumstances be given to any worker or subcontractor.
- .3 Do not, under any circumstances, make or allow workers to make duplicates of keys issued.
- .4 At end of project, return to Departmental Representative all keys issued.
- .5 Immediately report to Departmental Representative any lost, stolen or destroyed keys and door security access cards.

1.8 SITE SECURITY

- .1 Where work of this contract requires use of a permanently locked door, it is Contractor's responsibility to ensure that door is unlocked and locked after each use or provide a

competent security guard, posted at door, when door must remain open for an elongated period of time during a particular workshift.

- .1 Notify Building Security when security doors will be used and stringently follow all directives to ensure building security is effectively maintained.
- .2 Where work of this contract results in removal of doors or walls (providing security to the exterior or between spaces and suites), erect temporary security hoarding over openings constructed in such a way to provide the same degree of security as doors/walls removed.
- .3 When work must be carried out during Off Hours or beyond the work hours previously agreed upon at start of work, provide notice within 48 hours beforehand to minimize impact on Facility's security and tenant operations.
- .4 Off Hours are defined in section 01 14 10.

END OF SECTION

Part 1 General**1.1 REFERENCES AND CODES**

- .1 Perform Work in accordance with National Building Code of Canada (NBCC), 2015 edition, including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.

1.3 BUILDING SMOKING ENVIRONMENT

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

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 35 29 – Health and Safety Requirements

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.
 - .1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00.
- .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 specified in Clause 1.3.4 above.
- .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 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.

1.6 MOCK-UPS

- .1 Prepare mock-ups of certain 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 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 SITE ACCESS AND PARKING**

- .1 The Contractor is advised that while parking facilities for his workers and subcontractors will be on property, such parking facilities may be remote from the actual site of the work. In any case, follow all instructions from the Departmental Representative in regards to parking facilities.
- .2 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 BUILDING ACCESS

- .1 Use only access doors, and circulation routes within building as designated by Departmental Representative to access interior work.

1.3 MATERIAL STORAGE

Material storage space on site does not exist. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

1.4 PEDESTRIAN WALKWAYS AND HOARDING

- .1 Ensure maximum safety and security to facility users during the course of work.
- .2 Be responsible for and provide temporary 2.4 metre high plywood construction hoarding when work is adjacent to exterior sidewalks and circulation routes used by facility employees and public.
- .3 Maintain access and egress to building entrances and fire exits designated by Departmental Representative to remain in use. Provide enclosed walkways when work is adjacent to such doors as follows:
 - .1 Erect wooden pedestrian walkway complete with roof and side covers.
 - .2 Install walkways as soon as work is in the vicinity of entrance and exit doors and poses a potential danger to facility users.
 - .3 Construct to approximate size of 2.0 metre wide x 2.1 metre high x length as required to fully clear danger zone.
 - .4 Provide signage and lighting.
 - .5 Submit details of walkway size, location, layout and construction to Departmental Representative beforehand and obtain approval.
- .4 Adequately frame and brace hoarding to resist wind, and other weather or site conditions.

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- .5 Erect such protective devices during Facility's non-operational off hour periods.
- .6 Obtain Departmental Representative's concurrence prior to removal of hoarding and walkways.

1.5 INTERIOR HOARDING

- .1 Erect hoarding inside building to isolate construction areas and protect occupants and public for duration of work.
- .2 Construct hoarding as follows:
 - .1 Height: 2.4 metres or to underside of floor or roof above.
 - .2 Framing type: 38x89, spaced at 600mm o.c.
 - .3 Covering: 12.7 mm thick plywood sheathing, finished and painted.
 - .4 Sealed to abutting surfaces.
 - .5 Access Doors: wood pedestrian door dust tight and lockable.
 - .6 Scribed to underside and profile of ceiling or floor/roof deck above.

1.6 INTERIOR DUST CONTROL AND DUST BARRIERS

- .1 Control creation and spread of dust and dirt to building interior and in particular to areas within premises still under use by occupants.
- .2 Develop and implement a dust control plan, addressing effective measures to carry out work with least amount of dust being created and propagated.
 - .1 Carefully evaluate the type of work to be undertaken and the physical layout of each work area on site.
 - .2 Provide specifically tailored strategy for each work area.
 - .3 Pre-determine location and placement of dust barriers to confine resulting dust to immediate work area.
 - .4 Inform Departmental Representative of the proposed dust control measures to be followed at each work area and for each major dust generating activities. Obtain Departmental Representative's approval before proceeding with work.
- .3 Dust control plan to incorporate as a minimum the following dust protection and cleaning requirements:
 - .1 Erect dustproof partitions completely around work area to fully isolate construction from other parts of the building.
 - .2 Construct dust partitions as follows:
 - .1 Use 10 mm polyethylene installed and sealed tightly to abutting walls, ceilings and floor with continuous duct tape along all edges and seams. Support in position with 38 x 89 wood framing at 400 mm o.c. Locate seams only at framing members and overlap sheeting by minimum of 150 mm.
 - .2 Use 12 mm thick plywood installed to steel stud framing spaced at 400 o.c. for areas located in public and corridors in use by occupants.

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- .3 Erect from floor to underside of ceiling above, sheeting applied to occupied side of partition. Install polyethylene for remainder of partition height to underside of floor/roof deck above.
 - .4 Scribe, cut and fit sheathing tight to shape of structural steel, deck profile and to other obstructions in ceiling space and abutting walls.
 - .5 Use compressible neoprene gaskets around perimeter of partition and at all protrusions to achieve airtight construction.
 - .6 Provide a "dust tight" and lockable access door(s) within dust partition or between rooms for worker entry into work area. This is of particular importance for situations where excessive dust will be generated.
 - .7 Provide additional dust barriers, placed tightly to underside of the floor/roof deck above, in locations where existing walls are used as part of the dust barrier system but simply terminate at the finished ceiling level resulting in an open space above, or other similar condition, permitting dust to migrate beyond the construction areas.
 - .8 Make all dust barriers airtight, effectively blocking and stopping all dust migration.
 - .9 Inspect dust barriers at various intervals during each work shift. Immediately fix tears, unsealed edges and maintain barriers effectively sealed for the entire work duration.
 - .10 Shut down existing ventilation system feeding construction space or disconnect and seal-off supply and return air ducts to stop dust from contaminating other areas.
 - .11 Immediately clean areas in use by occupants and public contaminated by work.
 - .12 Vacuum carpets, wash floors and walls. Remove accumulated dust from all surfaces. Clean and remove smears, scuffs and marks.
- .4 Meager attempts at controlling dust will not be tolerated. Failure to provide effective dust control during work and to perform satisfactory cleaning thereafter will result in Departmental Representative to proceed and obtain a separate cleaning service agency to perform cleaning to tenant's satisfaction with cost for such services being charged against this Contract in the form of financial holdbacks.
 - .5 Obtain Departmental Representative's approval before erecting any dust partitions simply to underside of finish ceiling.
 - .6 Construction of dust barriers, enclosures and placement of temporary protective devices to be performed during Facility non-operational off-hour periods.

1.7 SANITARY FACILITIES

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

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- .3 Sanitary facilities are available at the site and may be used by Contractor's work force. Make arrangements for the use of such facilities through the Departmental Representative.

1.8 POWER

- .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- .2 Supply and install all temporary facilities for power such as pole lines, meter socket, underground cables, etc., as required and to approval of local power supply authority.
- .3 Power supply is available and will be provided for construction usage at no cost.
 - .1 Make arrangements for the use of such services through the Departmental Representative.
 - .2 Departmental Representative will designate and approve each location of existing power source to which connections can be made to obtain temporary power service.
 - .3 Connect to existing power supply in accordance with Canadian Electrical Code.
- .4 Provide and maintain temporary lighting to conduct work. Ensure illumination level is not less than 162lx in all locations.
- .5 Electrical power and lighting systems installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used over period of 3 months.

1.9 WATER SUPPLY

- .1 Water supply is available in existing building and will be provided for construction usage at no cost. Make arrangements for the use and transportation of such services to work area through the Departmental Representative.

1.10 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:

Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to 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.

1.11 REMOVAL OF TEMPORARY FACILITIES

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

Part 2 NOT USED

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 7 days of written request by Departmental Representative, 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 Departmental Representative 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 Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period following procedures indicated in the Instructions to Bidders.
- .3 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 Departmental Representative in writing of any conflict between these specifications and manufacturers instructions, so that Departmental Representative will designate which document is to be followed.

1.5 AVAILABILITY

- .1 Immediately notify Departmental Representative 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.
- .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 Departmental Representative. See section on Health and Safety Requirements in this regard.

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1.8 FASTENINGS - EQUIPMENT

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

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 cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Immediately remove damaged or rejected materials from site.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 NOT USED****END OF SECTION**

Part 1 General**1.1 REFERENCES**

- .1 Departmental Representative's identification of existing survey control points and property limits.

1.2 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.3 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .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 of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.4 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.5 SUBMITTALS

- .1 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

1.6 SUBSURFACE CONDITIONS

- .1 Promptly notify Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

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- .2 After prompt investigation, should Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Departmental Representative 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 Departmental Representative 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 to complete Work.

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- .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 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
 - .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
 - .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
 - .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
 - .9 Restore work with new products in accordance with requirements of Contract Documents.
 - .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material.
 - .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 Separate waste materials for 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

- .1 Not Used.

END OF SECTION

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Part 1 General**1.1 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including other than that caused by Departmental Representative or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

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- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Departmental Representative or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fittings, walls, and floors and cladding.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Inspect finishes, fittings and equipment and ensure specified workmanship and operation.
- .12 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .15 Sweep and wash clean paved areas where used by the Contractor.
- .16 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .17 Clean roofs, downspouts, and drainage systems.
- .18 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

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 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Waste Management Plan and Goals.
- .2 Accomplish maximum control of solid construction waste.
- .3 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Cost/Revenue Analysis Work plan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.
- .3 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .4 Inert Fill: inert waste - exclusively asphalt and concrete.
- .5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .11 Separate Condition: refers to waste sorted into individual types.
- .12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

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- .13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.
- .14 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.3 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
 - .1 Waste Audit.
 - .2 Waste Reduction Work plan.
 - .3 Material Source Separation Plan.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up :
 - .1 Submit 2 copies of Materials Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
 - .1 Failure to submit could result in hold back of final payment.
 - .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.
 - .3 For each material reused, sold or recycled from project, include amount in tonnes quantities by number, type and size of items and the destination.
 - .4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.5 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.

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- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 - .1 Transport to approved and authorized recycling facility.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
 - .1 Ship materials to site operating under Certificate of Approval.
 - .2 Materials must be immediately separated into required categories for reuse or recycling.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.7 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.

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- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.8 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by existing facility.

1.9 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.

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- .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable, recyclable materials is not permitted.
- .3 Construction Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Metal	100	
Cardboard	100	

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Schedule E - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Newfoundland	Department of Environment and Climate Change, Confederation Building, Box 8700 St. John's, NL A1B 4J6	ECCInfo@gov.nl.ca	709-729-1930
	Environment and Climate Change Canada Toronto ON	1-800-668-6767 enviroinfo@ec.gc.ca	

END OF SECTION

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Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 78 00 - Closeout Submittals.

1.2 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 equipment and systems complete with submission of test reports.
 - .9 Commissioning of equipment and systems specified.
- .4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

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Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

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Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 79 00 - Demonstration and Training.

1.2 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 Drawings". Label and place Contractor's signature and date.
 - .4 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
 - .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 Ceiling and floorelevations;
 - .5 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;
 - .6 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
 - .7 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
 - .8 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.

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- .5 As-built Specifications: legibly mark in red each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
 - .2 Changes made by Addenda and Change Orders.
 - .3 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. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.3 REVIEWED SHOP DRAWINGS

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

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.
- .3 Number of copies required:
 - .1 Upon review and acceptance by Departmental Representative, submit 3 final hardcopies.
 - .2 One complete copy on external drive or flash drive, organized in folders to match binder organization, including numbering of products and submittals by specification section number.
- .4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Certificate of Substantial Performance of the work.
- .5 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.

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- .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.
- .6 Manual Contents:
- .1 Cover sheet containing:
 - .2 Date submitted.
 - .3 Project title, location and project number.
 - .4 Names and addresses of Contractor, and all Sub-contractors.
 - .5 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
 - .6 List of maintenance materials.
 - .7 List of spare parts.
 - .8 List of special tools.
 - .9 Original or certified copy of warranties and product guarantees.
 - .10 Copy of approval documents and certificates issued by Inspection Authorities.
 - .11 Copy of reports and test results performed by Contractor as specified.
 - .12 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.
- .7 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.

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- .3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.
- .8 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 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour coded wiring diagrams.
 - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
 - .5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - .6 Servicing and lubrication schedule, and list of lubricants required.
 - .7 Manufacturer's printed operation and maintenance instructions.
 - .8 Sequence of operation by controls manufacturer.
 - .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - .10 Provide installed control diagrams by controls manufacturer.
 - .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
 - .12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .13 Include test and balancing reports.
 - .14 Additional requirements as specified in individual specification sections.
- .9 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 Additional Requirements: as specified in individual specifications sections.

1.6 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.

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- .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 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

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Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 78 00 - Closeout Submittals.

1.2 DESCRIPTION

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Departmental Representative prior to date of final inspection.
- .2 Departmental Representative will provide a list of Owner's personnel to receive instructions,
- .3 Cooperate with Departmental Representative in coordinating time and attendance of Owner's personnel with manufacturer's training Representative(s).

1.3 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 Departmental Representative, 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.

1.4 SUBMITTALS

- .1 Submit schedule of time, date and complete list of equipment and systems for which demonstration and training sessions will be provided. Submit schedule a minimum of 2 weeks prior to designate dates, for Departmental Representative's 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.

1.5 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.

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1.6 PREPARATION

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

1.7 DEMONSTRATION AND INSTRUCTIONS

- .1 Include the following items within the demonstration and training:
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each of equipment.
 - .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
 - .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.
 - .5 Provide other specific training and instructions as specified in trade sections

1.8 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 Products**2.1 NOT USED**

- .1 Not used.

Part 3 Execution**3.1 NOT USED**

- .1 Not used.

END OF SECTION

PART 1 **GENERAL****1.1** **SUMMARY**

- .1 This Section includes requirements for the following:
 - .1 Demolition and removal of selected portions of exterior building components or structural elements.
 - .2 Repair procedures for selective demolition operations.

1.2 **RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 35 43 - Environmental Procedures
- .4 Section 01 52 00 – Construction Facilities
- .5 Section 01 56 00 - Temporary Barriers and Enclosures
- .6 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .7 Section 02 41 13 – Selective Site Demolition
- .8 Section 02 41 16 – Structure Demolition
- .9 Section 02 41 19.16 – Selective Interior Demolition
- .10 Section 02 41 99 – Demolition for Minor Works

1.3 **REFERENCES**

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A10.8 2011, Safety Requirements for Scaffolding
- .2 Canadian Standards Association (CSA).
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures
 - .2 CSA Z797 – Code of Practice for Access Scaffold.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA)
 - .2 Canadian Environmental Protection Act (CEPA)
- .4 National Fire Protection Association (NFPA)

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- .1 NFPA 241-13, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .5 National Research Council Canada (NRC)
 - .1 National Building Code of Canada (NBC)

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordinate selective demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements.
- .2 Coordinate with Owner's Representative for the material ownership as follows:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property. Demolished materials shall become Contractor's property and shall be removed from Project site.
- .3 Convene pre-demolition meeting one week prior to beginning work of this section to confirm extent of salvaged and demolished materials; and to review Contractor's demolition plan.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Provide the following submittals before starting any work of this Section.
- .3 Submit schedule of demolition activities indicating:
 - .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
 - .2 Coordinate with Owner's ongoing site operations and limit the number of interruptions during regular business hours.
 - .3 Interruption of utility services.
 - .4 Coordination for shutoff, capping, and continuation of utility services.
 - .5 Locations of temporary partitions and means of egress, including for others affected by selective demolition operations.
 - .6 Coordination with Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- .4 Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction.
- .5 Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including but not limited to, lists of completed projects with project names and addresses, for work of similar complexity and extent.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.7 EXISTING CONDITIONS

- .1 Owner will occupy portions of building immediately adjacent to selective demolition area:
 - .1 Conduct selective demolition so that Owner's operations will not be disrupted.
 - .2 Provide not less than three (3) days' notice to Owner's Representative of activities that will affect Owner's operations.
- .2 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities and as follows:
 - .1 Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- .3 Should material resembling spray or trowel applied asbestos or any other designated substance be encountered in course of demolition, stop work, take preventative measures, and notify Owner's Representative immediately. Do not proceed until written instructions have been received.
- .4 Structures to be demolished to be based on their condition on date that tender is accepted.
- .5 Storage or sale of removed items or materials on site will not be permitted.
- .6 Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- .7 Maintain fire protection facilities in service during selective demolition operations.

PART 2 PRODUCTS**2.1 MATERIALS**

- .1 Design temporary support structures required for demolition work and underpinning and other foundation supports necessary for the project using a qualified professional engineer registered and licensed in province of the Work.
 - .1 Design, specifications, work procedures, or other records created for this work to be submitted to the Owner's Representative for review prior to commencement of work.
- .2 Use repair materials identical to existing materials:
 - .1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually fully match existing adjacent surfaces possible.

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- .2 Use materials whose installed performance equal or surpasses that of existing materials.
- .3 Comply with material and installation requirements specified in individual technical specification Sections.

PART 3 **EXECUTION**

3.1 **EXAMINATION**

- .1 Verify that utilities have been de-energized, disconnected and capped.
- .2 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .3 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
- .4 Perform engineering survey of 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 structure demolition operations.
- .5 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 **UTILITY SERVICES**

- .1 Coordinate existing services indicated to remain and protect them against damage during selective demolition operations
- .2 Locate, identify, de-energize, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - .1 Arrange to shut off affected utilities with utility companies.
 - .2 If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - .3 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - .4 Coordinate with Mechanical and Electrical Divisions for shutting off, disconnecting, removing, and sealing or capping utilities.
 - .5 Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 **PREPARATION**

- .1 Do work in accordance with 01 35 29.06 – Health and Safety Requirements.

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- .2 Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
 - .1 Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner's Representative. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - .2 Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - .3 Protect existing site improvements, appurtenances, and landscaping to remain.
- .3 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain in accordance with Sections 01 51 00 and 01 56 00, and as follows:
 - .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, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - .4 Cover and protect furniture, furnishings, and equipment that have not been removed.
- .4 Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities in accordance with Sections 01 51 00 and 01 56 00.
 - .1 Provide temporary weather tight enclosure for building exterior.
 - .2 Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures.
 - .3 Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- .5 Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise in accordance with Section 01 51 00.
- .6 Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction 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 POLLUTION CONTROLS

- .1 Provide temporary enclosures or other suitable methods reviewed and accepted by the Owner's Representative to limit spread of dust and dirt. Comply with governing environmental protection regulations, and as limited below:
 - .1 Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
 - .2 Wet mop floors to eliminate tracking of dirt, wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- .2 Remove and transport debris to 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 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.

3.5 SELECTIVE DEMOLITION

- .1 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 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - .2 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.
 - .3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - .4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain fire watch and portable fire suppression devices during flame cutting operations.
 - .1 A hot work permit is required to be completed by the contractor and submitted to the Owner's Representative for review for hot works such as welding, cutting or open flames or sparks, prior to the commencement of such work each day.
 - .5 Maintain adequate ventilation when using cutting torches.
 - .6 Remove decayed, vermin infested, or otherwise dangerous or unsuitable materials and promptly dispose of off site.

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- .7 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- .8 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .9 Dispose of demolished items and materials promptly.
- .10 Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- .2 Comply with Owner's Representative's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
- .3 Existing Items to Remain:
 - .1 Protect construction indicated to remain against damage and soiling during selective demolition.
 - .2 Items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- .4 Masonry:
 - .1 Demolish in small sections.
 - .2 Cut masonry at junctures with construction to remain, using power driven saw, then remove masonry between saw cuts.
- .5 Roofing: Remove no more existing roofing than can be covered in one day by new roofing. Refer to applicable Division 7 Section for new roofing requirements.

3.6 CLOSEOUT ACTIVITIES

- .1 Promptly repair damage to adjacent construction caused by selective demolition operations and as follows:
 - .1 Patch to produce surfaces suitable for new materials where repairs to existing surfaces are required,
 - .2 Completely fill holes and depressions in remaining existing masonry walls remain with an approved masonry patching material applied according to manufacturer's written recommendations.
 - .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- .2 Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre):
 - .1 Promptly dispose of demolished materials.
 - .2 Do not allow demolished materials to accumulate onsite.
 - .3 Do not burn demolished materials.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA International)
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.2 SUBMITTALS

- .1 Submit shop drawings in accordance with Sections 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.
- .2 Before proceeding with demolition of load bearing walls or of other walls and where required by authority having jurisdiction submit for review by Departmental Representative shoring and underpinning drawings prepared by qualified professional engineer registered or licensed in the Province of Newfoundland and Labrador, showing proposed method.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.4 SITE CONDITIONS

- .1 Review "Designated Substance Report" and take precautions to protect environment.
- .2 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Do not proceed until written instructions have been received from Departmental Representative.
- .3 Notify Departmental Representative before disrupting building access or services.

Part 2 Products**2.1 NOT USED**

- .1 Not used.

Part 3 Execution**3.1 PREPARATION**

- .1 Inspect building site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

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- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
 - .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
 - .2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PROTECTION

- .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.
- .2 Keep noise, dust, and inconvenience to occupants to minimum.
- .3 Protect building systems, services and equipment.
- .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .5 Do Work in accordance with Section 01 35 29 - Health and Safety Requirements .

3.3 SALVAGE

- .1 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .2 Remove items to be reused, store as directed by Departmental Representative and re-install under appropriate section of specification.

3.4 DEMOLITION

- .1 Remove parts of existing building to permit new construction. Sort materials into appropriate piles for reuse.
- .2 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.
- .3 Very heavy work such as Jack Hammering and concrete cutting shall be scheduled before and after working hours were possible. Coordinate schedule with Departmental Representative.

3.5 DISPOSAL

- .1 Dispose of removed materials, to appropriate recycling facilities reuse facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.6 PARTIAL DEMOLITION

- .1 The building and site will maintain regular occupancy during construction. Coordinate activities to be carried out under this section with the Department Representative to accommodate occupant and occupant work areas.

END OF SECTION

Part 1 General**1.1 REFERENCES:**

- .1 Definitions:
 - .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .2 Reference Standards:
 - .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
 - .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c.34).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
 - .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2021, 4th Edition, Paints, Coatings, Stains, and Sealers.
 - .2 GS-36-2013, 2.1 Edition, Adhesives for Commercial Use.
 - .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .5 National Research Council Canada Institute for Research in Construction (NRC-IRC)
 - .1 National Fire Code of Canada-2015.

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 hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29– Health and Safety Requirements, 01 35 43 – Environmental Procedures to Departmental Representative for each hazardous material required prior to bringing hazardous materials on site.

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- .3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
 - .1 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada (2015 ed.) requirements.
 - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
 - .5 Transfer of flammable and combustible liquids is prohibited within buildings.
 - .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices. Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
 - .7 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
 - .8 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
 - .9 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.

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- .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
- .6 Store Hazardous materials and wastes in secure storage area with controlled access. Maintain clear egress from storage area.
- .7 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
- .8 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
- .9 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .10 When hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Departmental Representative.
 - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept Subject material.
 - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
 - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
- .10 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .11 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.
- .5 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.
- .6 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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Part 2 Products**2.1 MATERIALS****.1 Description:**

- .1 Bring on site only quantities hazardous material required to perform work.
- .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
- .3 Sustainability Characteristics:
 - .1 Adhesives and Sealants in accordance with Section 07 92 00 - Joint Sealant.
 - .1 Adhesives and Sealants: maximum VOC limit to SCAQMD Rule 1168 to GS-36.
 - .2 Primers Paints Coatings in accordance with manufacturer's recommendations for surface conditions and Section 09 91 23 - Interior Painting, and 09 91 23.01 - Interior Re-Painting
 - .1 Primer: maximum VOC limit 250 g/L to GS-11 to SCAQMD Rule 1113.
 - .2 Paints: maximum VOC limit 50 g/L to GS-11 to SCAQMD Rule 1113.
 - .3 Coatings: maximum VOC limit to SCAQMD Rule 1113.

Part 3 Execution**3.1 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
 - .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
 - .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
 - .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
 - .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
 - .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
 - .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

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- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
- .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 06 05 73 - Wood Treatment.
- .2 Section 07 52 00 - Modified Bituminous Membrane Roofing
- .3 Section 07 61 13 - Metal Roofing Systems
- .4 Section 07 91 00 - Joint Sealants.
- .5 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C36/C36M, Specification for Gypsum Wallboard.
 - .2 ASTM C578, Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - .3 ASTM D5055, Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .3 CAN/CGSB-71.26, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .4 Canadian Standards Association (CSA)
 - .1 CSA A123.2, Asphalt Coated Roofing Sheets.
 - .2 CAN/CSA-A247, Insulating Fiberboard.
 - .3 CSA B111, Wire Nails, Spikes and Staples.
 - .4 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .5 CSA O112 Series, CSA Standards for Wood Adhesives.
 - .6 CSA O121, Douglas Fir Plywood.
 - .7 CAN/CSA-O141, Softwood Lumber.
 - .8 CSA O151, Canadian Softwood Plywood.
 - .9 CAN/CSA-O325.0, Construction Sheathing.
- .5 National Lumber Grades Authority (NLGA)

- .1 Standard Grading Rules for Canadian Lumber.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.4 SUBMITTALS

- .1 Submit proof of compatibility between Alkaline Copper Quaternary (ACQ) pressure treated lumber and fasteners to be utilized.

PART 2 PRODUCTS

2.1 FRAMING AND LUMBER MATERIALS

- .1 Lumber: unless specified otherwise, softwood, No. 1 or No. 2 grade, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Framing and board lumber: in accordance with NBC.
- .3 Furring, blocking, nailing strips, grounds, rough bucks, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
- .4 Pressure treated material to be Alkaline Copper Quaternary (ACQ).

2.2 PANEL MATERIALS

- .1 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .4 Extruded polystyrene sheathing: to Section 07 21 13 – Board Insulation.
- .5 Gypsum sheathing: to 09 21 16 – Gypsum Board Assemblies.

2.3 ACCESSORIES

- .1 Polyethylene film: to Section 07 26 00 – Vapour Retarders.

- .2 Sill Gasket Air seal: closed cell polyurethane or polyethylene.
- .3 Sealants: Section 07 91 00 – Joint Sealants.
- .4 General purpose adhesive: to CSA O112 Series.
- .5 Nails, spikes and staples: to CSA B111.
- .6 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .7 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

2.4 FASTENER FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work, interior highly humid areas and fire-retardant treated lumber.

2.5 WOOD PRESERVATIVE

- .1 Surface-applied wood preservative: clear or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat all material as indicated as follows:
 - .1 Wood fascia, backing, curbs, nailers.
 - .2 Wood furring for sheeting/siding on outside surface of exterior masonry concrete walls.
 - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.2 INSTALLATION

- .1 Comply with requirements of NBC latest edition, Part 9 supplemented by following paragraphs.

- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with "crown-edge" up.
- .5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .7 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
 - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .8 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .9 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners. Coordinate height of roof curbs with Section 07 52 00 – Modified Bituminous Membrane Roofing.
- .10 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

3.4 SCHEDULES

- .1 Electrical equipment mounting boards:
 - .1 Plywood, DFP or CSP grade, (G1S) select square edge 16 mm thick, unless otherwise indicated.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 07 26 00 - Vapour Retarders.
- .3 Section 07 52 00 - Modified Bituminous Membrane Roofing

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Gas Association (CGA)
 - .1 CAN/CGA-B149.1, Natural Gas and Propane Installation Code Handbook.
 - .2 CAN/CGA-B149.2, Propane Storage and Handling Code.
- .3 Canadian General Standards Board (CGSB).
 - .1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .4 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .3 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Provide certificate of quality compliance from insulation manufacturer.

PART 2 PRODUCTS**2.1 INSULATION**

- .1 Type 4, extruded polystyrene (XPS): to CAN/ULC S701 where indicated on drawings, for use on the exterior face of concrete foundation walls, where exposed above grade to have concrete facing. Concrete finish area to extend below grade as per the drawings.
- .2 Type 4, extruded polystyrene (XPS): to CAN/ULC S701 where indicated on drawings, for use on the exterior face of concrete foundation walls below grade without concrete facing.
 - .1 Thermal Resistance: Long term aged RSI value of 0.88/25 mm.
 - .2 Board Size: 610 x 2440 mm, thickness as indicated on Drawings.
 - .3 Water Absorption: to ASTM D2842, 0.9% by volume maximum.
 - .4 Edges: Ship lapped
 - .5 Water Vapour Permeance: to ASTM E96, 90 ng/Pas m²
- .3 Insulation types not indicated on drawings to be extruded polystyrene (XPS), Type 2 as a default.
- .4 Roof Insulation: Section 07 52 00 - Modified Bituminous Membrane Roofing

2.2 ADHESIVE

- .1 Adhesive suitable for bonding polystyrene and mineral fibre insulation to substrates as indicated.

2.3 ACCESSORIES

- .1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
- .2 Joint sealing tape: air resistant pressure sensitive adhesive tape as recommended by insulation manufacturer.

PART 3 EXECUTION**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions and data sheets.

3.2 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.

- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Owner's Representative.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Owner's Representative in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID INSULATION INSTALLATION

- .1 Apply adhesive to insulation board in accordance with manufacturer's recommendations.
- .2 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.
- .3 In addition to adhesive install mineral fibre insulation boards with insulation clips and disk, 2 per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.
- .4 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.
- .5 Carefully inspect for continuity of air barrier prior to placement of insulation.

3.5 PERIMETER FOUNDATION INSULATION

- .1 Exterior application: extend boards vertically below bottom of finish floor slab to depth as indicated on drawings. Mechanically fasten concrete faced insulation above grade with

purpose made clips and fasteners approved by the manufacturer. Install insulation below grade with adhesive.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 07 26 00 - Vapour Retarders
- .2 Section 07 27 00.01 - Air Barriers - Descriptive or Proprietary.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)
- .3 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.
 - .4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.3 TEST REPORTS

- .1 Submit test reports, verifying qualities of foam sealant meet or exceed requirements of this specification.
- .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.4 QUALITY ASSURANCE

- .1 Applicators to conform to CUFCA Quality Assurance Program.

1.5 SAFETY REQUIREMENTS

- .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .1 Workers must wear gloves, respirators, dust masks, eye protection, protective clothing when applying foam sealant.
 - .2 Workers must not eat, drink or smoke while applying foam sealant.

1.6 PROTECTION

- .1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

- .2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.
- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .5 Dispose of waste foam sealant daily in location designated by Owner's Representative and decontaminate empty drums in accordance with foam sealant manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Apply foam sealant only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Low expanding, one-component, polyurethane foam sealant, curing to a semi-rigid, closed cell urethane foam providing a RSI of 0.9 per 25.4 mm. To meet the following physical properties:
 - .1 Density: 25.7 kg/m³
 - .2 Compressive Strength Parallel @ 10%: 69-96 psi
 - .3 Tensile Strength: 103 psi
 - .4 Water Vapour Transmission: 5.97 perms
 - .5 Flame Spread: 20
 - .6 Smoke Development: 70

PART 3 EXECUTION**3.1 APPLICATION**

- .1 Apply foam sealant to clean surfaces in accordance manufacturer's printed instructions. Surfaces to be free of dust, dirt, oil and other foreign materials.
- .2 Cover surfaces not intended to be foamed.
- .3 Apply foam sealant to perimeter of openings indicated and to thickness as recommended by manufacturer. Trim excess cured foam from finished area.
- .4 Cover exposed urethane foam sealants to protect from adverse affects from ultraviolet light (sunlight).
- .5 General:
 - .1 Install materials in accordance with manufacturer's instructions.
 - .2 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within specified ranges.
 - .3 In low humidity, mist area with water to aid cure of one component sealant.
 - .4 Paint or cover foam exposed to ultra-violet radiation.
 - .5 Avoid overfilling restricted spaces.
 - .6 Use one component foam sealant for cracks or openings less than 6mm thickness. Use two component foam sealant for gap thicknesses in the 6mm to 75mm range, and for voids and hidden cavities.
 - .7 Install foam sealant in accordance with authorities having jurisdiction and all other applicable regulations pertaining to sealing materials.
- .6 Commercial:
 - .1 To provide continuity with the air/vapour barrier, seal the following areas:
 - .2 Various roof locations including penetrations of all kinds and roof to fascia junctions.
 - .3 Roof/wall junctions.
 - .4 Window and door frames at columns and wall framing.
 - .5 All penetrations made vertically through roof or horizontally through walls.
 - .6 At all floor and wall junctions.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 06 10 00 – Rough Carpentry.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
- .3 Underwriters Laboratories Canada (ULC)
 - .1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and datasheet and include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Limitations.
- .2 Quality assurance submittals:
 - .1 Certificates: submit certificates certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.
- .3 Provide submittals in accordance with section 01 35 21 – LEED Requirements.

1.4 MOCK-UPS

- .1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.
- .2 Mock-up will be used to judge workmanship, substrate preparation, and material application.
- .3 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with vapour barrier work.

- .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

PART 2 PRODUCTS

2.1 SHEET VAPOUR RETARDER

- .1 Polyethylene film - walls: to CAN/CGSB-51.34, 0.15mm thick with a water vapour permeance of not greater than $45 \text{ ng}/(\text{P}\cdot\text{s}\cdot\text{m}^2)$, flame spread rating of less than 150 to CAN/ULC S102.
- .2 Polyethylene film – under slab on grade: to CAN/CGSB-51.34, 0.25mm thick with a water vapour permeance of not greater than $45 \text{ ng}/(\text{P}\cdot\text{s}\cdot\text{m}^2)$, flame spread rating of less than 150 to CAN/ULC S102

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
- .2 Sealant: compatible with vapour retarder, recommended by vapour retarder manufacturer, to Section 07 92 00 - Joint Sealants.
- .3 Staples: minimum 6 mm leg.
- .4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall prior to installation of gypsum board to form continuous retarder.
- .3 Install Sheet Vapour retarder below concrete slab on grade to form continuous retarder.
- .4 Use sheets of largest practical size to minimize joints.
- .5 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Install staples through lapped sheets at sealant bead into wood substrate.
 - .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Install staples through lapped sheets at sealant bead into wood substrate.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
 - .1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.6 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL**1.1 SECTION INCLUDES**

- .1 Materials and installation methods providing primary air/vapour barrier materials and assemblies.
- .2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations.

1.2 RELATED SECTIONS

- .1 Section 07 92 00 - Joint Sealants.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13M, Sealing Compound, One Component, Elastomeric Chemical Curing.
 - .2 CAN/CGSB-19.18M, Sealing Compound, One Component, Silicone Base Solvent Curing.
 - .3 CAN/CGSB-19.24M, Multi-Component, Chemical Curing Sealing Compound.
 - .4 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .2 National Building Code of Canada (NBCC)
 - .1 NBCC, Part 5 - Environmental Separation
- .3 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- .1 Submit manufacturer's product data sheets.
- .2 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials and installation.
- .2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.
- .3 Manufacturer's Representative:

- .1 Inspect substrate prior to commencement of work, twice during application of membrane and at commissioning to ascertain that air/vapour barrier system is installed according to membrane manufacturer's most current published specifications and details.
- .2 Provide technical assistance to applicator and assist where required in correct installation of membrane.
- .3 Provide certificate of quality compliance upon satisfactory completion of installation.
- .4 Maintain one copy of documents on site.

1.6 QUALIFICATIONS

- .1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.
- .2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

1.7 MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct typical panel, 10 m² minimum, incorporating wall openings, insulation, building corner condition, illustrating materials interface and seals.
- .3 Locate where directed.
- .4 Mock-up may remain as part of the Work.
- .5 Allow 48 h for inspection of mock-up by Owner's Representative before proceeding with air/vapour barrier Work.

1.8 PRE- INSTALLATION MEETINGS

- .1 Convene one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.

- .3 Avoid spillage. Immediately notify Owner's Representative if spillage occurs and start clean up procedures.
- .4 Clean spills and leave area as it was prior to spill.
- .5 Store roll materials on end in original packaging.
- .6 Store primers at temperatures of 5°C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

1.10 PROJECT ENVIRONMENTAL REQUIREMENTS

- .1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.11 WARRANTY

- .1 Provide a written warranty for work of this section from Manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship for ten (10) years respectively.
- .2 Include coverage of installed sealant and sheet materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion or do not cure.

PART 2 PRODUCTS

2.1 SHEET MEMBRANE AIR BARRIER (TYPE 1)

- .1 Sheet Seal: self-adhering reinforced modified polyolefin tri-laminate sheet air barrier membrane for wall construction, specifically designed to be water resistant and vapor permeable. Adhesive backing to be protected with release film.
 - .1 Membrane Physical Properties:
 - .1 Air leakage: <0.004 CFM/ft² @ 1.57 lbs/ft² [<0.02L/s/m² @ 75Pa] when tested in accordance with ASTM E2178.
 - .2 Water Vapor Permeance: 33 perms to ASTM E96, Method B.
 - .3 Resistance to Water Penetration: Pass ICC-ES AC 38.
 - .4 Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM D 1970 modified.

- .5 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 5 and Smoke Development Classification of 125.
 - .6 Basis Weight: Minimum 100 gm/m², when tested in accordance with TAPPI Test Method T-410.
 - .7 Average Dry Breaking Force: 55 lbF MD, and 48 lbF CD per ASTM D 5034.
 - .8 Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC-ES AC 48.
 - .9 Standard of Acceptance: Blueskin VP 100 by Bakor/Henry Company or Air Shield SMP.
- .2 Accessories:
- .1 Self-adhering membrane for window sill pan flashings; an SBS modified bitumen, self-adhering sheet membrane which is integrally laminated to a polyethylene film. Membrane shall have the following physical properties:
 - .1 Membrane Thickness: 0.040 inches (40 mils).
 - .2 Low temperature flexibility: -30 degrees F to ASTM D146.
 - .3 Elongation: 200% minimum to ASTM D412-modified.
 - .4 Minimum Puncture Resistance 40lbf to ASTM E154.
 - .5 Lap Peel Strength 10 lbf/in width to ASTM D903 180° bend.
 - .6 Standard of Acceptance: Blueskin SA or LT by Bakor/Henry Company.
 - .2 Self-adhering membrane for all window jambs, headers, door openings, inside and outside corners, and other transitions shall be pre-cut self-adhering reinforced modified polyolefin tri-laminate sheet air barrier membrane for wall construction, specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:
 - .1 Air leakage: <0.004 CFM/ft² @ 1.57 lbs/ft² [<0.02L/s/m² @ 75Pa] when tested in accordance with ASTM E2178.
 - .2 Water Vapor Permeance: 33 perms to ASTM E96, Method B.
 - .3 Resistance to Water Penetration: Pass ICC-ES AC 38.
 - .4 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 5 and Smoke Development Classification of 125.
 - .5 Basis Weight: Minimum 100 gm/m², when tested in accordance with TAPPI Test Method T-410.
 - .6 Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC-ES AC 48.

- .7 Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D 5034.
- .8 Standard of Acceptance: BlueskinVP Window and Door Flashing by Bakor/Henry Company.

2.2 SEALANTS

- .1 Sealants in accordance with Section 07 92 00 - Joint Sealants.
- .2 Primer: recommended by sealant manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section.
- .2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.
- .3 Report any unsatisfactory conditions to the Owner's Representative in writing.
- .4 Do not start work until deficiencies have been corrected.

3.2 PREPARATION

- .1 Remove loose or foreign matter which might impair adhesion of materials.
- .2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure all substrates are free of surface moisture prior to application of membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION (SHEET MEMBRANE)

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Over the properly prepared substrate surface apply primer with a roller and allow drying to a tacky surface. Prime only area to be covered in a working day. Reprime area not covered with membrane within 24 hours.

- .3 After primer has dried, using a hand roller firmly press the entire membrane onto the primed surface, in strict accordance with membrane manufacturer's written instructions.
- .4 Ensure complete coverage of and adhesion of all substrates to receive membrane, including wall penetrations. Co-operate with other trades to ensure continuity of membrane.
- .5 Overlap membrane 50mm and carefully smooth out with a roller to ensure full continuous bond throughout overlaps without fissures or fishmouthing.
- .6 It is important that a complete air seal be achieved. Be responsible for the completeness of membrane wherever it is not specifically detailed. Consult with Owner's Representative if there is any doubt as to the integrity of membrane, whether detailed or not.
- .7 In order to ensure a complete seal, seal membrane to all penetrations in an approved manner.
- .8 Apply a trowelled bead of mastic to all terminations of the membrane at the end of a day's work.
- .9 Do not enclose membrane until it has been inspected and approved by Owner's Representative. Inform Owner's Representative 48 hours prior to required inspection.

3.4 PROTECTION OF WORK

- .1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished Work is protected from climatic conditions.

3.5 INSPECTION

- .1 Carefully inspect for continuity of air barrier prior to placement of insulation.
- .2 Repair all deficient membrane areas.
- .3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of air barrier membrane extending 50mm in all directions from edge of damaged areas.
- .4 Cover membrane immediately after Owner's Representative's inspection to protect from damage by other trades.

3.6 TESTING

- .1 Air leakage testing as directed by Owner's Representative and paid for by contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.
- .2 Testing will be witnessed by Owner's Representative and test reports will be signed by tester, site representative and contractor.
- .3 Inform Owner's Representative 48 hours prior to required testing.

END OF SECTION

PART 1 **GENERAL****1.1** **RELATED SECTIONS**

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 06 10 53 – Miscellaneous Rough Carpentry.
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .4 Section 07 92 00 - Joint Sealants.

1.2 **REFERENCES**

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A135.6, Hardboard Siding Standard.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3, Hardboard.
 - .2 CAN/CGSB-11.5, Hardboard, Precoated, Factory Finished, for Exterior Cladding.
 - .3 CAN/CGSB-11.6, Installation of Exterior Hardboard Cladding.
 - .4 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA O121, Douglas Fir Plywood.
 - .3 CSA O151, Canadian Softwood Plywood.
- .4 National Lumber Grading Authority (NLGA)
 - .1 NLGA Standard Grading Rules for Canadian Lumber.

1.3 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
 - .2 Submit copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's for caulking materials during application and curing.
- .2 Submit duplicate 300 x 300 mm size profile specified.
- .3 Submit manufacturer's installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Deliver siding suitable packaged to avoid damage to finished surface.
- .3 Store in an unheated structure or under cover until application. Siding may be temporarily stored outside if at least 4 inches off the ground and on a flat, well drained surface protected from moisture with a shed pack or waterproof cover.

1.5 QUALITY ASSURANCE

- .1 Provide Certificate of Quality Compliance from siding manufacturer upon completion of fabrication.
- .2 Provide Certificate of Quality Compliance upon satisfactory completion of installation.

1.6 WARRANTY

- .1 Warranty Period: 15 years against cracking, peeling, blistering, chalking, loss of coating adhesion, yellowing with age, and no damage caused by rinse cleaning surface dirt. Warranty to commence at date of Substantial Completion.

PART 2 PRODUCTS**2.1 MATERIALS**

- .1 Clapboard Siding: Western Lodgepole Pine or Eastern Spruce, NO. 1 select or better grade, factory finished, saw texture, , free of large knots, knot holes, or loose knots: maximum moisture content of 12 percent. Size:
 - .1 **Type 1:** Profile: Traditional V-groove. Overall size: 136mm wide X 17mm thick. Installed Horizontally. Colour: per Arch drawings paint, factory-applied.
 - .2 **Type 2:** Profile: Traditional V-groove. Overall size: 136mm wide X 17mm thick. Installed Vertically. Colour: per Arch drawings paint, factory-applied.
- .2 Moldings and trim: Western Lodgepole Pine or Eastern Spruce, NO. 1 select or better grade, factory finished, saw texture, free of large knots, knot holes, or loose knots: maximum moisture content of 12 percent. Size: Standard, as indicated on drawings
- .3 Strapping: Softwood Lumber, kiln dried treated with brush applied wood preservative.
- .4 Nails: Mechanically galvanized, to securely and rigidly retain the work permanently in position, pre-finished baked on coating to match siding finish. Nails 64 mm long for siding and 83 mm for trims.
- .5 Exterior Sheathing Membrane: CAN/CGSB 51.32M, Spun bonded olefin sheeting, conforming to ASTM D3575, single ply laminated and coated.

- .6 Sealant: Thermoplastic type, color to exactly match siding.
- .7 Concealed Flashings: 0.4 mm thick galvanized steel.

2.2 FINISH

- .1 Pre-finish color: Semi-transparent stain and solid colour, refer to Architectural Drawings, for exact colors.
 - .1 Standard color or custom color from manufacturer's range of colors.
 - .2 Touch-Up Paint: Semi-transparent stain and solid colour, same type and color as siding.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that substrate surfaces and wall openings are ready to receive work.

3.2 PREPARATION

- .1 Install metal flashing continuous over window and other openings. Secure in position tight to wall sheathing.
- .2 Install one layer of sheathing membrane horizontally on sheathed walls, weather lap edges and ends minimum 150 mm. Stagger vertical laps. Tape all edges.
- .3 Install strapping at 460 mm o.c.
- .4 Install siding starter strips, behind first row of siding.
- .5 Apply sealant around window, door and other opening frames.

3.3 INSTALLATION

- .1 Install siding and accessories to manufacturer's instructions.
- .2 Install screen at bottom of bottom course.
- .3 Install siding for natural watershed.
- .4 Install siding in straight aligned lengths, set level with plumb ends and corners.
- .5 Install in full lengths cut to suit opening width, no butt end joints.
- .6 Miter external and internal corners: Install corner strips, closures, frieze boards skirt boards and trim.
- .7 Fasten siding securely to wood batten substrate.

- .8 Face nail 25 mm from bottom of siding board directly into wood strapping, drive nail head just flush with siding surface; do not indent or penetrate painted coating.

3.4 INCIDENTAL SITE FINISHING

- .1 Carefully set exposed nails flush with siding coating.
- .2 Touch-up blemished siding materials to match siding color.

3.5 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .3 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 1177/C1177M, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB - 37.5, Cutback Asphalt Plastic Cement.
 - .2 CGSB 37-GP-19M, Cement, Plastic, Cutback Tar.
 - .3 CAN/CGSB-37.29, Rubber- Asphalt Sealing Compound.
 - .4 CGSB 37-GP-56M Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .5 CAN/CGSB - 51.33 Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .4 Canadian Roofing Contractor's Association (CRCA)
 - .1 CRCA Specification Manual.
- .5 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S704, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 SHOP DRAWINGS

- .1 Indicate in shop drawings flashings, control joints, tapered insulation details, roof drains and all required roofing materials.
- .2 Provide layout for tapered insulation as indicated on the architectural roof plan with respect to the roof drain locations.
- .3 Submit fastening pattern shop drawings.

1.4 STORAGE AND HANDLING

- .1 Store materials off-ground in weatherproof storage.
- .2 Store materials in upright position. Store membrane rolls with selvage edge up, store as per manufacturer's requirements to meet warranty.
- .3 Remove only in quantities required for same day use.
- .4 Place plywood runways over work to protect work and enable work flow.
- .5 Store sealants at +5°C minimum.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18°C for torch application, or to manufacturers' recommendations for mop application.
- .2 Minimum temperature for solvent-based adhesive is -5°C.
- .3 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.6 PROTECTION

- .1 Fire Extinguishers: maintain one stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 9 kg on roof per torch applicator, within 10 m of torch applicator.
- .2 Contractor to provide safety person on site at all times during the roofing process and shall remain on site two (2) hours after work has ceased or after torching has stopped. Safety person shall scan the perimeter and roof penetration details with a hand held infrared gun.

1.7 WARRANTY

- .1 Provide a written guarantee signed and issued in the name of The Owner by the Roofing System Manufacturer stating that roofing membrane is free from manufacturing defects and that the system will stay in place and remain leak proof for a period of ten (10) years from date of Substantial Certificate of Completion, subject to the standard limitations and conditions of the manufacturer.
- .2 Provide a written guarantee, signed and issued in the name of the Owner by the Contractor, stating that the roofing application has been performed in compliance with the plans and specifications, and for two (2) years from the date of Substantial Certificate of Completion, the Contractor shall repair, at no expense to the Owner, any defects which result of a failure to comply with the plans and specifications.

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- .3 Defective work shall include, but not limited to: leaking, wind uplift, delamination of roofing materials, reduction of thermal value due to moisture in insulation, crazing and ridging.
- .4 Warranty to be non-prorated.

1.8 COMPATIBILITY

- .1 Compatibility between components of roofing system is essential. Ensure that materials and components, as assembled in system, meet this requirement.

1.9 QUALITY ASSURANCE

- .1 Membrane: applied by applicator acceptable to Owner's Representative and approved by manufacturer for application of its products.
- .2 Applicators: minimum 5 years proven experience.
- .3 Manufacturer's representative:
 - .1 Inspect roofing system at the start of construction, midway and as required for commissioning. Additional inspections may be carried out at the discretion of the Roofing System Manufacturer.
 - .2 Provide technical assistance where required to correct installation of roofing system.
- .4 Submit laboratory test reports certifying compliance of bitumens and membranes with specification requirements.

1.10 MOCK-UP

- .1 Mock up to be 10 m² minimum size showing typical membrane lap joint, one inside and one outside corner parapet flashing. Insulation and fastening method, air/vapour barrier lap, gypsum board and fastening method and workmanship.
- .2 Allow 48 hours for inspection of mock-up by Owner's Representative before proceeding with roofing work.
- .3 Accepted mock up may form part of completed work.

PART 2 PRODUCTS

2.1 THERMAL BARRIER AND AIR/VAPOUR BARRIER

- .1 Thermal Barrier: Pre-primed glass mat faced gypsum panel non-asphaltic, highly filled proprietary heat-cured coating on one side, to ASTM C1177, 12.7 mm thick.

- .2 Air/Vapour Barrier: Self adhering peel and stick air/vapour barrier composed of Styrene-Butadiene-Styrene (SBS) modified bitumen reinforced with high density polyethylene film, anti slip surface, minimum thickness 1.0 mm.

2.2 INSULATION AND COVER BOARD COMPONENTS

- .1 For sloped roof decks or roof structures, provide uniform thickness rigid insulation.
- .2 For flat roof decks or roof structures, provide custom designed tapered insulation with minimum slope of 2.0 mm in 100 mm (2%). Taper insulation to drain, minimum RSI value at drain to be 3.21.
- .3 Expanded Polystyrene Insulation (EPS), Cover Board and Asphalt Recover Board:
 - .1 Expanded Polystyrene Insulation (EPS):
 - .1 To CAN/ULC-S701, Type 2, square edged.
 - .2 Insulation value thickness per cm based on values listed in the latest edition of NRC - Evaluation Listings.
 - .3 Provide two layers of insulation installed with staggered joints.
 - .2 Cover Board: Nonstructural, glass mat faced gypsum panel with water-resistant core to ASTM C1177, 12.7 mm thick for use with expanded polystyrene insulation.
 - .3 Asphalt Recover Board: Semi-rigid asphalt roofing substrate composed of mineral core between glass fibre mats, 1200 x 1500mm sheets, minimum thickness 6.0 mm. 1 layer required
- .4 Total assembly RSI value:
 - .1 Minimum average RSI value of assembly insulation components to be 7.0. Insulation assembly components to consist of thermal barrier, insulation and cover board.

2.3 BASE SHEET

- .1 Base Sheet: Base sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, non woven, polyester reinforcement, weighing 180 g/m².
 - .1 Type 2, fully adhered.
 - .2 Class C-plain surfaced.
 - .3 Grade heavy duty service.
 - .4 Top and bottom surfaces:
 - .1 Polyethylene/polyethylene.
 - .5 Base sheet membrane properties:
 - .1 Strain energy (longitudinal/transversal): 9.0/7.0 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 17.0/12.5 N/5 cm.
 - .3 Ultimate elongation (longitudinal/transversal): 60/65 %.

- .4 Tear resistance: 60 N.
- .5 Cold bending at -30 degrees C : no cracking.
- .6 Static puncture resistance: > 400.
- .7 Dimensional Stability: -0.3 / 0.3 %.

2.4 CAP SHEET

- .1 Cap sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, glass, polyester reinforcement, weighing 250 g/m².
 - .1 Type 1, fully adhered.
 - .2 Class A-granule surfaced.
 - .3 Grade heavy duty service.
 - .4 Bottom surface polyethylene.
 - .5 Colour to be light grey unless otherwise indicated.
 - .6 Cap sheet membrane properties:
 - .1 Strain energy (longitudinal/transversal): 13.0/10.0 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 25.0/16.0 kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): 60/65 %.
 - .4 Tear resistance: 80 N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Static puncture resistance: > 470.
 - .7 Dimensional Stability: -0.2 / 0.2 %.
- .2 Minimum total thickness if base sheet and cap sheet combined to be 5.8 mm. Cap sheet and base sheet to be of same manufacturer.
- .3 Install contrasting colour cap sheet, 2.0 m wide, along the entire perimeter of all roof sections. Contrasting colour cap sheet to be installed over light grey cap sheet. Colour to be as per Owner's Representative selection from manufacturer's standard colour range.

2.5 BASE SHEET FLASHING

- .1 To CGSB 37-GP-56M, Type 2, Class C, Grade 2, non-woven polyester reinforced 180g/m², self-adhesive membrane with polyethylene top face and release film under face.

2.6 SEALERS

- .1 Mastic made of synthetic rubbers, plasticized with bitumen and solvents with aluminum pigments to provide greater resistance to U.V.

2.7 PRIMERS

- .1 For self-adhesive membranes: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing resins used to prime porous and non-porous substrates such as

gypsum board, wood, concrete or metal to enhance the adhesion of self-adhesive membranes at temperatures above -10°C.

- .2 For heat welded membranes: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied membranes.

2.8 FASTENERS

- .1 Fasteners: minimum #14 mechanical fasteners made of case-hardened carbon steel with corrosion resistance coating, complying with FM standards. 75 mm diameter round or hexagon stress plates complying with CSA B35.3 and FM 4470 approval standards, diameter and lengths as required to suit total assembly thickness.
- .2 Roofing adhesive: single-component, moisture cured, solvent free polyurethane adhesive, dispensed from a portable disposable pre-pressurized container.

2.9 ROOF DRAINS

- .1 As per section 22 42 01 – Plumbing Specialties and Accessories, and per Mechanical drawings.

2.10 VENT STACK COVER

- .1 2-piece cap and body, insulated, spun aluminum insulated vent stack cover. Body and flashing to be one-piece, continuous spun aluminum. Size to suit pipe diameter.
- .2 Acceptable Manufacturer: Lexsoco Corporation Flash-Tite Standard Vent Stack Cover, or approved equal.”

PART 3 EXECUTION

3.1 WORKMANSHIP

- .1 Do roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual, except where specified otherwise.

3.2 PROTECTION

- .1 Cover walls and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Clean off drips and smears of bituminous material immediately.

- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected. Refer to Section 01 35 43 - Environmental Procedures for site drainage requirements.
- .5 Protect roof from traffic and damage.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.
- .7 Install insulation promptly to avoid possibility of condensation beneath vapour retarder.
- .8 Take necessary measures ensuring no penetration of the elements will occur to the building after commencement of work, including but not limited to water.
- .9 Only remove quantities of existing roofing material and install quantities of new roofing materials per day that can be covered with waterproofing membranes.

3.3 EXAMINATION ROOF DECKS

- .1 Examine roof decks and immediately inform Owner's Representative in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Decks are firm, straight, smooth, dry, and free of snow, ice or frost, and swept clean of dust and debris.
 - .2 Curbs have been built. Coordinate height of roof curbs with Section 06 10 00 – Rough Carpentry.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

3.4 EXPOSED MEMBRANE ROOFING APPLICATION (METAL DECK)

- .1 Air/Vapour Barrier:
 - .1 Place thermal barrier with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.
 - .2 Secure thermal barrier to metal deck using one (1) fastener per board, located at the centre of the board, fasteners to be FMRC approved.
 - .3 Fit butt edge joints in firm contact with one another.
 - .4 Prime all surfaces of thermal barrier to receive self-adhering modified bituminous sheet air/vapour barrier as per manufacturer's instructions.
 - .5 Apply self-adhering modified bituminous sheet air/vapour barrier to thermal barrier in an overlapping shingle fashion. Stagger all vertical joints.
 - .6 Align modified bituminous sheet air/vapour barrier, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all ends and side

laps. Roll membrane, including seams, with counter top roller to ensure full contact

- .2 Insulation
 - .1 Loosely lay layer of insulation over air/vapour barrier.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end boards to suit.
 - .4 Install tapered insulation in accordance with shop drawings.
- .3 Cover Board Components (Expanded Polystyrene (EPS)):
 - .1 Loosely lay cover board over EPS insulation.
 - .2 Place boards in parallel rows with ends staggered and in firm contact with one another.
 - .3 Cut end boards to suit.
 - .4 Mechanically fasten asphalt recover board with plates and fasteners.
 - .5 Fit boards tight together. Stagger joints between asphalt recover board and cover board. Install fasteners/adhesive based on design wind uplift securement requirements, for the building site location, for insulation and cover board, using FMRC approved fasteners placed in accordance with manufacturer's recommendations.
- .4 Base Sheet Application:
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
 - .2 Unroll and torch base sheet onto recover board taking care not to burn membrane or its reinforcement.
 - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
- .5 Cap Sheet Application:
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
 - .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
 - .4 Application to be free of blisters, fishmouths and wrinkles.
 - .5 Do membrane application in accordance with manufacturer's recommendations.
- .6 Flashings:

- .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
- .2 Torch, base and cap sheet onto substrate in 1 metre wide strips.
- .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by torch welding.
- .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
- .5 .Provide 75 mm minimum side lap and seal.
- .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
- .7 Do work in accordance with manufacturer's recommendations.

3.5 ROOF PENETRATIONS

- .1 Install roof drain pans, vent stack covers and other roof penetration Flashings and seal to membrane in accordance with the manufacturer's recommendations and details.
- .2 All roof drains to be installed by certified plumber. Coordinate installation so that work can be inspected by owners representative prior to commencement of remaining roof work.
- .3 All penetrations shall have collars, heads etc.

3.6 CLEANING

- .1 Check drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 06 10 00 – Rough Carpentry.
- .2 Section 07 52 00 – Modified Bituminous Membrane Roofing.
- .3 Section 07 61 13 – Metal Roofing System
- .4 Section 07 92 00 – Joint Sealants.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 The Aluminum Association Inc. (AA)
 - .1 Aluminum Sheet Metal Work in Building Construction.
 - .2 AA DAF45, Designation System for Aluminum Finishes.
- .3 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM D523, Standard Test Method for Specular Gloss.
 - .4 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .4 Canadian General Standards Board (CGBS)
 - .1 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.
- .5 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual.
- .6 Canadian Standards Association (CSA International)
 - .1 CSA A123.3, Asphalt Saturated Organic Roofing Felt.
 - .2 CSA B111, Wire Nails, Spikes and Staples.

1.3 SAMPLES

- .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.
- .2 Provide submittals in accordance with section 01 35 21.

PART 2 PRODUCTS**2.1 SHEET METAL MATERIALS**

- .1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, 24 gauge. Pre-painted to CGSB – GP-71.

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished sheet with factory applied polyvinylidene fluoride.
 - .1 Class F1S
 - .2 Colour as selected by Owner's Representative from manufacturer's standard range for flashing and trim elsewhere.
 - .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
 - .4 Coating thickness: not less than 22 micrometres.
 - .5 Resistance to accelerated weathering for caulk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 2500 hours.
 - .2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.
- .4 Sealants: Section 07 92 00 – Joint Sealants.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

- .2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 0.60 mm thick prefinished steel.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .5 Lock end joints and caulk with sealant.

END OF SECTION

PART 1 GENERAL**1.1 SYSTEMS DESCRIPTION**

- .1 This Section specifies fire stop systems and/or fire stop materials intended to fill gaps between fire separations, between fire separations and other construction assemblies, or used in or around items which fully or partially penetrate a fire separation, to restrict the spread of fire and smoke thus maintaining the integrity of a fire separation:
 - .1 Through-penetration fire stops:
 - .1 For openings created to allow a penetrating item such as piping, conduits, raceways, ducts, cable trays, cables, tubing or structural components to pass completely through a fire separation or fire-resistance rated assembly.
 - .2 Membrane penetration fire stops:
 - .1 For openings where penetrating items such as piping, conduits, raceways, ducts, cable trays, cables, tubing, recessed components (e.g.: panels, electric boxes, devices) or structural components pass through only one membrane of a fire separation or fire-resistance rated assembly.

1.2 RELATED WORK

- .1 Coordinate work of this section with other sections as required to properly execute the work and as necessary maintain satisfactory progress of the work of other sections.

1.3 RELATED SECTIONS

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

1.4 REFERENCES

- .1 National Research Council Canada (NRC)
 - .1 National Building Code of Canada 2015 (NBC).
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S115-11(R2016), Standard Method of Fire Tests of Firestop Systems.
 - .2 ULC Qualified Firestop Contractor Program.

1.5 DEFINITIONS

- .1 Fire Blocking: materials, components or system installed in a concealed space in the building to restrict the spread of fire and smoke in that concealed space or from that concealed space to an adjacent space.
- .2 Fire Stop: a material, component or system, and its means of support, used to protect gaps between fire separations, between fire separations and other construction assemblies, or used in openings where penetrating items wholly or partially penetrate fire separations, to restrict the spread of fire and smoke thus maintaining the fire-resistance continuity of a fire separation.

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- .3 Fire Stop System: the combination of specific materials and/or devices required with the penetrating item(s), the assembly and the opening to assemble the fire stop. Intumescent: materials that expand with heat to prevent fire spread through fire separations.
- .5 Listed Fire Stop System: a specific field erected construction consisting of the assembly, fire stop materials, any penetrating items and their means of support which have met the requirements for an F, FT, FH, FTH and/or L rating when tested in a fire-resistance rated assembly in accordance with CAN/ULC-S115-2018 - Standard Method of Fire Tests of Firestop Systems.
 - .1 F-Rating: the amount of time a fire stop system can remain in place without the passage of flame through the opening or the occurrence of flaming on the unexposed face of the fire stop.
 - .2 FT-Rating: a fire stop system with an F-Rating for the required time period which can also resists the transmission of heat through the fire stop during the same period and limit the rise in temperature on the unexposed face and/or penetrating item of the fire stop.
 - .3 FH-Rating: a fire stop system with an F-Rating for the required time period which can also resists the force of a hose stream without developing openings for a prescribed period.
 - .4 FTH-Rating: a fire stop system with an FT-Rating for the required time period which also passed the hose stream test for a prescribed period.
 - .5 L-Rating: largest test sample leakage rate, determined in accordance with the optional air leakage test of [CAN/ULC-S115](#).
- .6 Multi-penetration: two or more service penetrations through an opening in the fire separation.
- .7 Non-rated Fire Separation: fire separation acting as a barrier to the spread of smoke until a response is initiated such as the activation of a fire suppression system.
- .8 Single-penetration: single service penetration through an opening in the fire separation.
- .9 System Design Listing: document providing proof of testing with technical details, specifications and requirements that leads to the application of a specific listed fire stop system

1.6 SUBMITTALS

- .1 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.
- .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .3 Submit manufacturer's engineering judgement identification number and drawing details when no ULC or cUL system is available. Engineering judgement (EJ) must include both project name and contractor's name who will install firestop system as described in drawing.
 - .1 For each EJ submitted, include:

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- .1 Project name, number and location.
 - .2 A description of the proposed system with detailed drawing.
 - .3 Installation instructions.
 - .4 Complete descriptions of critical elements for the fire stop configuration.
 - .5 Copies of all referenced system design listings on which the EJ is based on.
 - .6 EJ issuer name and contact information.
 - .7 Date of issue of EJ with authorization signature of issuer.
 - .8 Manufacturer letter stating their opinion, with supporting justification, that the EJ will perform as a fire stop system were it to be subjected to the appropriate standard fire test method for the required fire rating duration.
- .2 Once the EJ has been reviewed, submit the EJ to the authority having jurisdiction for final approval.
 - .3 EJ shall be issued only by fire stop manufacturer's qualified technical personnel or in concert with the manufacturer by a knowledgeable registered Professional Engineer, a Fire Protection Engineer or an independent testing agency that provides testing and listing services for fire stop systems similar to the EJ being contemplated.
 - .4 EJ shall be based upon interpolations of previously tested fire stop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the Engineering Judgment is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g.: ASTM E 2032) may also be used as further support data.
 - .5 EJ shall be based upon knowledge of the elements of the construction to be protected and understanding of the probable behaviour of that construction and the recommended fire stop system protecting it were they to be subjected to the adequate standard fire test method for the required fire rating duration.
 - .6 EJ shall be limited to the specific conditions and configurations upon which EJ was rendered and should be based upon reasonable performance expectations for the recommended fire stop system under those conditions.
- .4 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation. Include manufacturer's specifications, training letter, and technical data for each material including the composition and limitations, documentation of ULC or CUL firestop systems to be used.
 - .5 Submit test reports showing compliance to [ASTM E 595](#).
 - .6 For each individual component, Submit copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 02 81 00 - Hazardous Materials.
 - .7 Submit material safety data sheets provided with product delivered to job site.
 - .8 Shop Drawings:
 - .1 Submit shop drawings showing system design listings for Project including

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- proposed materials, reinforcement, anchorage, fastenings and method of installation.
- .2 Construction details to accurately reflect actual job conditions for each product and assembly.
 - .3 Submit details for materials and prefabricated devices.
 - .4 Submit electronic copy of shop drawings and include:
 - .1 Title page, labelled "Fire and Smoke Stop System Listings". Include project name, date and the names of the installation company and the manufacturer of proposed products.
 - .2 Table of Contents.
 - .3 List of each proposed listed fire stop system and corresponding service penetration type or joint type in a matrix spreadsheet schedule, indicating floor and wall system, including rating for each.
 - .4 Location of penetrations:
 - .1 Drawings showing the location of each penetration with a unique penetration identification number and associated listing number.
 - .2 Schedules listing each penetration with a unique identification number, their associated listing number, organized by floor, wall and ceiling area and indicating each room number.
 - .5 System Design Listings:
 - .1 Submit CAN/ULC-S115 design listings for each listed fire stop system and each application identified.
 - .2 When more than one product is specified for the listed fire stop system or more than one packing/damming material is indicated, identify the item that will be used on this Project.
 - .6 Certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.7 MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 – Quality Control.
- .2 Construct mock-up showing service penetrations, fire separation and floor assemblies. Mock-up may be part of finished work.
- .3 Allow 48h for inspection of mock-up by Departmental Representative before proceeding with surrounding work.

1.8 MANUFACTURER'S REPRESENTATIVE

- .1 A manufacturer's representative is to be on site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures and at commissioning stage to certify acceptance completed installation. Training will be done as per manufacturer's written recommendations published in their literature and drawing details.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated

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- construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire-rating involved for each separate instance.
- .2 Fire stopping and smoke seal systems: in accordance with CAN-S115.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.
 - .2 Firestop system rating: as indicated on drawings.
 - .3 Service penetration assemblies: certified and tested by ULC or cUL in accordance with CAN-S115.
 - .4 Service penetration firestop components: certified and tested by ULC or cUL in accordance with CAN-S115.
 - .5 Fire-resistance rating of installed fire stopping assembly in accordance with the National Building Code of Canada (2015 ed.).
 - .6 Non-curing, re-penetrable intumescent sealants, caulking or putty material for use with flexible cables or cable bundles.
 - .7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal. Consult with Departmental Representative and damper manufacturer prior to installation ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - .8 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. No silicone-based firestop are allowed to be applied on plastic pipes.
 - .9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
 - .10 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
 - .11 Packing/Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
 - .12 Sealants for vertical joints: non-sagging.
 - .13 Fire stop insulation: pre-formed, semi rigid, non-combustible mineral wool.
 - .14 Refer to the listed fire stopping systems in the Firestopping Schedule for types. Provide all required approved materials to complete the systems as tested and certified, including mineral wool insulation, fire-rated mortar, fire rated sealants, sleeves, and other

components as part of the tested systems.

- .15 Any reference to "Hilti" fire stop systems is for the purposes of identifying standard firestop system types and details but shall not preclude the Contractor from using other tested manufacturer systems that meets these specifications, and meets the performance of each system identified. All firestop systems are to be submitted to the Departmental Representative for review prior to installation.

2.2 FIRESTOP IDENTIFICATION

- .1 Fire Stopped Penetrations:
- .1 Provide identification labels at each penetration.
 - .2 Identification labels: adhesive plastic stickers with the following information:
 - .1 Penetration number.
 - .2 Floor number.
 - .3 Room number.
 - .4 Product name and number.
 - .5 System Design number.
 - .6 Fire Rating Required: in hours.
 - .7 Fire Stop Contractor's Name and phone number.
 - .8 Installer's Name.
 - .9 Date of Installation.
 - .10 Re-penetrated by: Company, Installer and Date.
 - .3 Label shall state that the fill material around the penetration is a fire stop system and it shall not be disturbed except by authorized personnel.
- .2 Fire Wall/Separation (Barrier) Markings:
- .1 All accessible areas of firewalls shall be effectively and permanently identified with stenciling in the concealed space.
 - .2 Such identification shall be located within the concealed space and applied to the surface of the assembly in question.
 - .3 Provide identification for all vertical fire separations/fire walls.
 - .4 Identification markings: stencil painted with lettering at least 76 mm in height with min. 9.5mm stroke in contrasting colour using MPI formula INT 6.3A-G5.
 - .1 Colour to match Benjamin Moore 'Neon Red – 2087-10'.
 - .5 Marking to incorporate the assembly's fire-resistance rating and the following suggested wording, "2HR FIRE WALL - PROTECT ALL OPENINGS", or other accepted wording.
 - .1 Contractor to provide a shop drawing and mock-up for approval.
 - .6 Include horizontal red painted line, 76mm in width, between identification markings.
 - .7 Identification to be applied within:
 - .1 1830mm from an end wall, and;
 - .2 At intervals not exceeding 4575mm measured horizontally along the assembly, or;
 - .3 Space more frequently if spacing is interrupted by service penetrations or another obstruction limiting the viewing of the identification label. Consult the Departmental Representative for placement in these instances.
 - .8 For occupied areas with exposed ceilings: use 50mm stencil painted red dots without horizontal painted lines.

PART 3 EXECUTION**3.1 PREPARATION**

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification or UL Products Certified for Canada (CUL) and manufacturer's instructions.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to a neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.3 INSPECTION

- .1 Notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestop and smoke seal as and where identified in the drawings and by the firestopping systems identified in the Firestopping Schedule in Appendix "A".

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

PART 1 GENERAL**1.1 RELATED DOCUMENTS**

- .1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.2 DEFINITIONS

- .1 Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- .1 Only tested firestop systems shall be used in specific locations as follows:
 - .1 Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - .2 Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - .3 Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - .4 Openings around structural members which penetrate floors or walls.

1.4 WORK OF OTHER SECTIONS

- .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 03 30 00 - Cast-In-Place Concrete
 - .2 Section 04 20 00 - Masonry Work
 - .3 Section 07 84 43 - Joint Firestopping
 - .4 Section 07 90 00 - Joint Protection
 - .5 Section 09 20 00 - Plaster and Gypsum Board
 - .6 Section 09 29 00 - Gypsum Board
 - .7 Section 13 48 00 - Sound, Vibration and Seismic Control
 - .8 Section 21 00 00 - Fire Suppression
 - .9 Section 22 00 00 - Plumbing
 - .10 Section 23 00 00 - Heating, Ventilating, and Air Conditioning

.11 Section 26 00 00 - Electrical

PART 2 REFERENCES

- .1 Test Requirements: CAN/ULC-S115-11, "Standard Method of Fire Tests of Through Penetration Fire Stops".
- .2 Underwriters Laboratories of Canada (ULC) of Scarborough runs CAN/ULC-S115-11 under their designation of ULC-S115-11 and publishes the results in their "FIRE RESISTANCE RATINGS DIRECTORY" that is updated annually.
- .3 Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually. UL tests that meet the requirements of ULC-S115-M are given a cUL listing and are published by UL in their "Products Certified for Canada (cUL) Directory".
- .4 Omega Point Laboratories runs ASTM E-814 and publishes the results annually in their "Omega Point Laboratories Directory"
- .5 Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops."
- .6 International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- .7 CAN/ULC-S102-M, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .8 All major building codes: NBCC.
- .9 NFPA 101 - Life Safety Code
- .10 Canadian Electrical Code

2.2 QUALITY ASSURANCE

- .1 Fire-Test-Response Characteristics: Provide through-penetration fire stop systems that comply with specified requirements of tested systems.
- .2 A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
- .3 Firestop System installation must meet requirements of CAN/ULC-S115-11 or UL 2079 tested assemblies that provide a fire rating as shown in Section 2.03 Clauses N & O below.

- .4 Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- .5 Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- .6 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council

2.3 SUBMITTALS

- .1 Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Section 1300.
- .2 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for an application. Engineered judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- .3 Submit material safety data sheets provided with product delivered to job-site.

2.4 INSTALLER QUALIFICATIONS

- .1 Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary training to install manufacture's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- .2 Installation Responsibility: assign installation of through-penetration fire stop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.
- .3 The work is to be installed by a contractor with at least one of the following qualifications:
 - .1 FM 4991 Approved Contractor
 - .2 UL Approved Contractor
 - .3 Hilti Accredited Fire Stop Specialty Contractor
- .4 Installer shall have not less than 3 years experience with fire stop installation.

- .5 Successfully completed not less than 3 comparable scale projects using similar systems.

2.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and ULC or cUL label where applicable.
- .2 Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- .3 Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.
- .4 Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- .5 Do not use damaged or expired materials.

PART 3 PROJECT CONDITIONS

- .1 Do not use materials that contain flammable solvents.
- .2 Scheduling
 - .1 Schedule installation of CAST IN PLACE firestop devices after completion of floor formwork, metal form deck, or composite deck but before placement of concrete.
 - .2 Schedule installation of Drop-In firestop devices after placement of concrete but before installation of the pipe penetration. Diameter of sleeved or cored hole to match the listed system for the device.
 - .3 Schedule installation of other firestopping materials after completion of penetrating item installation but prior to covering or concealing of openings.
- .3 Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- .4 Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- .5 During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

3.2 PRODUCTS

- .1 **FIRESTOPPING, GENERAL**

- .1 Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- .2 Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- .3 Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.
- .4 Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

3.3 ACCEPTABLE MANUFACTURERS

- .1 Subject to compliance with through penetration firestop systems and joint systems listed in the U.L.C Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory, provide products of the following manufacturers as identified below:
 - .1 Hilti (Canada) Corporation, Mississauga, Ontario 1-800-363-4458 www.hilti.ca
 - .2 Provide products from the above acceptable manufacturer; no substitutions will be accepted.

3.4 MATERIALS

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- .2 Pre-Installed firestop devices for use with non-combustible and combustible pipes (closed and open systems), conduit and/or cable bundles penetrating concrete floors and/or gypsum walls, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Cast-In Place Firestop Device (CP 680-P) for combustible pipe
 - .1 Add Aerator adaptor when used in conjunction with aerator (“sovent”) system.
 - .2 Hilti CP 681 Tub Box Kit for use with tub installations.
 - .3 Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
 - .4 Hilti Speed Sleeve (CP 653) for use with cable penetrations.
 - .5 Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
 - .6 Hilti Firestop Block (CFS-BL)

- .3 Sealants, caulking materials or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
 - .2 Hilti Fire Foam (CP 620)
 - .3 Hilti Flexible Firestop Sealant (CP 606)
 - .4 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - .5 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- .4 Sealants or caulking materials for use with sheet metal ducts, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - .2 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
 - .3 Hilti Flexible Firestop Sealant (CP 606)
 - .4 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- .5 Intumescent sealants or caulking materials for use with combustible items penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the standard of acceptance is based on the following product or approved equal:
 - .1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- .6 Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
 - .2 Hilti Fire Foam (CP 620)
 - .3 Hilti Flexible Firestop Sealant (CP 606)
 - .4 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - .5 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- .7 Non curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Putty Stick (CP 618)
 - .2 Hilti Firestop Plug (CFS-PL)
 - .3 Hilti Firestop Cable Collar (CFS-CC)
- .8 Wall opening protective materials for use with cUL. / ULC listed metallic and specified nonmetallic outlet boxes, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Putty Pad (CFS-P PA)
 - .2 Hilti Firestop Putty Pad (CP 617)

- .3 Hilti Firestop Box Insert
- .9 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Collar (CP 643N)
 - .2 Hilti Firestop Collar (CP 644)
 - .3 Hilti Wrap Strips (CP 648E/648S)
- .10 Materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Block (CFS-BL)
 - .2 Hilti Composite Sheet (CFS-COS)
 - .3 Hilti Firestop Mortar (CP 637)
 - .4 Hilti Fire Foam (CP 620)
 - .5 Hilti Firestop Board (CP 675T)
- .11 Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Block (CFS-BL)
 - .2 Hilti Firestop Board (CP 675T)
- .12 Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum or masonry walls, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Speed Sleeve (CP 653) with integrated smoke seal fabric membrane.
 - .2 Hilti Firestop Cable Collar (CFS-CC)
 - .3 Hilti Firestop Sleeve (CFS-SL SK)
 - .4 Hilti Retrofit Sleeve (CFS-SL RK) for use with existing cable bundles.
 - .5 Hilti Gangplate (CFS-SL GP) for use with multiple cable management devices.
 - .6 Hilti Gangplate Cap (CFS-SL GP CAP) for use at blank openings in gangplate for future penetrations.
- .13 For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the standard of acceptance is based on the following products or approved equal:
 - .1 Hilti Firestop Block (CFS-BL) (for walls and floors)
 - .2 Hilti Firestop Plug (CFS-PL) (for walls and floors)
 - .3 Hilti Firestop Cable Collar (CFS-CC)
 - .4 Hilti CP 680 Cast-In Place Firestop Device (for floors only)

- .14 For penetrations through a Fire Separation wall provide a firestop system with a "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating Of Separation	Required ULC or cUL "F" Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

For combustible pipe penetrations through a Fire Separation provide a firestop system with a "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

- .15 For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

PART 4 EXECUTION

4.1 PREPARATION

- .1 Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - .1 Verify penetrations are properly sized and in suitable condition for application of materials.
 - .2 Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - .3 Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - .4 Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - .5 Do not proceed until unsatisfactory conditions have been corrected.

4.2 COORDINATION

- .1 Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

- .2 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- .3 Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
- .4 Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.

4.3 INSTALLATION

- .1 Regulatory Requirements: Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory or Omega Point Laboratories Directory.
- .2 Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - .1 Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 - .2 Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - .3 Protect materials from damage on surfaces subjected to traffic.

4.4 FIELD QUALITY CONTROL

- .1 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- .2 Keep areas of work accessible until inspection by applicable code authorities.
- .3 Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- .4 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- .5 Manufacturer's Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

4.5 IDENTIFICATION & DOCUMENTATION

- .1 The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration location on the entire project.
- .2 The Documentation Form for through penetrations is to include:
 - .1 A Sequential Location Number
 - .2 The Project Name
 - .3 Date of Installation
 - .4 Detailed description of the penetrations location
 - .5 Tested System or Engineered Judgment Number
 - .6 Type of assembly penetrated
 - .7 A detailed description of the size and type of penetrating item
 - .8 Size of opening
 - .9 Number of sides of assemblies addressed
 - .10 Hourly rating to be achieved
 - .11 Installers Name
- .3 Copies of these documents are to be provided to the general contractor at the completion of the project.
- .4 Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - .1 The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
 - .2 Contractor's Name, address, and phone number.
 - .3 Through-Penetration firestop system designation of applicable testing and inspecting agency.
 - .4 Date of Installation.
 - .5 Through-Penetration firestop system manufacturer's name.
 - .6 Installer's Name.

4.6 ADJUSTING AND CLEANING

- .1 Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- .2 Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

4.7 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- .1 To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreement.

END OF SECTION

PART 1 GENERAL**1.1 SECTION INCLUDES**

- .1 Materials, preparation and application for caulking and sealants.
- .2 Text to complete other various Sections containing sealant or caulking specifications, including Section 07 52 00 - Modified Bituminous Membrane Roofing.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA).
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA).

1.3 SUBMITTALS

- .1 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
 - .4 Installation instructions, surface preparation and product limitations.
- .2 Submit duplicate samples of each type of material and colour.
- .3 Cured samples of exposed sealants for each color where required to match adjacent material.
- .4 Manufacturers' instructions to include installation instructions for each product used.

- .5 Provide submittals in accordance with section 01 35 21 – LEED Requirements.

1.4 QUALITY ASSURANCE/MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant. Mock-up may be part of finished work.
- .3 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with sealant work.
- .4 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4°C.
 - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 PRODUCTS**2.1 SEALANT MATERIALS**

- .1 Sealants and Caulking compounds must:
 - .1 Meet or exceed all applicable governmental and industrial safety and performance standards; and
 - .2 Be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).
- .2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulphate.
- .3 Sealant and caulking compounds must not contain a total of volatile organic compound (VOC's) in excess of 5% by weight as calculated from records of the amounts of constituents used to make the product.
- .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .6 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .7 Where sealants are qualified with primers use only these primers.
- .8 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Urethanes One Part.
 - .1 Non-Sag to CAN/CGSB-19.13, Type 2.
- .2 Silicones One Part.
 - .1 To CAN/CGSB-19.13, mildew resistant.
- .3 Acoustical Sealant.

- .1 To ASTM C919.
- .4 Sealants acceptable for use on this project are listed as follows:
 - .1 Between window frames and siding: sealant to CAN/CGSB 19.13, MC-2-25-N, colour to match window frames. Acceptable material: Tremco Dymeric or approved equal.
 - .2 Control joints in concrete floors. Acceptable Material: Tremco Dymeric or approved equal.
 - .3 Sealant for around washroom wall fixtures and at vanity backsplash and wall, etc., to CGSB-19-GP-22M, mildew resistant. Acceptable Material: Dow Corning 786 or approved equal.
 - .4 Sealant for sound rated partitions, i.e., perimeter joints and opening all around wall outlets, etc., to CGSB-10-GP-21M. Synthetic rubber base. Acceptable Material: Tremco Acoustical or approved equal.
 - .5 Sealant for around penetrations though fire rated floors and walls, etc., one part silicone elastomer. Acceptable Material: Dow Corning Fire Stop Sealant or approved equal.
 - .6 Sealant for floor and wall isolation joints, etc., bitumen impregnated open celled foam. Acceptable Material: Emseal Precompressed Joint Sealer or approved equal.
 - .7 Color of sealant to be selected by the Consultant.
 - .8 Sealants for interior and exterior horizontal traffic joints. THC 900 as manufactured by Tremco.
- .5 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building, Sealant type CAN/CGSB- 19.13.
- .2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Sealant type CAN/CGSB – 19.13.

- .3 Control and expansion joints in exterior surfaces of unit masonry walls: Sealant type: CAN/CGSB – 19.13.
- .4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: CAN/CGSB – 19.13.
- .5 Control and expansion joints on the interior of exterior surfaces of unit masonry walls. Sealant Type CAN/CGSB -19.13.
- .6 Interior control and expansion joints in floor surfaces: Sealant type CAN/CGSB -19.13.
- .7 Perimeters of interior frames, as detailed and itemized: Sealant type CAN/CGSB -19.13.
- .8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type CAN/CGSB -19.13.
- .9 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities, counters, plastic laminate and adjacent wall finish, etc.): Sealant type CAN/CGSB – 19.13, mildew resistant.
- .10 Exposed interior control joints in drywall: Sealant type: CAN/CGSB -19.13.
- .11 Acoustical Sealant ASTM C919.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

PART 3 EXECUTION

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 07 21 20 – Low Expanding Foam Sealant.
- .2 Section 07 92 00 - Joint Sealants.
- .3 Section 08 71 00 - Door Hardware.
- .4 Section 08 80 50 – Glazing.
- .5 Section 09 91 13 - Exterior Painting.
- .6 Section 09 91 23 - Interior Painting.
- .7 Section 23 37 13 - Diffusers, Registers and Grilles.
- .8 Division 26: Wiring for electronic hardware.

1.2 REFERENCES

- .1 Codes and Standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A653/A653M, Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.
- .4 Canadian Standards Association (CSA)
 - .1 G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .5 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames.
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors.
- .6 National Fire Protection Association (NFPA)
 - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

- .7 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN4-S104M, Fire Tests of Door Assemblies.
 - .2 CAN4-S105M, Fire Door Frames Meeting the Performance Required by CAN4-S104.
 - .3 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .4 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings.
 - .5 CAN/ULC-S704, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 DESIGN REQUIREMENTS

- .1 Design door assembly to withstand minimum 1,000,000 swing cycles in accordance with ANSI A151.1, with no failure of any design features of the door.
- .2 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .3 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
- .4 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 and NFPA 252 for ratings specified or indicated.
- .5 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104 and NFPA 252 and listed by nationally recognized agency having factory inspection services and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.4 SUBMITTALS

- .1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvred, arrangement of hardware and fire rating and finishes.
- .2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing firerating and finishes.
- .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .4 Submit one 300 x 300 mm top corner sample of each type door.
- .5 Submit one 300 x 300 mm corner sample of each type of frame.
 - .1 Show butt cutout, glazing stops.

1.5 DELIVERY STORAGE AND HANDLING

- .1 Deliver, store, handle and protect doors and frames in accordance with Section 01 61 00-Common Product Requirements.
- .2 Deliver, handle and store doors and frames at the job site in such a manner as to prevent damage.
- .3 Store doors and frames under cover with doors stored in a vertical position on blocking, clear of floor and with blocking between doors to permit air circulation.

1.6 QUALITY ASSURANCE

- .1 Conform to requirements to ANSI A117.1
- .2 Company specializing in manufacturing products specified with a minimum of five (5) years documented experience.

1.7 WARRANTY

- .1 Provide a written warranty for work of this section from manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship, for ten (10) years respectively.

PART 2 PRODUCTS**2.1 MATERIALS**

- .1 Hot dipped galvanized steel sheet: to ASTM A653/A653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653/A653M, ZF75.

2.2 DOOR CORE MATERIALS

- .1 Stiffened: face sheets welded insulated core.
 - .1 Expanded polystyrene: CAN/ULC-S701, density 16 to 32 kg/m³.
 - .2 Polyurethane: to CAN/ULC-S704 rigid, modified polyisocyanurate, closed cell board. Density 32 kg/m³.
- .2 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250°C at 60 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.
- .3 Thermal Insulation material must:

- .1 Not require being labelled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act.
- .2 Be manufactured using a process that uses chemical compounds with the minimum zone depletion potential (ODP) available.

2.3 ADHESIVES

- .1 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

2.4 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.5 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior top and bottom caps steel.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Door bottom seal: Section 08 71 00 – Door Hardware.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal riveted.
- .7 Sealant: Section 07 92 00 – Joint Sealants.
- .8 Provide low expanding, single component polyurethane foam sealant installed at head and jamb perimeter of door frame for sealing to building air barrier, vapour retarder and door frame. Foam sealant width to be adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder foam interior. Refer to Section 07 21 20 – Low Expanding Foam Sealant.
- .9 Glazing: Section 08 80 50 – Glazing.
- .10 Make provisions for glazing as indicated and provide necessary glazing stops.
 - .1 Provide removable stainless steel glazing beads for dry glazing of snap-on type.
 - .2 Design exterior glazing stops to be tamperproof.
- .11 Finish Painting: to Section 09 91 13 – Exterior Painting and Section 09 91 23 – Interior Painting.

2.6 FRAMES FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.2 mm welded, thermally broken type construction.
- .4 Interior frames: 1.2 mm welded type construction.
- .5 Blank, reinforce, drill and tap frames for mortised, template hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.

2.7 FRAME ANCHORAGE

- .1 Shim and anchor new doors in accordance with CAN/CSA A440.4.
- .2 Provide appropriate anchorage to floor and wall construction.
- .3 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .4 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .5 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm o.c. maximum.

2.8 FRAMES: WELDED TYPE

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.

- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.9 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: insulated, hollow steel construction. Interior doors: honeycomb hollow steel construction.
- .3 Fabricate doors with longitudinal edges locked seam. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.
- .5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
- .6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .7 Reinforce doors where required, for surface mounted hardware. Provide flush steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104 ASTM E152 NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .10 Manufacturer's nameplates on doors are not permitted.

2.10 HOLLOW STEEL CONSTRUCTION

- .1 Form each face sheet for exterior doors from 1.2 mm sheet steel.

- .2 Form each face sheet for interior doors from 1.2 sheet steel.
- .3 Reinforce doors with vertical stiffeners, securely welded to each face sheet at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with polystyrene core.
- .5 Fill voids between stiffeners of interior doors with honeycomb core.

2.11 THERMALLY BROKEN DOORS AND FRAMES

- .1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.
- .2 Thermal break: rigid polyvinyl chloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .4 Apply insulation.

PART 3 EXECUTION**3.1 INSTALLATION GENERAL**

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

3.2 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier and vapour retarder.

3.3 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor as follows.
 - .1 Hinge side: 1.0 mm.
 - .2 Latch side and head: 1.5 mm.
 - .3 Finished floor: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres.
- .5 Undercut doors as indicated on the door schedule.

3.4 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

3.6 COMMISSIONING

- .1 Contractor to instruct maintenance personnel in operation and maintenance of doors and hardware.
- .2 Confirm operation and function for all doors and hardware.
- .3 Commissioning will be witnessed by Owner's Representative and Certificate will be signed by Contractor and Owner's Representative.

END OF SECTION

PART 1 **GENERAL****1.1** **DESCRIPTION**

- .1 Door system components include door panel, glass inserts, door frame, hinges, weather seals.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3 Section 06 20 00 - Finish Carpentry.
- .4 Section 08 11 00 - Metal Doors and Frames.
- .5 Section 08 71 00 - Door Hardware.
- .6 Section 08 80 50 - Glazing.
- .7 Section 23 37 13 - Diffusers, Registers and Grilles.

1.3 **REFERENCES**

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
 - .1 Quality Standards for Architectural Woodwork.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-71.19, Adhesive, Contact, Sprayable.
 - .2 CAN/CGSB-71.20, Adhesive, Contact, Brushable.
- .3 Canadian Standards Association (CSA).
 - .1 CSA O115, Hardwood and Decorative Plywood.
 - .2 CAN/CSA O132.2 Series, Wood Flush Doors.
 - .3 CAN/CSA-O132.5, Stile and Rail Wood Doors.
- .4 National Fire Protection Association (NFPA).
 - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252, Standard Method of Fire Tests of Door Assemblies.
- .5 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN-4S104M, Fire Tests of Door Assemblies.
 - .2 CAN4-S105M, Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications, and data sheet
 - .2 Submit two copies of WHMIS MSDS Safety Data Sheets. Indicate VOC's:
 - .1 For caulking materials during application and curing.
 - .2 For door materials and adhesives.
- .2 Shop Drawings:
 - .1 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.
- .3 Submit one 300 x 300 mm corner sample of each type wood door.
- .4 Show door construction, core, glazing detail and faces.
- .5 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 REGULATORY REQUIREMENTS

- .1 Wood fire rated doors: labelled and listed by an organization accredited by Standards Council of Canada.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery: Reasonable care shall be exercised during shipping and handling in keeping with the decorative nature of product.
- .2 Storage & Protection: Store upright in a dry, well ventilated building or shelter at a constant temperature. Do not store in damp areas or freshly plastered buildings. Place units on wood blocks at least 2" high to prevent moisture at threshold and/or possible damage. Do not place in non-vented plastic or canvas shelters. Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.
- .3 Protect doors from scratches, handling marks and other damage.
- .4 Store doors away from direct sunlight.

1.7 WARRANTY

- .1 Manufacturer warrants the panel to be free of manufacturing defects in material and workmanship for 5-years.
- .2 Areas which prove to be defective in any way shall be repaired or replaced and any damage to other work as a result of such defects shall be repaired at no cost to the Owner.

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PART 2**PRODUCTS****2.1 DOOR PANEL**

- .1 Wood-edge steel doors shall be fabricated using 6-piece construction that includes primed white, hot dipped galvanized steel facings, coated with multiple protective chemical layers to promote paint adhesion, and deter corrosion.
- .2 Lock and hinge stiles and top rail are finger jointed wood or laminated lumber. Composite bottom rail is moisture and decay resistant. Lock areas reinforced for single and double bore configurations.
- .3 Door facings are to be interlocked to stiles and rails forming a mechanical bond. Insulated core to be poured-in-place, high performance polyurethane foam forming a secure attachment to all door components.
- .4 Bottom rail may be machined to accept weather seal. Mounting surface for latching hardware to be reinforced with solid internal blocking. Hinge preparations to be machined for standard weight full mortise 100 mm butt hinges. Latch to suite door hardware.
- .5 Embossed panel style as indicated on drawing door schedule.

2.2 GLASS INSERT

- .1 Insulated glass inserts shall be fabricated in 13mm double pane construction. Glass frame may be design in rigid plastic or cellular vinyl.

2.3 DOOR FRAME

- .1 Wood frames shall be fabricated as a single rabbet jamb design.
- .2 Hinge jamb(s), strike jamb, head jamb, and mullion(s) shall be machined to accept a kerf applied weather seal.
- .3 Hinge jamb preparations are to be machined for standard weight full mortise 100 mm butt hinges.
- .4 Strike jamb preparations as per hardware requirements.
- .5 Inswing or bumper outswing threshold shall be high-dam design. Low profile threshold shall be required for handicap accessible openings. Double door units shall include a t-astragal attached to the "passive" panel with top and bottom flush bolts that securely strike into the head jamb and threshold.

2.4 HINGES

- .1 Three standard weight full mortise 100 mm butt hinges are required on doors 2134 mm height or smaller and four on doors greater than 2134 mm.

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2.5 WEATHER SEAL

- .1 Door frame shall be fabricated featuring a vinyl wrapped foam filled compression design that is kerf installed. Corner seals shall be installed to the rabbet section of the door frame at the bottom of the hinge and lock jamb. Door bottom sweep shall be sealed and securely attached to the operable door panel(s).

PART 3 EXECUTION**3.1 EXAMINATION**

- .1 Site verification of substrate conditions, which have been previously completed, are acceptable for the product installation instructions in accordance with manufacturer's specifications. Verify that door frame openings are constructed plumb, true and level before beginning installation process. Select fasteners of adequate type, number and quality to perform the intended functions.

3.2 INSTALLATION

- .1 Remove protective packaging just prior to installation. Installer shall be experienced in performing work required and shall be specialized in the installation of work similar to that required for this project. Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product packaging instructions for installation.

3.3 FLASHING, INSULATING & TRIMMING

- .1 Exterior of installed unit shall be flashed, trimmed & sealed to prevent air infiltration and/or water penetration. Interior of installed unit shall be insulated & trimmed to prevent thermal and/or acoustical transmission.

3.4 FINISHES

- .1 Various types of materials are used in the construction of the door system; each shall be sealed in accordance with manufacturer's specifications to protect against various environmental conditions. Make sure to seal and inspect all 5-surfaces (top, hinge side, lock side, exterior face and interior face) of the active door panel(s). Finishing and/or re-finishing must be completed within 45-days from the time the protective packaging was removed and/or the installation was performed. Conduct periodic inspections of all coated surfaces to ensure that door components are not exposed.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 07 92 00 - Joint Sealing: caulking of joints between frames and other building components.
- .4 Section 07 21 29.03 - Sprayed Insulation - Polyurethane Foam: insulating of joints between frames and other structural and building components.
- .5 Section 07 26 00 - Vapor Retarders: joining of air, vapour and waterproof membranes to window frames.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim junction between combination units elevations of unit, anchorage details, description of related components [and exposed finishes] fasteners, and caulking. Indicate location of manufacturer's nameplates.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit one representative model of each type window.
- .3 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.
- .4 Include 150 mm long samples of head, jamb, sill, meeting rail as required to indicate profile.

1.4 TEST REPORTS

- .1 Submit test reports from approved independent testing laboratories,

certifying compliance with specifications, for:

- .1 Insect screens.
- .2 Air tightness.
- .3 Water tightness.
- .4 Wind load resistance.
- .5 Condensation resistance.
- .6 Sash strength and stiffness - Operable Casement.
- .7 Ease of operation - windows with operable lights.
- .8 Sash pull-off - vinyl windows.
- .9 Forced entry resistance.
- .10 Mullion deflection - combination and composite windows.

1.5 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Materials: to CSA-A440/A440.1 supplemented as follows:
- .2 All vinyl windows by same manufacturer.
- .3 Sash: solid vinyl.
- .4 Main frame: solid vinyl.
- .5 Glass: to Section 08 80 50, insulated sealed units.
- .6 Screens: to CAN/CGSB-79.1.
 - .1 Style: removable.
 - .2 Insect screening mesh: size per glazing.
 - .3 Fasteners: pin.
 - .4 Screen frames: vinyl.
 - .5 Mount screen frames for interior replacement.



2.2 WINDOW TYPE AND CLASSIFICATION

- .1 Types:

- .1 Casement: with insulating glass.
- .2 Fixed: with insulating glass.
- .3 Screens: on ventilating portion of windows.
- .2 Classification rating: to CSA-A440/A440.1.
 - .1 Air tightness: [A3].
 - .2 Water tightness: [B4].
 - .3 Wind load resistance: [C3].
 - .4 Condensation resistance: Temperature Index, I 40.
 - .5 Forced Entry: [F1].
 - .6 Insect Screens: [S1].
 - .7 Glazing: [G1].

2.3 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
- .3 Face dimensions detailed are maximum permissible sizes.
- .4 Brace frames to maintain squareness and rigidity during shipment and installation.
- .5 Finish steel clips and reinforcement with [380] g/m2 zinc coating to CAN/CSA-G164.

2.4 VINYL FINISHES



- .1 Vinyl finishes: in accordance with CSA-A440/A440.1, including appendices, supplemented as follows:
 - .1 White colour.

2.5 HARDWARE



- .1 Hardware: stainless steel or white bronze sash locks and aluminum handles to provide security and permit easy operation of units.
- .2 Locks: provide operating sash with spring loading locking device, to provide automatic locking in closed position.
- .3 Where windows latching devices are located in excess of 1900 mm above

floor level:

- .1 Equip casement units with roto operators with locking handle.

**2.6 AIR BARRIER
AND VAPOUR
RETARDER**



- .1 Equip window frames with site-installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder as follows:
 - .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
 - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier.

PART 3 EXECUTION

3.1 WINDOW
INSTALL
ATION

- .1 Install in accordance with CSA-A440/A440.1.
- .2 Arrange components to prevent abrupt variation in colour.

3.2 CAULKIN
G

- .1 Seal joints between windows and window trims with sealant. Caulk butt joints in continuous sills.
- .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Architect.

END OF SECTION

1. PART 1 – GENERAL**1.1. SECTION INCLUDES:**

Furnish, deliver and install all finish hardware necessary for all doors, also hardware as specified herein and as enumerated in Hardware Groups and as indicated and required by actual conditions at the project site.

The mechanical hardware shall include the furnishing of all necessary screws, bolts, expansion shields and all other devices necessary for the proper application of the hardware.

The electrical hardware shall include the furnishing of all necessary low voltage wiring at the door opening, to access system control locations and computer location, complete with plug connectors and shall include the connections to all electric hardware devices for the proper operation and application of the hardware.

Division 26 to provide high voltage wiring and conduit to the door opening or power supplies including conduit to hardware locations.

1.2. RELATED SECTIONS:

General Requirements	Division 1
Installation	Section 06200
Cabinet Hardware	Section 06200
Steel Doors and Frames	Section 08110
Wood Doors	Section 08210
Glazing	Section 08800

1.3. REFERENCE STANDARDS:

Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers Association.

CAN/CGSB-69.17-M86/ANSI/BHMA A156.02-1996 Bored Locks

CAN/CGSB-69.18-M90/ANSI/BHMA A156.01-2000, Butts and Hinges.

CAN/CGSB-69.20-M90/ANSI/BHMA A156.04-200 Door Controls

CAN/CGSB-69.21-M90/ANSI/BHMA A156.05-2001, Auxiliary Locks.

CAN/CGSB-69.22-M90/ANSI/BHMA A156.06-2001. Arch. Door Trim.

CAN/CGSB-69.23-M90/ANSI/BHMA A156.07-1997. Template Hinge

ANSI/BHMA A156.22-1996 Door Gasketing Systems

ANSI/BHMA A156.28-2000 Keying Systems

ANSI/BHMA A156.21-2001. Thresholds

ANSI/DHI A115-W Wood Door Prep Standards.

ANSI/DHI A115 Steel Door Prep Standards.

ANSI/DHI A115.IG Installation Guide for Doors and Hardware.

DHI Abbreviations & Symbols

DHI Hdw. Locations Drs. Frames

National Building Code Canada Latest Edition

National Fire Code Canada Latest Edition

NFPA 80 Fire Drs. & Windows Latest Edition

NFPA 101 Life Safety Code Latest Edition

NFPA 105 Smoke & Draft B Control Door Assemblies Latest Edition

NFPA 252 Fire Tests of Door Assemblies Latest Edition

1.4. REQUIREMENTS REGULATORY AGENCIES:

Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

Supply only hardware which is in compliance with Government of Newfoundland and Labrador Building Accessibility Regulations.

Prior to supplying hardware items, review hardware groups and report to Consultant any hardware specified which is not in compliant with regulatory agencies.

1.5. SHOP DRAWINGS, PRODUCT DATA, SAMPLES:

Submit schedules, shop drawings, product data, and samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

Provide eight copies of the following:

Hardware Schedule:

Submit in vertical format a hardware list. Include in list all door opening details and products to be installed for each opening.

Product Data:

Submit detailed catalogue cuts for every hardware item.

Samples:

Submit samples as requested by Consultant.

Samples in compliant with Specifications may be installed on job site.

Templates:

Send templates, if required, to any manufacture requesting templates.

Keying Schedule:

Final keying requirements will be determined after award of contract.

Arrange a meeting with Contractor and Owner to confirm keying details.

Submit eight copies of keying schedule.

Wiring Diagrams:

Submit elevation type wiring diagrams and point to point information for every electrical hardware item.

Submit elevation type wiring diagrams for every electrical hardware item.

1.6.SUPPLIER QUALIFICATIONS:

Hardware supplier to have on staff qualified Architectural Hardware Consultant recognized by the Door and Hardware Institute or a person with equivalent qualifications to assist installers and direct detailing, processing and delivery of material.

1.7.DELIVERY AND STORAGE:

Store finishing hardware in locked, clean and dry area.

Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

1.8.PROTECTION:

All hardware shall be protected against damage from paint, plaster or other defacing materials. Whenever possible manufactures protective covering, when provided, shall not be removed until final project cleaning takes place. Material not protected by manufacture shall be covered or removed from door during painting or any other adjustments that can cause damage to hardware.

1.9.MAINTENANCE DATA:

Provide maintenance data for finished hardware for incorporation into manual specified in Section 01730 -Operation and Maintenance Manual.

Provide following:

Maintenance instructions for any hardware item requiring maintenance.

Catalogue pages for each product.

Copies of template drawings as required.

Copies of wiring diagrams as required.

Name and address of Hardware Supplier.

Name and address of each Manufacture

Manufacture parts list where applicable.

Copies of the final hardware schedule.

Copies of the final keying schedule.

Brief the maintenance staff regarding proper care, cleaning, and general maintenance.

1.10. MAINTENANCE MATERIALS:

Provide maintenance materials in accordance with Section 01731 - Maintenance Materials, Special Tools and Spare Parts.

1.11. WARRANTY:

All material shall be provided with a minimum one year warranty against defects in material and workmanship from the date of substantial compilation of the project.

If manufactures warranty exceeds one year period then this extended period will apply.

2. PART 2 – PRODUCTS:

2.1.MANUFACTURES:

Use one manufacturer=s products only for all similar items.

Following manufactures products are listed in hardware groups;

Closers	LCN
Door Seals	Pemko Canada
Hinges	Dorma Door Controls
Smokestrip/Door Seals	Pemko Canada
Stops	Canadian Builders Hardware
Thresholds	Pemko Canada
Weatherstrip	Pemko Canada

2.2.MATERIALS :

1. Screws and Fasteners

Supply with products standard fasteners provided by the manufacture to suit door and frame application.

Supply special fasteners where indicated in hardware groups.

2. Locks and latches:

Bored and preassembled locks and latches: to CAN/CGSB69.17, 4000 bored lock, grade , designed for function and keyed as stated in Hardware Schedule.

Mortise locks and latches: to CAN/CGSB-69.29, series 1000 mortise lock, grade 1, designed for function as stated in Hardware Groups.

Locks shall be non-handed, backset as noted in Hardware Groups, threaded roses, no exposed screws, anti-friction latch retractor and key removable Lever.

All trim in compliance with Barrier Free Regulations.

Lever trim shall be complete with thru-bolted mechanism.

Roses round.

Normal strikes: box type, lip projection not beyond jamb.

Schlage C keyway required.

Deadlocks with 25 mm throw bolt with concealed hardened steel rollers.

Finished to as stated in Hardware Groups.

Barrier Free Trim as indicated in Hardware Groups.

Schlage ND Series or accepted alternate for Exterior.

Schlage AL Series or accepted alternate for Interior.

3. Deadbolts

Deadbolts shall be adjustable for 1 3/8" and 1 3/4" door thicknesses.

Shall be furnished with Schlage "C" conventional core.

Backset to be adjustable with a minimum 1" throw.

Thumb turn to meet accessibility regulations.

Schlage B600 or accepted alternate.

4. Butt Hinges

Butts and hinges: to CAN/CGSB-69.18, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Groups.

Quantity size and width of hinges in accordance with manufactures recommendations and ANSI Standard 156.1.

Hinges shall be of the size, type, material and finish as indicated in hardware groups.

Exterior butt hinges shall be stainless steel or brass/bronze plated with NRP security feature.

Interior hinges of steel, unless otherwise noted.

Size hinges to suit door frame trims as required.

CB81 or accepted alternate for 1 3/4" doors.

Residential grade hinges by door supplier.

5. Door Closers and Accessories:

Door controls (closers): to CAN/CGSB-69.20, designated by identifiers listed in Hardware Groups, size in accordance with CAN/CGSB-69.20, table A1.

Closers of narrow slim line design complete with backcheck, rack and pinion hydraulic action.

Closers equipped with full cover, as noted in Hardware Groups, complete with secure and concealed mounting screws.

All manual closers with manufacturer's twenty-five [25] year warranty.

Barrier free openings shall be equipped with closers that meet all requirements of the National and Provincial Codes.

Adapter plates as noted in Hardware Groups are used for added reinforcing as well as door and frame conditions. Adapter plates shall be added to any opening if required to suit field conditions or door design.

Closers shall include all necessary Arm Brackets, Cush arm supports and blade stop spacers to suit door swing, frame reveals or stop conditions.

Size and hand closers prior to site delivery in accordance with the Manufactures recommendations.

Closers capable of field adjustment of at least fifteen [15] percent.

Degree of opening to be as shown on the plans and indicated on the reviewed hardware schedule.

Finished as stated in Hardware Groups.

LCN	Sargent Stanley	
1460	1430	D-3550
4040	281	D-4550

6. Door Stops.

Floor stops of brass material complete with fasteners to suit wall or floor conditions.

Floor and wall stops of brass material complete with fasteners to suit wall or floor conditions.

All floor stops sized according to door clearance, thresholds or undercuts as noted in Door Schedule.

CBH	Std. Metal	GJ
103	S101	FB13
113	S102	FB14
157	S110	FB19X

7. Thresholds:

To ANSI/BHMA A156.21-2001.

Thresholds of aluminum material

Provide 50 mm longer than opening to allow fitting at job site.

Confirm type and sizes from detailed drawings.

When Mullion is used increase length of Threshold to fit around Mullion.

Special thresholds shall be factory assembled and sized to suit the sill conditions at site.

Fasteners of countersink type suitable to properly install to Floor conditions.

Supply complete with fasteners and necessary floor anchors.

Pemko	Nat. Guard	Hager	Crowder
179P	890P	541SP	CT-39P
2005AP	896P	520SP	Nil

Special Details Refer to drawings

8. Weatherstripping and Door Seals:

To ANSI/BHMA A156.22-1996

Stripping and seals as noted in Hardware Groups.

Weatherstripping of aluminum material with brush or silicone stripping unless noted otherwise.

Smoke and Door Seal Stripping of self adhesive silicone stripping.

Door Bottom shall be concealed with low closing force and positive seal.

Door Bottom shall be low closing force with positive sealing.

Door Bottom shall be complete with closed end caps.

Air seals shall meet UBC 7.2 Positive Pressure Test.

Fasteners of countersink type suitable to properly install to frame specified.

Pemko	Nat. Guard	Crowder
319CS	134SA	W-14S
355CS	158SA	N/A
3452CP	C627A	W-11P

2.3. FINISHES:

Provide hardware items of finishes shown in Hardware Groups.

Abbreviations of finishes are as follows:

BMHA	CAN.	MATERIAL	FINISH
626	C26D	Brass/Bronze	Satin Chrome
628	C28	Aluminum	Satin Alum, Clear Anodized
630	C32D	Stainless Steel	Satin Stainless Steel
652	C26D	Steel Plated	Satin Chrome
689	AL	All Painted	Aluminum
719	AL	Aluminum	Mill Natural Finish Aluminum
Std.	Std.	All	Manufactures Standard
FTMDF	All	All	Finish to Match Door and Frame

2.4. KEYING:

Final keying requirements will be determined after award of contract.

2.5. ABBREVIATIONS:

The following abbreviations are applicable to this section:

ATMS	STMS	Arm/Strike to Template with Machine Screws
ASB		Arm complete with Sex Bolts
AB, CB, TA		Concealed Ball Bearing Hinge
BC		Back Check
B3E or B4E		Beveled 3 or 4 Sides
BTB		Back to Back Mounted
C to C, C/L		Centerline to Centerline
Cyl.		Cylinder [of a lock]
CMK		Construction Master Key
CSK		Counter Sunk Screws
Deg.		Degree [of opening]
Dr		Door

CB, FBB or BB	Ball Bearing Hinge
FTMS 1/2TMS	To Template with full or 2 Mach. Screws
GMK	Grand Master Key
MK or MKD	Master Keyed
KA KD	Keyed Alike Keyed Different
HMD PSF	Hollow Metal Door Pressed Steel Frame
HMI PSF	Hollow Metal Insulated Door Pressed Steel Frame
LH RH	Left Hand Right Hand
LHR RHR	Left Hand Reverse Right Hand Reverse
PSF	Pressed Steel Frame
SB/MS	Packed with Sex Bolts and Machine Screws.
TMS	To Template with Machine Screws
TB or SB	Packed with Thru or Sex Bolts
WD PSF	Wood Door Pressed Steel Frame

2.6. TERMS:

Following abbreviations are applicable to this section.

AHC	Architectural Hardware Consultant
ANSI	American National Standards Institute , Inc.
CGSB	Canadian Government Standards Board
CSDFMA	Can. Steel Dr. & Fr. Mfg. Assoc.
CDC	Certified Door Consultant
CSA	Canadian Standards Association
CSC	Construction Specifications Canada
DHI	Door and Hardware Institute
NBC	National Building Code
NFC	National Fire Code
ULC	Underwriters= Laboratories Canada
WHI	Warnock Hersey International

3. PART 3 - EXECUTION

3.1.CO-ORDINATION:

Templates: Send templates, if required, to any manufacture requesting templates.

Wiring Diagrams: Provide any special information, voltage requirements and wiring diagrams to other trades requiring such information.

3.2.EXAMINATION:

Arrange site meeting with Engineer prior to start of installation of hardware.

Meeting will include examination of openings, site conditions and materials for conditions that prevent proper application of finish hardware.

Installation will not proceed until defects are corrected.

3.3. INSTALLATION:

No operating hardware shall be installed at a height of more than 1200 mm above the finished floor [NBCC 3.4.6.15.5]

Unless otherwise noted all hardware will be mounted according to manufacture templates and installation instruction sheets.

Product not usually supplied with this information shall be mounted according to National Building Code and the Door and Hardware Institute publication "A Recommended Locations for Standard Steel Doors and Frames".

Provide installers with all necessary information prior to start of hardware installation.

Closers shall be installed according to Manufactures templates and installation instructions. Unless required otherwise installation shall be on pull side of door.

Where closer or arm is installed on door sex bolts, finished to match other hardware, will be used.

Degree of opening to be as shown on the plans and indicated on the reviewed hardware schedule

Installation of all Automatic Operators items to be performed by AAADM certified and Manufacture authorized personnel including connections to hardware products installed by others.

Seal all Weather, soundproof and light proof stripping and thresholds with suitable caulking to ensure gaps are properly closed.

Install key control cabinet.

3.4. FIELD QUALITY CONTROL

Consultant will engage an independent qualified hardware consultant to review and examine quality and installation of finished hardware as follows:

Inspection will be made at completion of installation of all products. A detailed report will be made in writing to the Architect and Contractor concerning any problems which affect the proper operation of hardware. Installers should be present to make any adjustments to materials as determined by this inspection.

3.5. COMMISSIONING

Site visit and training prior to substantial completion as directed by Engineer/Architect.

Provide ten [10] month warranty service and other warranty visits when requested by Consultant.

3.6. Adjusting and Cleaning:

At final completion, hardware shall be left clean and free from disfigurement.

Make a final adjustment to all door closers and other necessary items.

Where hardware is found defective, repair, replace or correct as directed by inspection reports.

Cleaning of hardware shall not be made with any abrasive materials or paint remover type chemicals. Hardware items use lacquer coatings which can be damaged if not properly cleaned.

3.7.HARDWARE GROUPS:

Provide following hardware groups for each location listed:

Hardware Group -

All Entry Doors

1 Passage Lever RHO 626

1 Single Cylinder Deadbolt 626

Hinges By Door Supplier

Hardware Group -

Workshop Door #301 & FRC Bay # 304

(Masonite or approved Alternate c/w 3 hinges)

1 Passage Lever AL10 RHO 626

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 07 82 00 – Joint Sealants.
- .2 Section 08 11 14 – Metal Doors & Frames.
- .3 Section 08 11 16 – Aluminum Doors and Frames.
- .4 Section 08 14 16 – Flush Wood Doors.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM C542, Specification for Lock-Strip Gaskets.
 - .2 ASTM D2240, Test Method for Rubber Property – Durometer Hardness.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.1, Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.3, Clear Float Glass
 - .3 CAN/CGSB-12.5, Mirrors, Silvered.
 - .4 CAN/CGSB-12.8, Insulating Glass Units.
 - .5 CAN/CGSB-12.11, Wired Safety Glass.
- .5 Canadian Standards Association (CSA).
 - .1 CSA A440.2, Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors.
- .6 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual.
- .7 Laminators Safety Glass Association (LSGA).
 - .1 LSGA Laminated Glass Design Guide.

1.3 SYSTEM DESCRIPTION

- .1 Performance Requirements:
 - .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330n and NBC latest edition.
 - .3 Limit glass deflection to 1/200 with full recovery of glazing materials.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .3 Closeout Submittals:
 - .1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

1.5 QUALITY ASSURANCE

- .1 Perform work in accordance with FGMA Glazing Manual IGMAC and Laminators Safety Glass Association – Standards Manual for glazing installation methods. Provide shop inspection and testing for glass.
- .3 Provide certificate of quality compliance from manufacturer.

1.6 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to including glass glazing, and perimeter air barrier and vapour retarder seal.
- .3 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Construct mock-up where directed.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

- .6 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with work.

1.7 WARRANTY

- .1 Provide ten (10) year warranty for glazing units.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Install glazing when ambient temperature is 10°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: FLAT GLASS

- .1 Float glass: to CAN/CGSB-12.3, Glazing quality, 5 mm minimum thickness.
- .2 Fire Glass : PYRAN PLATINUM BY GLASSOPOLIS or equal to achieve a 45 minute fire resistance rating for use in 45 minute fire rated doors to unit size as indicated on the drawings. Provide suitable frame to be set in door to achieve the same 45 minute fire resistance rating.
- .3 Fire and Safety Rated Glass : PYRAN PLATINUM L BY GLASSOPOLIS or equal to achieve the required fire resistance rating for use in fire rated doors to unit size as indicated on the drawings. Provide suitable frame to be set in door to achieve the same fire resistance rating.
- .4 Safety glass: to CAN/CGSB-12.5, transparent, 6 mm thick.
 - .1 Type 1, Laminated, Type 2 - tempered
 - .2 Class B - float
 - .3 Category 11
- .5 Silvered mirror glass: to CAN/CGSB-12.5, 4 mm thick.
 - .1 Type 1A - Float glass for normal use
- .6 Glass for cabinet and millwork: to CAN/CGSB-12.5, transparent, minimum 4.0 mm thick, unless otherwise indicated.
 - .1 Type 1 - Clear Laminated or Type 2 - Tempered.

2.2 MATERIALS: SEALED INSULATING GLASS

- .1 .1 Insulating glass units: to CAN/CGSB-12.8, triple unit, minimum 42.9 mm overall thickness (as per NBCC for window area and climatic conditions.)
 - .1 Insulating Glass Unit Construction: 6mm SolarBronze + 13mm Argon filled space + 6mm Solarban 70 on clear + 13mm air space + 6mm Clear
 - .2 Transmittance Visible %: minimum 35
 - .3 U-Value, winter nighttime = max. 0.18
 - .4 U-Value, summer daytime = max. 0.17
 - .5 Solar heat gain co-efficient = 0.22
 - .6 Light to solar Gain: 1.59
 - .7 Shading Coefficient: 0.25
 - .8 Exterior Solar Reflectance %: 21
 - .9 Insulating glass units: to CAN/CGSB-12.8, triple
 - .10 Submit an actual triple glazed unit as specified to the Architect for review prior to placing order.
- .2 Insulating glass units for exterior steel doors: to CAN/CGSB-12.8, double unit, minimum 22 mm overall thickness (as per NBCC for window area and climatic conditions.)
 - .1 Glass: to CAN/CGSB-12.1, tempered.
 - .2 Glass thickness: minimum 4.5 mm each light (as per NBCC for window area and climatic conditions.)
 - .3 Inner-cavity space thickness: 13 mm.
 - .4 Glass coating: surface number 2 (inside face of outer light), low "E".
 - .5 Inert gas: argon.

2.2 MATERIALS

- .1 Sealant: 07 92 00 – Joint Sealants.

2.3 ACCESSORIES

- .1 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height.
- .2 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
 - .1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.

- .4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.
- .5 Glazing clips: manufacturer's standard type.
- .6 Lock-strip gaskets: to ASTM C542.

PART 3 EXECUTION

3.1 EXAMINATION

- .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.

3.2 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION: EXTERIOR – WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

- .1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
- .3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .5 Rest glazing on setting blocks and push against tape and heel of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line.
- .7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

- .8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 INSTALLATION: INTERIOR DRY METHOD (TAPE AND TAPE)

- .1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .3 Place setting blocks at 1/4 with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .5 Place glazing tape on free perimeter of glazing in same manner described in 3.4.3. Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .7 Knife trim protruding tape.

3.5 INSTALLATION: MIRRORS

- .1 Set mirrors with clips. Anchor rigidly to wall construction.
- .2 Set in frame.
- .3 Place plumb and level.

3.6 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.7 PROTECTION OF FINISHED WORK

- .1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF SECTION

1.0 SCOPE AND PURPOSE

- 1.1 These specifications establish the requirements for test specimens, apparatus, sampling, test procedures and test reports to be used in evaluating the performance of newly installed windows, storefronts, curtain walls and sloped glazing systems and their installation during construction; ("Test Area" hereafter referred to as "specimen").
- 1.2 The purpose of this specification is to provide a method which can be used to evaluate the installed performance of windows, storefronts, curtain walls and sloped glazing systems for air leakage and resistance to water penetration under controllable and reproducible test conditions intended to simulate wind driven rain events. Field air leakage testing is not recommended for a portion of continuous framing systems (bypassing floors) due to the complexity of compartmentalizing air chambers and cavities within these systems.

2.0 TEST AGENCY REQUIREMENTS

- 2.1 Testing shall be performed by a qualified testing agency.
- 2.2 A team of two individuals shall set-up and execute the testing program.
- 2.3 The testing shall be performed by a Professional Engineer with curtain wall design/failure investigation expertise.
- 2.4 All calibrated testing equipment and chamber materials are to be supplied by the testing agency.

3.0 COST

- 3.1 All costs associated with execution of this testing specification shall be borne by the contractor and included as part of the construction project bid price.
- 3.2 Contractor is to provide to the testing agency with:
 - all access (interior and exterior) required to perform the testing on the units selected;
 - adequate water and power supply per the requirements of the testing agency; including hoses and power cords, and
 - 1 labourer to assist with the execution of the testing and clean-up following the testing.

4.0 TEST METHODS

- 4.1 Field testing procedure and test apparatus shall meet the requirements of the following referenced ASTM test method. The most current revision of the ASTM method shall be identified in the specifications. If a revision number is not referenced, then the version current during the bidding stage of the project shall be used.

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4.1.1 Resistance to air infiltration using static air pressure difference: ASTM E 783, "Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors."

4.1.2 Resistance to water penetration using static air pressure difference: ASTM E 1105, "Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors and Curtain Walls and by Uniform or Cyclic Static Air Pressure Difference."

4.2 TEST CHAMBER ARRANGEMENT

4.2.1 Joints (transition seals) between the specimen and the adjacent wall, curb or roof shall be included in the test specimen. The test chamber shall be applied to the interior of the wall, curb or roof construction in such a manner as to create a pressure differential across the specimen assembly, including perimeter frame intersections and perimeter seals, subframes, receptors and flashing.

It is not practical to install a chamber on a segment of a continuous horizontal or vertical member; therefore air leakage testing of these systems is not recommended.

4.2.2 Testing shall be performed immediately after the first units have been installed and regularly thereafter. All testing is to be performed prior to the installation of drywall or interior finish wall/roof materials but after the transition seal from the glazing system to the adjacent wall system is installed. If interior finish wall/roof materials have been installed, they shall be removed at the test area to allow visual access to these areas to check for water penetration, or other means of visual access shall be provided. The test chamber shall be applied to the wall/roof system in such a manner as to apply a pressure differential to all joinery conditions and minimize extraneous air leakage.

5.0 SAMPLING

5.1 As soon as practical after installation has begun, and after the test specimen has been completely installed, adjusted, cleaned and perimeter sealed (including adequate time for the sealant to cure), and signed off by the glazing installer, the specimen shall be tested for air leakage and water penetration resistance as specified in Section 6.0.

5.1.1 All trades and contractors involved and responsible for the test specimen performance (i.e. manufacturer, erector, glazier, perimeter transition seal contractor, etc.) shall be made aware of the test date and invited to witness the testing.

5.2 If any of the specimen(s) do not conform to the prescribed air leakage and water penetration resistance requirements, the manufacturer and/or the installer shall be afforded the opportunity to perform a site inspection and determine the reason for non-compliance. Non-compliant specimen(s) shall be repaired as required and retested as soon as practical. The remedial work shall be recorded and approved by the specifying authority, architect and/or owner. Upon satisfactorily passing a retest, the remedial work performed shall become punch list items to randomly check for similar conditions on the entire project.

If water leakage is observed and the source of the leakage cannot be determined, a forensic evaluation using the procedures outlined in AAMA 511 shall be performed while maintaining the test pressures defined in the field testing specifications, and employing the test methods defined in AAMA 503.

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5.3 The following testing schedule shall be followed:

5.3.1 Test #1: Mock-up Sample, which is considered to be the first assembly installed on the project; installation of the project glazing assemblies is not to progress until the mock-up assembly testing is deemed a pass by the owner's representative or the owner provides instruction to continue with the glazing assembly installation irrespective of the mock-up results.

- 1 window sample
- 1 curtain wall sample - to include spandrel and expansion joint where possible

5.3.2 Test three (3) glazing assemblies during the construction of the project, but prior to 30% of the installation being complete.

5.3.3 For every failure other than the mock-up assembly, test an additional two (2) assemblies.

5.4 The test area specimen(s) shall conform to the following:

5.4.1 The test specimen's size and location shall be selected by the architect or owner's representative. If the specimen location has not been pre-determined, the location shall be selected by the architect or owner's representative.

5.4.2 If no specimen size and/or location is identified in the construction documents, select an appropriate size specimen that will provide representative performance data, usually a minimum of 9.3 m² (100 ft²). The specimen shall include, perimeter (transition) seals, typical splices, frame intersections, and, if applicable, at least two entire vision lites and two entire spandrel lites (where applicable) containing an intermediate vertical and an intermediate horizontal.

5.4.3 The test specimen shall be representative of typical installations and construction for the project. The specimen(s) shall have no outstanding punch list items or visible damage or irregularities, nor be singled out because of obvious performance problems.

5.4.4 After the specimen(s) locations have been selected, the responsible contractor and/or manufacturer representative are to remove interior finishes (if necessary), to clean the specimen(s) and remove adjoining sheetrock, trim, insulation or other materials, which could adversely affect the test chamber attachment and visual inspection. Care shall be taken not to disturb the interior air seal, if present. Interior or exterior components that are required for product performance shall not be removed as some product installations require an interior air seal to perform as designed.

6.0 TEST PROCEDURES

6.1 Air leakage resistance and water penetration resistance tests shall be performed at pressures specified in Sections 6.2 and 6.3.

6.1.1 Where both tests are to be conducted in sequence, the test for air leakage resistance shall be conducted before the test for water penetration resistance. If there is reason to believe that residual water from rain or other sources may be located in the specimen, a two-minute negative (outward) pressure test followed by a two-minute positive (inward) pressure test shall be conducted at the same pressure differential used for the performance test to purge the specimen of any residual

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- water. The specimen gaskets or weatherstrips shall be examined and shall be dry before proceeding with the air leakage resistance test.
- 6.2 An air leakage resistance test shall be conducted at a minimum uniform static test pressure of 75 Pa (for windows) or 300 Pa (for curtain wall) or as specified for the project. Air leakage resistance shall be determined per ASTM E 783.
- 6.2.1 The maximum allowable rates of air leakage for field testing shall meet the rating of A3 as defined in CSA-A440/A440.1. for operable units and "fixed" for non operable units.
- 6.3 Water penetration resistance performance shall be determined per ASTM E 1105 using Procedure A, "Uniform Static Air Pressure Difference."
- 6.3.1 The field water penetration resistance tests shall be conducted at the specified project water penetration test pressure, but not less than 200 Pa (4.18 psf). If no pressure has been specified, refer to the following table, National Building Code or CSA A440. Use the largest pressure that does not exceed the rated performance for the assembly being tested, but it is strongly recommended that the glazing product utilized on the project, as a minimum, meet the following requirement:
- | | |
|-----------------------|-------------------------|
| a. Argentia B5 | j. Grand Bank B6 |
| b. Bonavista B6 | k. Grand Falls B4 |
| c. Cape Harrison B5 | l. Labrador City B2 |
| d. Cape Race B6 | m. Port aux Basques B6 |
| e. Churchill Falls B2 | n. St. Anthony B6 |
| f. Buchans B3 | o. <u>St. John's B6</u> |
| g. Corner Brook B5 | p. Stephenville B5 |
| h. Gander B4 | q. Wabana B6 |
| i. Goose Bay B3 | r. Wabush B2 |
- 6.3.2 With all operable portions of the specimen closed and locked, the specimen shall be subjected to a water penetration test in accordance with ASTM E 1105 with continuous pressure and water application. Observe and note all points of water penetration, if any, that occur during the test. If the origin of the water leakage cannot be definitively attributed to either the product specimen or the joint between the product specimen and the surrounding condition, a forensic evaluation shall be performed using the procedures outlined in AAMA 511 while maintaining the test pressures defined in the field testing specifications and employing the test methods defined in AAMA 503.
- 6.3.3 Water penetration:
- 6.3.3.1 Attributable to the surrounding condition shall be defined as the presence of uncontrolled water which did not originate from the product specimen or the joint between the product specimen and the wall/roof.
- 6.3.3.2 Water penetration attributable to the product specimen shall be defined as the penetration of water beyond a plane parallel to the glazing (vertical plane) intersecting the inner most projection of the

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test specimen, not including interior trim and hardware, underspecified conditions of air pressure difference across the specimen, and that indisputably originates from the product.

6.3.3.3 Water penetration attributable to the perimeter joint shall be defined as uncontrolled water that indisputably originates at the joint.

7.0 TEST REPORTS

7.1 The report shall include enough information to reproduce the test. At a minimum, the following information shall be included:

7.1.1 General

The testing agency, name of the individual(s) performing the tests, test witnesses, date and time of test, date of report, identification and location of the building shall be identified. The date of the last equipment calibration and the location of calibration records shall also be included in the report.

7.1.2 Glazing Product Description

The manufacturer, model, operation type (if applicable), dimensions, materials, etc; identification and location of specimen(s) within the building; physical condition of specimen; description of any modifications made to the specimen; number of retests, etc. The test agency shall report the plumb, level and square condition of the tested specimen.

7.1.3 Sampling Procedures

If applicable, describe or list the procedures established from Section 3.0.

7.1.4 Test Parameters

List or describe the specified static pressure differential(s) used in the test, whether the chamber was affixed to the interior or exterior of the wall/roof, and provide a detailed description (include sketches showing location, if appropriate) of the chamber attachment to the specimen. Provide a written description of any measures that were taken to control ambient conditions. Clearly identify any elements of the specimen that were not tested. Verify in a statement that the sample was inspected immediately prior to the test or installation of the chamber if it conceals portions of the specimen, that the original conditions were observed and documented, and that all surfaces were dry, such that water observed during or after testing was produced by the test itself and no other possible source.

7.1.5 Test Results

Record the following:

- Actual and allowable air leakage for the product specimen.
- Actual and allowable water penetration for the product specimen.
- Actual and allowable water penetration for the perimeter condition.
- Environmental conditions as measured at the time of the test: wind speed, wind direction, precipitation, barometric pressure and ambient temperature.

7.1.6 Additional Observations

If problems with a specimen installation are observed, they shall be brought to the responsible contractor's and/or manufacturer representative's attention.

The observations to be recorded shall include but not be limited to the following:

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- Deterioration of building elements due to water penetration
- Deviations of the installation from the drawings of record
- Staining or discoloration of building components
- Evidence of damage to either the installed product or the surrounding building elements
- Unusual or unexpected evidence of water penetration or air leakage which would require remediation
- Any observed performance or installation details which might be deemed of importance to a subsequent forensic investigation.

7.1.7 Compliance Statement

Make a statement that the tests were conducted in accordance with this specification or completely describe any deviation. Also, state whether or not the results indicate compliance with the field testing specification requirements.

END OF SECTION

.1 GENERAL

1.2 RELATED SECTIONS

- .1 Section 07 82 00 – Joint Sealants.
- .2 Section 08 11 14 – Metal Doors & Frames.
- .3 Section 08 11 16 – Aluminum Doors and Frames.
- .4 Section 08 14 16 – Flush Wood Doors.

1.3 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM C542, Specification for Lock-Strip Gaskets.
 - .2 ASTM D2240, Test Method for Rubber Property – Durometer Hardness.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.1, Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.3, Clear Float Glass
 - .3 CAN/CGSB-12.5, Mirrors, Silvered.
 - .4 CAN/CGSB-12.8, Insulating Glass Units.
 - .5 CAN/CGSB-12.11, Wired Safety Glass.
- .5 Canadian Standards Association (CSA).
 - .1 CSA A440.2, Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors.
- .6 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual.
- .7 Laminators Safety Glass Association (LSGA).
 - .1 LSGA Laminated Glass Design Guide.

1.4 SYSTEM DESCRIPTION**.1 Performance Requirements:**

- .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330n and NBC latest edition.
 - .3 Limit glass deflection to 1/200 with full recovery of glazing materials.

1.5 SUBMITTALS**.1 Product Data:**

- .1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Manufacturer's Instructions:

- .1 Submit manufacturer's installation instructions.

.3 Closeout Submittals:

- .1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

1.6 QUALITY ASSURANCE

- .1 Perform work in accordance with FGMA Glazing Manual IGMAC and Laminators Safety Glass Association – Standards Manual for glazing installation methods. Provide shop inspection and testing for glass.
- .3 Provide certificate of quality compliance from manufacturer.

1.7 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to including glass glazing, and perimeter air barrier and vapour retarder seal.
- .3 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Construct mock-up where directed.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

- .6 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with work.

1.8 WARRANTY

- .1 Provide ten (10) year warranty for glazing units.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Install glazing when ambient temperature is 10°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: FLAT GLASS

- .1 Float glass: to CAN/CGSB-12.3, Glazing quality, 5 mm minimum thickness.
- .2 Fire Glass : PYRAN PLATINUM BY GLASSOPOLIS or equal to achieve a 45 minute fire resistance rating for use in 45 minute fire rated doors to unit size as indicated on the drawings. Provide suitable frame to be set in door to achieve the same 45 minute fire resistance rating.
- .3 Fire and Safety Rated Glass : PYRAN PLATINUM L BY GLASSOPOLIS or equal to achieve the required fire resistance rating for use in fire rated doors to unit size as indicated on the drawings. Provide suitable frame to be set in door to achieve the same fire resistance rating.
- .4 Safety glass: to CAN/CGSB-12.5, transparent, 6 mm thick.
 - .1 Type 1, Laminated, Type 2 - tempered
 - .2 Class B - float
 - .3 Category 11
- .5 Silvered mirror glass: to CAN/CGSB-12.5, 4 mm thick.
 - .1 Type 1A - Float glass for normal use
- .6 Glass for cabinet and millwork: to CAN/CGSB-12.5, transparent, minimum 4.0 mm thick, unless otherwise indicated.
 - .1 Type 1 - Clear Laminated or Type 2 - Tempered.

2.2 MATERIALS: SEALED INSULATING GLASS

- .1 Insulating glass units for Glazed Aluminum Curtain Wall: to CAN/CGSB-12.8, double unit, minimum 25mm overall thickness (as per NBCC for window area and climatic conditions.)
 - .1 Glass: to CAN/CGSB-12.3
 - .1 Exterior Lite; 6mm, Heat Strengthened, clear, tempered.
 - .2 Interior Lite; 6mm, Low E, tempered
 - .2 Glass thickness: minimum 6 mm each light (as per NBCC calculations for window area and climatic conditions.)
 - .3 Inter-cavity space thickness: 13 mm.
 - .4 Inert gas: argon.
 - .5 Light transmittance: minimum 0.25.
- .2 Insulating glass units for exterior steel doors: to CAN/CGSB-12.8, double unit, minimum 22 mm overall thickness (as per NBCC for window area and climatic conditions.)
 - .1 Glass: to CAN/CGSB-12.1, tempered.
 - .2 Glass thickness: minimum 4.5 mm each light (as per NBCC for window area and climatic conditions.)
 - .3 Inner-cavity space thickness: 13 mm.
 - .4 Glass coating: surface number 2 (inside face of outer light), low “E”.
 - .5 Inert gas: argon.
- .3 Insulating glass units for exterior aluminum doors in curtain wall: to CAN/CGSB-12.8, double unit, minimum 22 mm overall thickness (as per NBCC for window area and climatic conditions.)
 - .1 Glass: to CAN/CGSB-12.1, tempered.
 - .2 Glass thickness: minimum 4.5 mm each light (as per NBCC for window area and climatic conditions.)
 - .3 Inner-cavity space thickness: 13 mm.
 - .4 Glass coating: surface number 2 clear”, and surface number 3 Low E tempered.
 - .5 Inert gas: argon.

2.2 MATERIALS

- .1 Sealant: 07 92 00 – Joint Sealants.

2.3 ACCESSORIES

- .1 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height.

- .2 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
 - .1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.
- .4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.
- .5 Glazing clips: manufacturer's standard type.
- .6 Lock-strip gaskets: to ASTM C542.

PART 3 EXECUTION

3.1 EXAMINATION

- .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.

3.2 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION: EXTERIOR – WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

- .1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
- .3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

- .5 Rest glazing on setting blocks and push against tape and heel of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line.
- .7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
- .8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 INSTALLATION: INTERIOR DRY METHOD (TAPE AND TAPE)

- .1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .3 Place setting blocks at 1/4 with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .5 Place glazing tape on free perimeter of glazing in same manner described in 3.4.3. Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .7 Knife trim protruding tape.

3.5 INSTALLATION: MIRRORS

- .1 Set mirrors with clips. Anchor rigidly to wall construction.
- .2 Set in frame.
- .3 Place plumb and level.

3.6 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.

- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.7 PROTECTION OF FINISHED WORK

- .1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF SECTION

PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 07 92 00 - Joint Sealants.
- .2 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C645, Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C754, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.40, Primer, Structural Steel, Oil Alkyd Type.

PART 2 PRODUCTS**2.1 MATERIALS**

- .1 Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.91 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
 - .1 Stud sizes shall be as indicated on the drawings
 - .2 Bottom track: single piece.
 - .3 Top track: single piece track **or** double track **or** slotted single top track. (double track or slotted single top track to accommodate deflection).
- .2 Acoustical sealant: to Section 07 92 00 – Joint Sealants.
- .3 Insulating strip: rubberized, moisture resistant 3 mm thick cork foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.
- .4 Dampproof course: closed cell, polyethylene foam, 6.3 mm thick, 89 mm wide.

PART 3 EXECUTION**3.1 ERECTION**

- .1 Align partition tracks at floor and ceiling and secure at 600 mm o.c. maximum.

- .2 Allow minimum deflection gap of 16.5 mm for double track or slotted single top track.
- .3 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .4 Place studs vertically not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .5 Erect metal studding to tolerance of 1:1000.
- .6 Attach studs to bottom and ceiling track using screws.
- .7 Co-ordinate erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .8 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .13 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .14 Extend partitions to ceiling height except where noted otherwise on drawings.
- .15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
- .16 Install continuous insulating strips to isolate studs from uninsulated surfaces, where applicable.
- .17 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.2 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 **GENERAL****1.1** **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 32 17 23 - Pavement Marking.

1.2 **REFERENCES**

- .1 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual
- .3 Society for Protective Coatings (SSPC).
 - .1 SSPC Painting Manual, Systems and Specifications Manual.
- .4 National Fire Code of Canada.

1.3 **QUALITY ASSURANCE**

- .1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Qualified journeyman shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .3 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Products" listing and shall be from a single manufacturer for each system used.

- .5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
- .6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Owner's Representative.
- .7 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.
 - .2 Ceilings: No defects visible from floor at 45° to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

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

1.5 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Owner's Representative for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Owner's Representative for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.6 SUBMITTALS

- .1 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used.
- .2 Submit WHMIS - MSDS - Material Safety Data Sheets.
- .3 Upon completion, submit records of products used, records to be included in Operation and Maintenance Manuals. List products in relation to finish system and include the following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 Manufacturer's Material Safety Data Sheets (MSDS).
 - .5 MPI Environmentally Friendly classification system rating.
- .4 Submit manufacturer's application instructions for each product specified.

- .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 3 mm plate steel for finishes over metal surfaces.
 - .2 13 mm birch plywood for finishes over wood surfaces.
 - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
- .6 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.
- .7 Submit full range of available colours where colour availability is restricted.

1.7 QUALITY CONTROL

- .1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 When requested by the Owner's Representative or Paint Inspection Agency, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit 1 - 4 litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.
- .3 Deliver to Owner's Representative and store where directed.

1.9 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 Provide and maintain dry, temperature controlled, secure storage.
- .6 Observe manufacturer's recommendations for storage and handling.
- .7 Store materials and supplies away from heat generating devices.
- .8 Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C.
- .9 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .10 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .11 Remove paint materials from storage only in quantities required for same day use.
- .12 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .13 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.
- .14 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.10 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 Owner's Representative and, applied product manufacturer, perform no painting 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 the relative humidity is above 85% or when dew point is less than 3°C variance between air/surface temperature.
 - .5 rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when maximum moisture content of substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
 - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint only when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes only 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 painting 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.
- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of the Owner's Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 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 Owner's Representative.
- .6 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal.
- .7 Material which 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 ground follow these procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .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 approved legal manner in accordance with hazardous waste regulations.
- .10 Empty paint cans are to be dry prior to recycling.

PART 2 **PRODUCTS****2.1** **MATERIALS**

- .1 Paint materials listed in the latest edition of the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for each coating formula to 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, adhesives, solvents, cleaners, lubricants, and other fluids, shall:
 - .1 be water-based, water soluble, water clean-up.
 - .2 be non-flammable
 - .3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .4 be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .5 Water-borne surface 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 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Water-borne surface coatings must have a flash point of 61.0°C or greater.
- .8 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.
- .9 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

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2.2 COLOURS

- .1 Colours to be selected by the Owner's Representative except as shown in the drawings.
- .2 Second coat in a three coat 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 only with Owner's 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 any 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 Owner's 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 values:

Gloss Level /Category	Units @ 60°/	Units @ 85°
G1 - matte finish	0 to 5	max. 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	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

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

2.5 EXTERIOR PAINTING SYSTEMS

- .1 The following paint formulas requires a three coat finish as indicated in the MPI Architectural Painting Specifications Manual.
- .2 Concrete Vertical Surfaces: (including horizontal soffits)
 - .1 EXT 3.1A – Latex G4 finish
- .3 Concrete Horizontal Surfaces: decks

- .1 EXT 3.2D - Alkyd floor enamel G4 finish.
- .4 Structural Steel and Metal Fabrications:
 - .1 EXT 5.1J - Pigmented polyurethane finish (over high build epoxy).
- .5 Galvanized Metal: not chromate passivated
 - .1 EXT 5.3D - Pigmented polyurethane finish for use in high contact/high traffic areas.

PART 3 **EXECUTION**

3.1 **GENERAL**

- .1 Perform preparation and operations for exterior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.
- .2 Apply all paint materials in accordance with paint manufacturer's written application instructions.

3.2 **EXISTING CONDITIONS**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Owner's Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Owner's Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Concrete: 12%.
 - .2 Clay and Concrete Block/Brick: 12%.
 - .3 Wood: 15%.

3.3 **PROTECTION**

- .1 Protect existing building surfaces and adjacent structures from paint splatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Owner's 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 passing pedestrians, building occupants and general public in and about the building.
- .6 Remove electrical cover plates, light fixtures, surface hardware on doors, and all other surface mounted fittings, equipment and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.
- .7 As painting operations progress, place "WET PAINT" signs in areas of work to approval of Owner's Representative.

3.4 CLEANING AND PREPARATION

- .1 Clean and prepare exterior surfaces in accordance with MPI Painting Specification Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other 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 other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 Prevent contamination of cleaned surfaces before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .3 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .4 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove

traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes or blowing with clean dry compressed air.

- .6 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.
- .7 Do not apply paint until prepared surfaces have been accepted by Owner's Representative.

3.5 APPLICATION

- .1 Method of application to be as approved by Owner's 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 shall 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 as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Owner's Representative.
- .5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Paint fire protection piping to match adjacent wall and ceilings.
- .4 Do not paint over nameplates.

3.7 FIELD QUALITY CONTROL

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

3.8 RESTORATION

- .1 Clean and re-install all 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 exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect surfaces from paint droppings and dust to approval of Owner's Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Owner's Representative.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings; submit drawings stamped and signed for approval by Departmental Representative.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .6 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .7 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.

- .3 Special performance data as specified.
- .8 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .9 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .10 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings or AutoCAD files. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour for each service.
 - .4 Make available for reference purposes and inspection.
- .11 As-built drawings:
 - .1 Submit to Departmental Representative for approval and make corrections as directed.
 - .2 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Testing and Quality Control.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.4 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.

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- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 All materials used on this project shall be new and CSA approved unless noted otherwise.

Part 3 Execution

3.1 PAINTING, REPAIRS AND RESTORATION

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 – Testing and Quality Control and submit report.
 - .1 Perform tests as specified in other sections of this specification.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed by Departmental Representative.

3.4 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Departmental Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This Section includes requirements for selective demolition and removal of plumbing and related mechanical components and incidentals required to complete work described in this Section ready for new construction.

1.2 RELATED REQUIREMENTS

- .1 Section 02 41 99 – Demolition for Minor Works.

1.3 REFERENCES

- .1 CSA Group (CSA)
 - .1 CSA S350 M1980, Code of Practice for Safety in Demolition of Structures

1.4 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB s, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide in accordance with Section 01 33 00 – Submittal Procedures before starting work of this Section:

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling:
 - .1 Account for Owner's continued occupancy requirements during selective demolition with Section 02 41 19.16 - Selective Interior Demolition and schedule staged occupancy and worksite activities Owner.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
 - .1 Provincial/Territorial Workers' Compensation Boards/Commissions.
 - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs.

1.8 SITE CONDITIONS

- .1 Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination before tendering.
- .2 Discovery of Hazardous Substances:
 - .1 Immediately notify Owner if materials suspected of containing hazardous substances are encountered.
- .3 Hazardous Substances:
 - .1 Reference Section 02 81 01 – Hazardous Materials.

1.9 SALVAGE AND DEBRIS MATERIALS

- .1 Demolished items become Contractor's property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain the Owner's property.
- .2 Carefully remove materials and items designated for salvage and store in a manner to prevent damage or devaluation of.

Part 2 Products**2.1 MATERIALS**

- .1 General Patching and Repair Materials: Refer to Section 02 41 99 – Demolition for Minor Works for listing of patching and repair materials incidental to removal or demolition of components associated with work of this Section.
- .2 Plumbing Repair Materials: Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials

are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.

- .3 Fire stopping Repair Materials: Use listed fire stopping materials compatible with existing fire stopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Existing Conditions:
 - .1 Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid.
 - .2 Owner will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.
- .2 Identify on-site removal of walls and ceilings required to facilitate work.
- .3 Identify on-site testing of piping to facilitate work.
- .4 Identify risks from hazardous materials prior to commencing work.
- .5 Ensure hazardous materials are removed or abated prior to commencing demolition.
- .6 For components intended for relocation and reuse; remove, protect, store, clean, reinstall and connect to plumbing system. Recommission.

3.2 PREPARATION

- .1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
 - .1 Prevent movement and install bracing to prevent damage of adjacent services and parts of existing buildings scheduled to remain.
 - .2 Notify Departmental Representative and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
 - .3 Prevent debris from blocking drainage inlets.
 - .4 Protect mechanical systems that will remain in operation.
- .2 Protection of Building Occupants: Sequence demolition work so that interference with the use of the building by the Owner and users is minimized and as follows:
 - .1 Prevent debris from endangering safe access to and egress from occupied buildings.

- .2 Notify Owner and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.3 EXECUTION

- .1 Coordinate requirements of this Section with information contained in Section 02 41 99 – Demolition for Minor Works.
 - .1 Disconnect and cap mechanical services in accordance with requirements of local Authority Having Jurisdiction.
 - .2 Do not disrupt active or energized utilities without approval of the Owner.
 - .3 Erect and maintain dust proof and weather tight partitions to prevent the spread of dust and fumes to occupied building areas; remove partitions when complete.
 - .4 Demolish parts of existing building to accommodate remedial work as indicated.
 - .5 At end of each work day, leave worksite in safe condition.
 - .6 Perform demolition work in a neat and workmanlike manner:
 - .1 Remove tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
 - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
 - .7 Conduct demolition of plumbing systems in accordance with local Authorities Having Jurisdiction (AHJ's) and National Plumbing Code of Canada. (Latest Edition)

3.4 CLOSEOUT ACTIVITIES

- .1 Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction.

END OF SECTION

PART 1**General****1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings; submit drawings stamped and signed for approval by Departmental Representative.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .3 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
 - .4 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings or AutoCAD files. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

- .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
- .3 Use different colour for each service.
- .4 Make available for reference purposes and inspection.
- .5 As-built drawings:
 - .1 Submit to Departmental Representative for approval and make corrections as directed.
 - .2 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .3 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .6 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.4 MAINTENANCE

- .1 Clean and/or vacuum interior filters of all mini-split/heat pump systems after completion of construction.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

1.6 MATERIALS

- .1 All materials used on this project shall be new and CSA approved unless noted otherwise.

PART 3 EXECUTION

1.7 REINSTATEMENT OF EXISTING EQUIPMENT

- .1 Refrigerant Piping and Systems:
 - .1 Bleed inert gas into pipe during brazing.
 - .2 Remove valve internal parts, solenoid valve coils, sight glass.

- .3 Do not apply heat near expansion valve and bulb Leak test to CSA B52 before evacuation to 2 MPa and 1 MPa on high and low sides respectively.
 - .4 Test Procedure: Build pressure up to 35 kPa using nitrogen leave for 8 hours.
 - .5 Charge system through filter-drier and charging valve on high side. Low side charging not permitted.
 - .6 With compressors off, charge only amount necessary for proper operation of system. If system pressures equalize before system is fully charged, close charging valve and start up. With unit operating, add remainder of charge to system.
 - .7 Re-purge charging line if refrigerant container is changed during charging process.
- .2 Ventilation Systems:
- .1 Material – Stainless Steel or Galvanized Steel to match existing construction.
 - .2 Extend and seal ducting as needed to facilitate installation of new building envelope components.
 - .3 Duct Fabrication: to SMACNA.
 - .4 Duct Sealant: oil resistant, polymer type flame resistant duct sealant. Temperature range of minus 30°C to plus 93°C. Tape: polyvinyl treated, open weave fiberglass tape, 50 mm wide.
 - .1 Apply sealant to outside of joint to manufacturer's recommendations.
 - .2 Bed tape in sealant and recoat with minimum of one coat of sealant to manufacturer's recommendations. Sealant and tape to be applied to full perimeter of duct.
 - .5 Hoods, Vents:
 - .1 Remove and reinstate. Install and reseal openings per Section 07 92 00 – Joint Sealants.

1.8 PAINTING, REPAIRS AND RESTORATION

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

1.9 CLEANING

- .1 Protect open ends of ducts, diffusers, grilles, registers and equipment during construction to prevent ingress of dust and dirt into interior of ducts. If dust or dirt is detected prior to startup, vacuum interior of all ducts and equipment.

1.10 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 – Testing and Quality Control and submit report.
 - .1 Submit tests as specified in other sections of this specification.

- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in Division 01.

1.11 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Departmental Representative may record these demonstrations on video tape for future reference.

1.12 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1**General****1.1 SUMMARY**

- .1 This Section includes requirements for selective demolition and removal of heating, ventilation and air conditioning systems, controls and automated automation components, and related mechanical components and incidentals required to complete work described in this Section.

1.2 RELATED SECTIONS

- .1 Section 01 74 00 – Cleaning.
- .2 Section 01 74 21 – Construction / Demolition Waste Management and Disposal

1.3 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.

1.4 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Account for Owner's continued occupancy requirements during selective demolition and schedule staged occupancy and worksite activities.

1.6 SITE CONDITIONS

- .1 Condition of materials identified as being salvaged or demolished are based on their observed condition on date that tender is accepted.

1.7 SALVAGE AND DEBRIS MATERIALS

- .1 Demolished items become Contractor's property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain Owner's property.
- .2 Carefully remove materials and items designated for salvage and store in a manner to prevent damage or devaluation of materials

Part 2 Products**2.1 MATERIALS**

- .1 Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.
- .2 Use listed fire stopping materials compatible with existing fire stopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

Part 3 Execution**3.1 EXAMINATION**

- .1 Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Owner will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.
- .2 Identify on-site removal of existing equipment needed to facilitate exterior building envelope improvement.
- .3 Identify on-site testing of ductwork and equipment to facilitate the work.

3.2 PREPARATION

- .1 Protect systems and components indicated to remain in place during selective demolition operations and as follows:
 - .1 Prevent debris from blocking drainage inlets.
 - .2 Protect mechanical systems that must remain in operation.
 - .3 Ensure hazardous materials are removed or abated prior to commencing demolition.
 - .4 For components intended for relocation and reuse, remove, store, protect, clean and reinstall and connect to HVAC systems, and recommission.
- .2 Sequence demolition work so that interference with the use of the building by the Owner and users is minimized and as follows:
 - .1 Prevent debris from endangering the safe access to and egress from occupied buildings.
 - .2 Notify Owner and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.3 EXECUTION

- .1 Disconnect services in accordance with requirements of local Authority Having Jurisdiction.
- .2 Do not disrupt active or energized utilities without approval of the Owner.
- .3 Erect and maintain dust proof and weather tight partitions to prevent the spread of dust and fumes to occupied building areas; remove partitions when complete.
- .4 Demolish parts of existing building to accommodate new construction and remedial work as indicated.
- .5 At end of each work day, leave worksite in safe condition.
- .6 Perform demolition work in a neat and workmanlike manner:
 - .1 Remove any tools or equipment after completion of work and leave site clean and ready for subsequent renovation work.
 - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
- .7 Conduct demolition of HVAC systems in accordance with local Authority Having Jurisdiction (AHT) and Departmental Representative.
- .8 Equipment and Systems that are being removed and reinstated shall be placed into service and recommissioned to ensure proper operation. Heat Pump/Mini-Split systems shall have refrigerant lines properly purged and shall be recharged as required to ensure fully functional systems. Reference Section 23 05 00 – Common Work Results for HVAC.

- .9 Extend services, including control wiring, to reinstated equipment as required to accommodate increase in wall thicknesses.

3.4 CLOSEOUT ACTIVITIES

- .1 Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre).

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 Canadian Standards Association (CSA)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
 - .2 CAN/CSA-22.3 No. 1, Overhead Systems.
 - .3 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.3 CARE, OPERATION AND START-UP

- .1 Contractor to reinstate all existing circuits as per drawings.
- .2 Ensure all wiring is correct.
- .3 Ensure all surface mount equipment is installed and sealed from elements. Coordinate all work with other divisions.

1.4 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235
- .2 All 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 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .2 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 and instrumentation.
 - .3 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .3 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 it 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 Shop drawing review is for general compliance with Contract Documents. No responsibility is assumed by the Departmental Representative for correctness of dimensions or details. Corrections or comments, or lack thereof, made on the shop drawings during the Departmental Representative's review does not relieve the Contractor from compliance with the requirements of the drawings and specifications.
 - .8 If changes are required, notify Departmental Representative of these changes before they are made.
- .4 Operation and Maintenance Data:
- .1 Provide operation and maintenance data for incorporation into operation and maintenance manuals.
 - .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.
- .5 As-Built Drawings: Submit in accordance with 01 78 00 – Closeout Submittals.

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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 Locate all existing underground services and make all parties aware of their existence and location.
- .4 Where interference occurs, Departmental Representative must approve relocation of equipment and materials regardless of installation order.
- .5 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 Inform all other divisions in time, concerning required openings. Where this requirement is not met, bear the cost of all cutting. Openings of 200 mm or smaller shall be the responsibility of Division 26. Openings larger than 200 mm shall be the responsibility of Division 1. Obtain written approval of Structural engineer before drilling any beams or floors.

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.

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- .3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

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.
- .2 Show on the record drawings the installed inverts of all services entering and leaving the building and the property. Dimension underground services at key points of every run in relation to the structure and building.
- .3 Indicate exact location of all services for future work. Show and dimension all work embedded in the structure.
- .4 Submit record drawings within 30 days prior to start of commissioning.

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 FIRE RATING OF PENETRATIONS

- .1 Maintain fire ratings around conduits passing through floors, ceilings and fire rated walls.
- .2 Use 3M brand or equal fire barrier products at each penetration.
- .3 Acceptable products for fire barrier products shall be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet.
- .4 Acceptable manufacturers: Nelson, Fire Stop Systems, 3M or approved equal. Material of same manufacturer to be used throughout project.

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1.14 DELIVERY, STORAGE AND HANDLING

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

1.15 SYSTEM START-UP

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

1.16 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 Departmental Representative.
- .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 Departmental Representative.
- .9 Divert unused batteries and antifreeze to appropriate recycling facilities as approved by Departmental Representative.

1.17 ANCHOR BOLTS AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

Part 2 Products**2.1 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS**

- .1 Supplier and installer responsibility is indicated on electrical drawings and related mechanical responsibility is indicated on mechanical drawings, where applicable.
- .2 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 25 and shown on mechanical drawings. Division 25 – EMCS Controls Contractor is responsible for all conduit, wiring and connections below 50V which are related to control systems in Division 25 and shall comply with the requirements of Division 26 for standard of quality.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with drawings.
- .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.

2.3 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.
 - .2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

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

NAMEPLATE SIZES

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 where applicable).
- .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 Transformers: indicate capacity, primary and secondary voltages and transformer number.
- .10 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.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

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

Conduit System
up to 250 V

Prime Color
Yellow

Auxiliary Color

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<u>Conduit System</u>	<u>Prime Color</u>	<u>Auxiliary Color</u>
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 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 Departmental Representative.
- .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 Departmental Representative. 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 Have core drilled openings installed in foundation walls to accommodate the work of this Division. Seal conduit or cable through the cored opening using industrial duty round compression seals sized to suit diameter of conduit or cable. Cable seals to be Roxtec RS type or approved equal.

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 Expansion bolts, inserted after concrete has been poured are acceptable.
- .4 Paint all hangers, eg. U-bolts, trapeze hangers, etc. BEFORE INSTALLATION.
- .5 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 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 27 26 – Wiring Devices.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.
- .5 Provide weatherproof back boxes and box extenders for all devices being reinstated such that devices are flush with new building envelope.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.4 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.
 - .2 Wall receptacles:
 - .1 General: 300 mm.
 - .2 Above top of continuous baseboard heater: 200mm.
 - .3 Above top of counters or counter splash backs: 175 mm.
 - .4 In mechanical rooms: 1400 mm.
 - .3 Panelboards: as required by Code or as indicated.
 - .4 Telephone and interphone outlets: 300 mm.
 - .5 Wall mounted telephone and interphone outlets: 1400 mm.
 - .6 Fire alarm stations: 1200 mm.
 - .7 Fire alarm bells: 2400 mm.
 - .8 Television outlets: 300 mm.
 - .9 Wall mounted speakers: 2400 mm.
 - .10 Clocks: 2400 mm.
 - .11 Door bell pushbuttons: 1200 mm.
 - .12 Exit lights: 2400 mm.
 - .13 Emergency lighting heads: 2400 mm.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.6 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.
- .4 Contractor to conduct and pay for the costs the following tests:
 - .1 Circuits originating from branch distribution panels.
 - .2 Lighting and its control.
 - .3 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.
 - .4 Systems: fire alarm system, communications.
- .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 Measure and record circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Measure and record 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing and record value.
- .7 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.
- .8 Submit test results for Departmental Representative's review and include in Commissioning Manuals.

3.7 PREPERATION FOR FIRESTOPPING

- .1 Prepare the space between conduits and adjacent sleeve or fire separation for the use of fire proofing material.
- .2 Where cables or conduits pass through fire rated walls or ceilings, sleeve with steel conduit and prepare the opening for fire and smoke sealing and seal with proper fire and smoke rated material.

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- .3 Where conduits pass through fire or smoke rated partitions, install a junction box in the conduit just prior to exiting the space. Use this junction box to install smoke stopping material.

3.8 PAINTING

- .1 Apply at least one coat of 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.

3.9 TRIAL USAGE

- .1 Departmental Representative may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
 - .1 Lighting system.
 - .2 Power distribution system.
 - .3 Communication systems.
 - .4 Security systems.
 - .5 Metering system.
 - .6 Fire alarm system.
 - .7 Public address system.

3.10 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.

3.11 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.

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- .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 Departmental Representative 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 Departmental Representative 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 Departmental Representative.

3.12 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 Departmental Representative.
- .4 At time of final cleaning, clean lighting, reflectors, lenses and other lighting surfaces that have been exposed to construction dust and dirt.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This Section includes requirements for selective demolition and removal of electrical safety and security, communications components including removal of conduit, junction boxes, and panels to source (home run removal) and incidentals required to complete work described in this Section.

1.2 RELATED REQUIREMENTS

- .1 Section 02 41 99 – Demolition for Minor Works.

1.3 REFERENCES

- .1 CSA Group (CSA)
 - .1 CSA S350 M1980, Code of Practice for Safety in Demolition of Structures

1.4 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Departmental Representative ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB s, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide in accordance with Section 01 33 00– Submittal Procedures before starting work of this Section:
- .2 Landfill Records: Indicate receipt and acceptance of selective demolition waste and hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling:
 - .1 Account for Departmental Representative’s continued occupancy requirements during selective demolition, schedule staged occupancy and worksite activities with Departmental Representative.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
 - .1 Provincial/Territorial Workers’ Compensation Boards/Commissions.
 - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs.

1.8 SITE CONDITIONS

- .1 Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination before tendering.
- .2 Discovery of Hazardous Substances:
 - .1 It is not expected that Hazardous Substances will be encountered in the Work. Immediately notify Departmental Representative if materials suspected of containing hazardous substances are encountered.

1.9 SALVAGE AND DEBRIS MATERIALS

- .1 Demolished items become Contractor’s property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain the Departmental Representative’s property.

Part 2 Products**2.1 MATERIALS**

- .1 General Patching and Repair Materials.

- .2 Electrical Repair Materials: Use only new materials, CSA or ULC labelled as appropriate and matching components remaining after work associated with components identified for removal or demolition are completed.
- .3 Fire stopping Repair Materials: Use fire stopping materials compatible with existing fire stopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

Part 3 Execution

3.1 PREPARATION

- .1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
 - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.
 - .2 Notify Departmental Representative and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
 - .3 Prevent debris from blocking drainage inlets.
 - .4 Protect mechanical systems that will remain in operation.
- .2 Protection of Building Occupants: Sequence demolition work so that interference with the use of the building by the Departmental Representative and users is minimized and as follows:
 - .1 Prevent debris from endangering safe access to and egress from occupied buildings.
 - .2 Notify Departmental Representative and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.2 EXECUTION

- .1 Coordinate requirements of this Section with other divisions:
 - .1 Disconnect electrical circuits; maintain electrical service and main distribution panel as is, ready for subsequent Work.
 - .2 Remove existing luminaires, electrical devices and equipment including associated conduits, boxes, wiring, and similar items unless specifically noted otherwise.
 - .3 Disconnect and remove existing fire alarm system including associated conduits, boxes, wiring, and similar items unless specifically noted otherwise.
 - .4 Disconnect and remove communication systems including associated conduits, boxes, cabling, and similar items unless specifically noted otherwise.
 - .5 Perform demolition work in a neat and workmanlike manner:

- .1 Remove tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
- .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
- .6 Place weatherproof blank cover plates on exterior outlet boxes remaining after demolition and removal activities.
- .7 Remove existing conduits, boxes, cabling and wiring associated with removed luminaires, electrical devices and equipment.
- .8 Seal open ends of conduit with silicone sealant and leave in place where they are inaccessible or cannot be removed without damaging adjacent construction.

3.3

CLOSEOUT ACTIVITIES

- .1 Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction.

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 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).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 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.
- .4 Clamps or connectors for armoured cable, aluminum sheathed cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

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.

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 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.

Part 2 Products**2.1 BUILDING WIRES**

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper and ACM alloy conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE as indicated.
 - .1 Use RW90 XLPE or RWU90 XLPE in underground conduits.
 - .2 For direct buried underground cables, use RWU90 XLPE.
 - .3 RWU90 XLPE not required under interior floor slabs.
- .3 Copper conductors: size as indicated, with thermoplastic insulation type TWH rated at 600 V, typically used for insulated ground wires.
- .4 Type ACM conductors permitted for feeders above 60 amps.

2.2 TECK Cable

- .1 Cable: to CAN/CSA-C22.2 No. 131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper and ACM alloy, size as indicated.
- .3 Insulation:
 - .1 Cross-linked polyethylene XLPE, rating – 600 V.
- .4 Inner jacket: polyvinyl chloride material.

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- .5 Armour: interlocking aluminum, compliant to applicable Building Code classification for this project.
- .6 Overall covering: thermoplastic polyvinyl chloride material.
- .7 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 1500 mm centers.
 - .3 Threaded rods: 6 mm dia. to support suspended channels.
- .8 Connectors:
 - .1 Watertight and/or type approved for TECK cable, as indicated.

2.3 CONTROL CABLES

- .1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket. Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type TW - 40° C polyethylene insulation with shielding of tape coated with paramagnetic material wire braid over each conductor and overall covering of PVC jacket.

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 Owner and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 No splices permitted in panel board feeders in new construction. Splices in re-work or renovation projects only with pre-approval by Owner.

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 Conductor length for parallel feeders to be identical.

- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

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.
 - .2 In surface and lighting fixture raceways in accordance with Section 26 50 00- Lighting.

3.4 INSTALLATION OF TECK CABLE 0 -1000 V

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

3.5 INSTALLATION OF CONTROL CABLES

- .1 Install control cables in conduit as indicated.
- .2 Ground control cable shield.

END OF SECTION

Part 1 General**1.1 REALTED SECTIONS**

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

1.2 SUBMITTALS

- .1 Submit shop drawings and product data for cabinets.
- .2 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada.

Part 2 Products**2.1 SPLITTERS**

- .1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
- .3 At least three spare terminals on each set of lugs in splitters less than 400 A.
- .4 4X required for exterior mounting.

2.2 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.
- .3 4X required for exterior mounting

Part 3 Execution**3.1 SPLITTER INSTALLATION**

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

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Mount cabinets with top not higher than 2 m above finished floor.
- .3 Install terminal block as indicated in Type T cabinets.
- .4 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.
- .5 Ensure all electrical boxes above drywall ceilings are accessible via a properly sized access door installed directly below the box in drywall ceilings. Temporary removal of electrical light fixtures are not considered safe access to above ceiling electrical boxes and shall not be permitted.

3.3 IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Install size 2 identification labels indicating system name voltage and phase.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 26 05 00 – Common Work Results – Electrical.
- .2 Section 26 05 34 – Conduits, Conduit Fastenings and Fittings.

1.2 REFERENCES

- .1 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.
- .5 347 V outlet boxes for 347 V switching devices.
- .6 Combination boxes with barriers where outlets for more than one system are grouped.
- .7 Box extenders to allow device to be situated flush with new building envelope.

2.2 GALVANIZED STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
- .3 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.

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2.3 CONDUIT BOXES

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

2.4 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.

2.5 SERVICE FITTINGS

- .1 'High tension' receptacle fitting made of 2 piece die-cast aluminum with brushed aluminum housing finish for 1 duplex receptacles. Bottom plate with two knockouts for centered or offset installation.
- .2 Pedestal type 'low tension' fitting made of 2 piece die cast aluminum with brushed aluminum housing finish to accommodate two amphenol jack connectors.

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 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No. 62, Surface Raceway Systems.

1.3 SUBMITTALS

- .1 Indicate types of raceways with terminology similar to that used in this Section.
- .2 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

Part 2 Products**2.1 SURFACE RACEWAY SYSTEM (WIRING PULLED IN)**

- .1 Steel: to CSA C22.2 No. 62, one piece, free of sharp edges.
- .2 Corners, pull boxes, elbows, tees, one piece assembly to facilitate site wiring.
- .3 Finish: buff enamel.
- .4 Necessary switch, receptacle, extension boxes, adapters and utility fittings required for complete installation.

2.2 FITTINGS

- .1 Elbows, tees, couplings and hanger fittings: to CSA C22.2 No. 62, manufactured as accessories to raceway supplied.

Part 3 Execution**3.1 INSTALLATION**

- .1 Install raceways before installation of wiring. Install covers for raceways and fittings after installation or wiring.

- .2 Install supports, elbows, tees, connectors, fittings, bushings, adaptors as required.
- .3 Keep number of elbows, offsets, connections to minimum.
- .4 Use wiring with mechanical protection in channel raceways.
- .5 Install barriers in raceways where different voltage systems are indicated.

END OF SECTION

Part 1 General

Part 2 References

- .1 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.

2.2 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 3 Products

3.1 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.
- .2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

3.2 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 Beam clamps to secure conduits to exposed steel work.

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.3 Channel type supports for two or more conduits at 1.5 m oc.

.4 Threaded rods, 6 mm dia., to support suspended channels.

3.3 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.

3.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

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

3.5 FISH CORD

.1 Polypropylene.

Part 4 Execution

4.1 MANUFACTURER'S INSTRUCTIONS

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

4.2 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.

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- .3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
- .4 Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.
- .5 Minimum conduit size for lighting and power circuits: 19 mm. 12 mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.
- .6 Install EMT conduit from computer room branch circuit panel to outlet boxes located in sub floor.
- .7 Install EMT conduit from computer room branch circuit panel to junction box in sub-floor immediately below panel. Run flexible conduit from junction box to outlet boxes for each computer in sub-floor.
- .8 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 19 mm dia.
- .10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .11 Install fish cord in empty conduits.
- .12 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .13 Dry conduits out before installing wire.

4.3 SURFACE CONDUITS

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

4.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.

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- .3 Do not install conduits in terrazzo or concrete toppings.
- .4 Install Rigid Galvanized conduits for all installations between new insulation under new building envelope.

4.5 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – 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 SECTION INCLUDES**

- .1 Switches, receptacles, wiring devices, cover plates and their installation.

1.2 RELATED SECTIONS

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

1.3 REFERENCES

- .1 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).

Part 2 Products**2.1 RECEPTACLES**

- .1 Duplex receptacles, CSA type 5-15 R, CSA type 5-20R, 125 V, 15 A, U ground, to: CSA-C22.2 No.42 with following features:
 - .1 White thermoplastic moulded housing.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight back wired entrances, four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
 - .6 Specification grade.
 - .7 Extra Heavy-Duty.
- .2 Single receptacles CSA type 5-15 R, CSA type 5-20R, 125 V, 15 A, U ground with following features:
 - .1 White thermoplastic moulded housing.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Four back wired entrances, 2 side wiring screws.

- .3 Other receptacles with ampacity and voltage as indicated.
- .4 Receptacles of one manufacturer throughout project.
- .5 Extra Heavy-Duty.

2.2 GFCI Receptacles

- .1 CSA type 5-15 R, CSA type 5-20R, 125 V, 125A Duplex GFCI Extra Heavy-Duty.

2.3 COVER PLATES

- .1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.
- .2 Cover plates from one manufacturer throughout project.
- .3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .4 Nylon ivory or stainless steel cover plates as indicated, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.
- .5 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .6 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.
- .7 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.
- .8 All wiring device cover plates to be labeled using clear adhesive strips with black type identifying panel and circuit number for each device.

Part 3 Execution

3.1 INSTALLATION

- .1 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height in accordance with Section 26 05 00 – Common Work Results - Electrical.
 - .3 Where split receptacle has one portion switched, mount vertically and switch upper portion.
- .2 Cover plates:

- .1 Protect cover plate finish with paper or plastic film until painting and other work is finished.
- .2 Install suitable common cover plates where wiring devices are grouped.
- .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 American National Standards Institute (ANSI)
 - .1 ANSI C82.1, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
 - .2 ANSI C82.4, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.
- .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.

1.2 RELATED SECTIONS

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

1.3 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 relamping schedule.
- .5 Submit product literature for each type of lamp supplied, complete with the mercury content of each lamp.

1.4 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.
- .4 Disposal and recycling of fluorescent lamps as per local regulations.
- .5 Disposal of old PCB filled ballasts.

1.5 ACCEPTABLE PRODUCTS

- .1 Luminaires described on 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 Lamp and ballast 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.
 - .5 Approval in writing is obtained from the Departmental Representative to the supplier/manufacturer five (5) days prior to tender closing date.

Part 2 Products**2.1 LAMPS**

- .1 LED, as indicated.

2.2 Ballasts

- .1 LED drivers:
 - .1 General requirements:
 - .1 Designed for 10 year operational life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
 - .2 Designed and tested to withstand electrostatic discharges without impairment of performance when tested according to IEC 61000-4-2.
 - .3 UL 8750 recognized or listed as applicable.
 - .4 Complies with IEC 61347-2-13 as applicable.

2.3 FINISHES

- .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

2.4 LUMINAIRES

- .1 As indicated in luminaire schedule on drawings.

2.5 OPTICAL CONTROL DEVICES

- .1 As indicated in luminaire schedule on drawings.

Part 3 Execution**3.1 INSTALLATION**

- .1 Locate and install luminaires as indicated. Install lamps in all fixtures.
 - .1 Provide adequate support to suit ceiling system.

3.2 WIRING

- .1 Connect luminaires to lighting circuits.
 - .1 Install flexible conduit for vertical power supply drop to luminaires as indicated. Horizontal wiring using flexible conduit is not permitted.

3.3 LUMINAIRE SUPPORTS

- .1 For suspended ceiling installations support luminaires from ceiling grid in accordance with local inspection requirements.

3.4 LUMINAIRE ALIGNMENT

- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.5 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical.

END OF SECTION

Part 1 General**1.1 SCOPE OF WORK**

- .1 Testing and commissioning are called for throughout the individual specifications. This does not relieve this trade from providing all testing and commissioning necessary to ensure that systems and equipment operate as required and that they interface with other systems and equipment as required.

1.2 SECTION INCLUDES

- .1 Commissioning of all building electrical systems and component including:
 - .1 Testing and adjustment.
 - .2 Demonstrations and Training.
 - .3 Instructions of all procedures for Departmental Representative's personnel.
 - .4 Updating as-built data.
 - .5 Co-ordination of Operation and Maintenance material.

1.3 RELATED SECTION

- .1 Section 01 77 00 – Closeout Procedures.
- .2 Section 26 05 00 – Common Work Results - Electrical.

1.4 REFERENCES

- .1 CSA (Canadian Standards Association).
- .2 Underwriters Laboratories of Canada.

1.5 QUALITY ASSURANCE

- .1 Provide qualified trades persons, certified testing agencies, factory trained and approved by the Commissioning Team Leader.
- .2 Submit the names of all personnel to be used during the Commissioning activities for Departmental Representative Approval.

1.6 COMMISSIONING

- .1 The purpose of the commissioning process is to fully test all building systems including architectural, mechanical and electrical components and operating procedures by challenging these systems to realistic operation conditions.
- .2 The Commissioning activities shall be co-ordinated by the General Contractor.

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- .3 Commissioning activities for the electrical systems must have available up to date as-built drawing information and accurate Operations and Maintenance Manuals. These documents shall be a major part of this activity.
- .4 Contractor shall be responsible to update all documentation with information and any changes duly noted during the Commissioning exercise.
- .5 Contractor shall arrange for all outside suppliers, equipment manufacturers, test agencies and others as identified in the commissioning sections of this specification. The cost associated with this requirement shall be included as part of the tender price.

1.7 SUBMITTALS

- .1 A commissioning document shall be prepared by the Departmental Representative prior to conducting these activities for use by the Commissioning Team.
- .2 The electrical sub-contractor shall be responsible for ensuring all activities are properly documented in this manual and co-ordinated through the General Contractor.
- .3 As-built drawings and data books must be available two weeks prior to commissioning for review and use by the consultant and Commissioning Team prior to the start of the commissioning activities.

1.8 PREPARATION

- .1 Provide test instruments required for all activities as defined in the commissioning documents.
- .2 Verify all systems are in compliance with the requirements of the commissioning documents prior to the precommissioning check out operation.
- .3 Confirm all scheduled activities have identified personnel available.
- .4 Where systems or equipment do not operate as required, make the necessary corrections or modifications, re-test and re-commission.

1.9 SYSTEM DESCRIPTION

- .1 Perform all start up operations, control adjustment, trouble shooting, servicing and maintenance of each item of equipment as defined in the commissioning documentation.
- .2 Departmental Representative will provide list of personnel to receive instructions and will co-ordinate their attendance at agreed upon times.
- .3 Prepare and insert additional data in the operations and maintenance manuals and update as-built drawings when need for additional data becomes apparent during the commissioning exercise.

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- .4 Where instruction is specified in the commissioning manual, instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .5 Conduct presentation on Departmental Representative's premises. Departmental Representative will provide space.

1.10 FINAL REPORT

- .1 This trade shall assemble all testing data and commissioning reports and submit them to the Departmental Representative.
- .2 Each form shall bear signature of recorder, and that of supervisor of reporting organizer.

1.11 SCHEDULE OF ACTIVITIES

- .1 Commissioning activities shall be conducted based on pre-established schedule with all members of the commissioning team.
- .2 In addition, there will be two meetings held through the contract duration to introduce the parties of the commissioning team, establish the schedules and deadlines for the various activities and review the Commissioning Manual.
- .3 Adhering to the established schedule is very important as the co-ordination and scheduling of the participants will be difficult to alter once this is established. Close co-ordination of this schedule is important.
- .4 In the event project cannot be commissioned in the allotted time slot, the contractor shall pay for all costs associated with assembling the Commissioning Team at a later date. If the contractor has not performed his duties to reach commissioning stage as outlined earlier, he will incur all expenses of other trades and the Commissioning Team due to his non-compliance.

Part 2 Products (NOT APPLICABLE)**Part 3 Execution (NOT APPLICABLE)****END OF SECTION**

Part 1 General**1.1 GENERAL**

- .1 This section describes the extent of services to be provided for wiring of equipment supplied by others.
- .2 Within the context of this section, Others means:
 - .1 Other divisions of this specification (i.e.: Division 25 – Integrated Automation).
 - .2 The Owner, as defined in the Contract.
 - .3 Other contractors supplying and installing equipment to the contract.

1.2 EXTENT OF SERVICES PROVIDED

- .1 The work of this contract is to include all power and control wiring of equipment which is provided by Division 26.
- .2 All power and control wiring above 50 V for equipment supplied by Division 25 will be the responsibility of this contractor. Coordinate with Integrated Automation contractor for exact requirements.
- .3 All control wiring 50 V and less for equipment supplied by Division 25 will be the responsibility of Division 25- Integrated Automation Contractor. Conduit and wire associated with this is the responsibility of Division 25.
- .4 All power and control wiring associated with equipment supplied by Division 01 will be the responsibility of this contractor. Coordinate with general contractor for exact requirements.
- .5 Final connection of all wiring to equipment provided by others (except control wiring below 50 V associated with Division 25 equipment) will be by division 26. Coordinate with the provider for connection instructions.

1.3 RESPONSIBILITY OF DIVISION 26

- .1 It is the responsibility of the Division 26 subcontractor to verify final requirements for wiring of all equipment noted. Verification of wiring requirements to include:
 - .1 Confirmation of electrical characteristics.
 - .2 Location of connection point.
 - .3 Method of connection (i.e. direct or plug-in etc.)
- .2 Obtain and become familiar with shop drawings for all relevant equipment.
- .3 No claim for extra will be entertained for wiring equipment which has been indicated, or changes to installed wiring where installation proceeded prior to verification of electrical requirements.

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Part 2 **Products (NOT APPLICABLE)**

Part 3 **Execution (NOT APPLICABLE)**

END OF SECTION