

**Project Manual for
HRH – Acute Behavioural Assessment and Management Unit (ABAMU)
Toronto, ON**

OWNER

Humber River Health
2111 Finch Avenue West, Toronto, ON

CONSULTANTS

Architect

C& Partners Architects Inc.
720 Bathurst St, Toronto, ON M5S 2R4

Mechanical and Electrical Consultants

Quasar Consulting Group
250 Rowntree Dairy Rd, Woodbridge, ON L4L 9J7

Issued for Tender
October 03, 2025

1.0 GENERAL

.1 This project manual including specifications is not to be used for construction purposes unless signed and sealed by the Consultants identified in this document.

2.0 ARCHITECT:

C& Partners Architects Inc.
720 Bathurst St,
Toronto, ON M5S 2R4

3.0



October 03, 2025

(Signature and title of signing officer)

(Date)

(Seal)

MECHANICAL AND ELECTRICAL ENGINEER:

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END OF THIS SECTION

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Part 1 General

1.1 INFORMATION AVAILABLE TO BIDDERS

- .1 Neither the Owner nor the Consultant guarantee the accuracy or completeness of information available to bidders. The Contractor shall satisfy himself, regarding all matters relating to asbestos materials, designated substances and conditions which may affect methods or cost of construction before commencing work.

1.2 HAZARDOUS SUBSTANCES SURVEY

- .1 A copy of a report forming part of the Bid Documents is attached as an appendix, and is identified as follows:
 - .1 Asbestos-Containing Material Reassessment Survey, Humber River Hospital Reactivation Care Centre, 2111 Finch Avenue West, Toronto, Ontario, ECOH Project File, dated January 9th, 2024, prepared by ECOH Management Inc., consisting of 263 sheets
- .2 The Owner and Consultant assume no responsibility for any interpretation or deduction that a third party may make from the contents of the report.
- .3 The Owner and Consultant assume no responsibility for the scope or accuracy of the information contained in the report.
- .4 Direct questions pertaining to the report to the author of the report.

1.3 OWNER'S SAFETY INFORMATION

- .1 A copy of Owner's safety regulation and instructions forming part of the Bid Documents is attached as an appendix, and is identified as follows:
 - .1 "Safety Regulations and Instructions for Contractors", dated April 13, 2021, prepared by Humber River Health, consisting of 64 sheets.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to:
 - .1 Project information.
 - .2 Work covered by Contract Documents.
 - .3 Critical milestone dates
 - .4 Coordination with occupants.
 - .5 Specification and drawing conventions.
 - .6 Mechanical and electrical requirements of general work
 - .7 Regulatory requirements.
 - .8 Permits and responsibilities

1.2 PROJECT INFORMATION

- .1 Project Name: Humber River Hospital – Finch Site ABAMU (Acute Behavioural Assessment and Management.)
- .2 Project Location: 2111 Finch Avenue West, Toronto, Ontario.
- .3 Project Web Site: A project Web site administered by Contractor shall be used for purposes of managing communication and documents during the construction stage.
- .4 The Work shall consist of all items specifically included in the Construction Documents as well as all inferable additional items of Work necessary to make the related assembly or system operational and compliant with the project quality standards.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The Work of Project is defined by the Contract Documents and consists of the following:
 - .1 Renovations to the interiors of existing building to provide 12 bed for Acute Behavioural Assessment and Management Unit (ABAMU) at Reactivation Care Centre (RCC) – Finch site, 3 West.
- .2 Type of Contract:
 - .1 Project shall be constructed under a single prime contract.
 - .1 CCDC 2 – 2020 Stipulated Price Contract is a standard contract between Owner and prime Contractor that establishes a single, pre-determined fixed price, or lump sum as amended by the Supplementary Articles, Definitions and Conditions, and otherwise as defined in Definitions of CCDC 2 – 2020.

1.4 GENERAL CONDITIONS

- .1 The General Conditions of the Stipulated Price Contract, Standard Construction Document, CCDC 2 - 2020 and the Supplementary Articles, Definitions and Conditions, Document 00 73 02, will govern the Work specified in each section of the Specifications.

1.5 CRITICAL MILESTONE DATES

- .1 Work of this Contract shall proceed in accordance with the construction schedule reviewed and acceptable to the Owner and Consultant, with the following critical milestone dates:
 - .1 Substantial Performance of the Work: August 01, 2025.

1.6 COORDINATION WITH OCCUPANTS

- .1 Partial Owner Occupancy: Owner shall occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - .1 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - .2 Provide not less than 72 hours' notice to Owner of activities that shall affect Owner's operations.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- .1 Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - .1 Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase or where stated in a heading followed by material, equipment, component, or operation.
 - .2 The words "shall consist of" or similar words or phrases are implied which denote supply, fabricate and supply, install, provide or commission of such materials, equipment or operations for component of the work designated by heading.
 - .3 Where items in Contract Documents are referred to in singular, provide as many as required to complete the Work. Words used in one (1) gender only shall mean females as well as males and conversely.
 - .4 Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 - .5 Specifications are not intended as detailed description of installation methods but serve to indicate requirements in completing the Work.
- .2 Division 01 General Requirements:

- .1 Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- .2 Requirements that are the direct responsibility of the Contractor but shall not be interpreted to define absolutely the limits of responsibility that shall be established between the Contractor and the Owner.
- .3 Drawing Scope:
 - .1 Drawings are intended to graphically convey the scope of the Work and indicate general and approximate location, arrangement and size of fixtures, equipment, ducts, piping, conduit and outlets.
 - .2 Obtain more accurate information regarding location, arrangement and sizes from study and coordination of the drawings, and shop drawings and become familiar with conditions and spaces affecting these matters before proceeding with the Work. Where conditions require reasonable changes in indicated location and arrangements, make such changes at no additional cost to the Owner.
- .4 Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - .1 Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - .2 Abbreviations: Materials and products are identified by abbreviations as scheduled on Drawings.
 - .3 Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 MECHANICAL AND ELECTRICAL REQUIREMENTS OF GENERAL WORK

- .1 General: Except as otherwise indicated, comply with applicable requirements of sections in Divisions 21, 22, and 23 for mechanical provisions for general construction work specified in Divisions 02 through 14. Except as otherwise indicated, comply with applicable requirements of sections in Divisions 25, 26, 27, and 28 for electrical and electronic provisions for general construction work specified in Divisions 02 through 14.
 - .1 Service Connections: Refer to Divisions 21, 22, 23, 25, 26, 27, and 28 for the characteristics of the mechanical, electrical, and electronic services to be connected to units of general work. Provide units manufactured or fabricated for proper connection to and utilization of available services, as indicated. Completion and final connection of mechanical services to general construction work is defined as being mechanical work and completion and final connection of electrical services to general construction work is defined as electrical work.
- .2 Electrical Requirements: Except as otherwise indicated, comply with applicable provisions of the National Electrical Code (NEC) and standards by National Electrical Manufacturer's Association (NEMA), for electrical components of general work. Provide Underwriters Laboratories listed and labeled products where applicable.

1.9 REGULATORY REQUIREMENTS

- .1 Ontario Building Code of Canada – OBC 2024, including amendments, shall govern the

Work.

- .2 Ontario Regulation 332/12, including amendments, shall govern the Work.
- .3 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Work. Codes and regulations form an integral part of the Contract Documents.

1.10 PERMITS AND RESPONSIBILITIES

- .1 Permits: The Contractor shall, without additional expense to the Owner, be responsible for obtaining any necessary licenses, fees, inspections, and permits, and for complying with any federal, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- .2 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
- .3 The Contractor shall, without additional expense to the Owner, provide monetary deposits for the prosecution of the work, if required.

1.11 DESCRIPTION OF THE WORK

- .1 Work of this Contract includes furnishing labour, materials, equipment, services and other related expenses to execute complete construction as specified in the Contract Documents.
- .2 Term "NIC" means work of this Project which is not being performed or provided under this Contract; term means "Not In this Contract" or "Not a part of the work to be performed or provided by this Subcontractor".
- .3 "NIC" work may be specified or indicated on the drawings as an aid to the Subcontractor in scheduling amount of time and materials necessary for completion of the Contract.

1.12 PERFORMANCE OF THE WORK

- .1 Work of each Section once commenced at the Site shall be completed within the shortest possible time, consistent with the Contract requirements.
- .2 Work of each Section shall be organized as much as possible prior to commencement at the Site and supplies of materials and products shall be secured and deliveries of same scheduled including, in part, the supply and delivery of specially manufactured items, to favour the expeditious performance of the Work.
- .3 Work of each Section shall not commence at the Site until the Subcontractor has satisfied the Contractor and Consultant that products and materials will be available at the time required for building into the Work, and that unavailability of products and materials at the

appropriate time will not prejudice the expeditious performance of the Work.

- .4 Areas immediately above, below and beyond the construction enclosures may contain required mechanical and/or electrical services, special rooms and highly sensitive research and/or equipment. These areas must be kept clean, free from dust, dirt, debris and waste construction materials.
- .5 Waste construction materials, new construction materials and products shall therefore be transported beyond the construction enclosures in closed containers. Sweep clean closed containers of dust, dirt and debris before entering occupied areas.

1.13 SCHEDULING

- .1 Sequence and scheduling of construction shall be based on maintaining continuous operation and access to the work during construction.
- .2 Each Subcontractor will agree with the Contractor on the date of commencement of the Work and the date of completion of the Work of this Contract.

1.14 INTERRUPTIONS IN THE WORK SCHEDULE

- .1 Suspend parts of the work affected as required to allow the Consultant to review and accept mock-ups and to establish standards of workmanship for remainder of Work.

1.15 INCLEMENT WEATHER AND COLD WEATHER WORK

- .1 Take precautions during inclement weather and provide adequate protection.
- .2 Continue the Work, including winter months, if applicable, until the Work is completed and accepted.
- .3 Inclement weather or extra work caused thereby shall not be considered valid reason for additional payment or delay in satisfactory conclusion of the Work.

1.16 PROJECT PERSONNEL

- .1 Provide project personnel at the Site during execution of each part of the work in accordance with the General Conditions of the Contract.

1.17 SITE DIMENSIONS

- .1 Before proceeding with shop drawings, fabrication, or supply of each new part of the Work, examine installed parts of the Work and verify as-built site dimensions to coordinate previously built construction with pending construction.

1.18 WORK OF OTHER SUBCONTRACTORS

- .1 Commencement of parts of the Work, in existing areas and in areas provided by other subcontractors, will be deemed to signify subcontractor's acknowledgment and acceptance of those parts of the Work.

- .2 Immediately report defects, which affect quality and performance of the Work, in writing to the Consultant.
- .3 Before entering existing premises to carry out the Work or to obstruct or take out of use, area(s) of existing premises, or to cause other interference, request meeting with the Consultant in order to reach agreement as to time and length of time you may interfere, possess, obstruct or remove from use such area or services.

1.19 PROCEDURE AND SUPPLY OF CRITICAL MATERIALS

- .1 Supply products in ample time to be installed into the Work together with templates, measurements and other information required for placement.

1.20 SECURITY CLEARANCE OF EMPLOYEES

- .1 Where part of the Place of the Work is designated by the Owner as a secure location, construction personnel on Site may be subject to security checks and may be required to obtain security clearance before commencing the Work.
- .2 Security checks shall be arranged by the Owner which has designated part of the Place of the Work as secure location. Provide to the Owner, names, addresses, social insurance numbers and consents of its workers.

1.21 EXISTING SITE SERVICES

- .1 Before commencing the Work, establish location and extent of existing services in area of the work and notify the Consultant of findings.
- .2 Consult public and service companies' records and become fully informed of locations and extent of buried and overhead services and utilities.
- .3 Should piping, sewers, cables or similar services be encountered during work of this Contract that are not known from the owner's and utility companies' records, notify the Consultant and do not proceed with removal or cutting until directed.

1.22 RELICS AND ANTIQUES

- .1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets and similar objects found at the Place of the Work or in building to be demolished, shall remain property of the Owner. Protect such articles and request direction from the Consultant.
- .2 Give immediate notice to the Consultant if evidence of archaeological finds are encountered during construction and await his written instructions before proceeding with work in this area.
- .3 In event that deeply buried cultural archaeological remains are found on property during construction activities, office of Archaeology and Heritage Planning Unit, Ministry of Citizenship, Culture and Recreation, (MCCR), shall be notified immediately. Furthermore, in event that human remains are encountered during construction, MCCR and Registrar or Deputy Registrar of Cemeteries Regulation Unit of Ministry of Consumer and Commercial Relations ((416) 326-8392) shall be contacted immediately.

1.23 ACOUSTIC PARTITIONS/CEILINGS/STEEL DOORS

- .1 Partitions and/or ceilings and/or steel doors with sound attenuation insulation are designated as "acoustic partitions and ceilings and steel doors". Provide sound rated partitions and ceilings in locations indicated to meet required minimum Sound Transmission Class (STC) ratings. If not stated otherwise, STC rating is 47.
- .2 Coordinate the work of various Subcontractors to avoid "short circuiting" of the STC rating for "acoustic partitions and ceilings and steel doors". Carefully locate and treat ducts, grilles, diffusers, electrical outlets, boxes and other similar mechanical and electrical devices. Where electrical boxes are situated back-to-back serving each side of the partitions, locate them at least 250 mm apart laterally and if interconnected, use flexible connections.
- .3 Ensure to seal around cut-outs for lights, cabinets, pipes, ducts, electrical boxes and other similar items. Avoid back-to-back penetrations of the diaphragm, flanking paths and door/ borrowed light openings.

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 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to:
 - .1 Access to site.
 - .2 Work restrictions.
 - .3 Site restoration.

1.2 ACCESS TO SITE

- .1 General: Contractor shall have full use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- .2 Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - .1 Driveways, Walkways and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - .1 Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - .2 Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - .2 Construction Personnel Parking: Limit vehicle parking for construction personnel to locations indicated on the Drawings. Applicable parking fees shall be paid by the Contractor and Subcontractors.
 - .1 Coordinate parking with Owner. Any vehicles parked on site in areas not approved by Owner shall be towed.
- .3 Condition of Existing Building and Grounds: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- .4 Under no circumstances shall the Contractor or their Subcontractors use the Owner's or tenant's equipment, or any equipment located in the Place of the Work including, but not limited to, computers, faxes or photocopiers.

1.3 WORK RESTRICTIONS

- .1 Work Restrictions, General:
 - .1 Comply with restrictions on construction operations and on-site work hours, security, and limitations on use of public streets and with other requirements of

- Owner, Landlord and authorities having jurisdiction
- .2 Comply with COVID-19 polices and procedures.
- .2 On-Site Work Hours: Limit work in the existing building to normal business working hours, 07:00 – 18:00.
 - .1 Weekend Hours: 09:00 – 17:00
 - .2 Early Morning Hours: Any work required outside of hours stated above requires owner's authorization prior to proceeding.
 - .3 Hours for Utility Shutdowns: After 09:00, with owner's authorization.
 - .4 Hours for [Core Drilling] After 09:00, with owner's authorization.
- .3 Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - .1 Notify Owner not less than two (2) Working Days in advance of proposed utility interruptions.
 - .2 Obtain Owner's written permission before proceeding with utility interruptions.
 - .3 Unless otherwise directed, existing water, gas, power and communication systems, sanitary sewer lines, and other surface and subsurface structures and systems, shall be protected during progress of Work. Should Contractor in performance of Work disturb, disconnect or damage any of above, expenses arising from disturbance or in replacing or repair shall be borne by Contractor.
- .4 Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - .1 Notify Owner not less than two (2) Working Days in advance of proposed disruptive operations.
 - .2 Obtain Owner's written permission before proceeding with disruptive operations.
 - .3 Refer to Division 01, Section 01 35 13.19 "Special Procedures for Healthcare Facilities.
- .5 Employee Identification: Owner shall provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- .6 Employee Screening: Comply with Owner's requirements for screening of Contractor personnel working on Project site.
 - .1 Maintain list of approved screened personnel with Owner's representative.
- .7 Contractor shall:
 - .1 Not unreasonably encumber site with materials and equipment.
 - .2 Not load structure with weight that shall endanger structure.
 - .3 Not use explosives without written acceptance of the Consultant and local authorities having jurisdiction.
 - .4 Schedule use of elevator for construction operations. Refer to Division 01, Section 01 35 13.19 "Special Procedures for Healthcare Facilities.

- .5 Schedule use of existing service elevator for construction operations. Use of passenger elevators for construction operations is prohibited.
- .6 Control use of existing stairwells for vertical circulation.
- .7 Make deliveries of construction materials, equipment, supplies and similar products and make removals at the area designated by the Owner's Representative.
- .8 Assume full responsibility for protection and safekeeping of stored products.
- .9 Cooperate with and coordinate Work with work under separate contracts, including access to the Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 SITE RESTORATION

- .1 As identified due to scope of work, restore existing paving, sidewalks, curbs and landscaping damaged during construction.
- .2 Provide paving, walks, curbs and landscaping to match existing conditions where not otherwise shown for damaged areas affected by the Work.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to administrative and procedural requirements governing allowances.
 - .1 Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
 - .2 Types of allowances include the following:
 - .1 Lump-sum allowances.
 - .2 Unit-cost allowances.
 - .3 Quantity allowances.
 - .4 Contingency allowances.
 - .5 Testing and inspecting allowances.

1.2 SELECTION AND PURCHASE

- .1 At the earliest practical date after award of the Contract, advise Consultant of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- .2 At Consultant's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- .3 Purchase products and systems selected by Consultant from the designated supplier.

1.3 ACTION SUBMITTALS

- .1 Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- .1 Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- .2 Submit time sheets and other documentation to show labour time and cost for installation of allowance items that include installation as part of the allowance.
- .3 Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- .1 Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 ALLOWANCES

- .1 Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Consultant under allowance and shall include freight, and delivery to Project site.
- .2 Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labour, installation, overhead and profit, and similar costs related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.
- .3 Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
- .4 If requested by Consultant, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 CONTINGENCY ALLOWANCES

- .1 Use the contingency allowance only as directed by Consultant for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- .2 Contractor's related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation insurance, equipment rental, and similar costs.
- .3 Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- .4 At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.8 TESTING AND INSPECTING ALLOWANCES

- .1 Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- .2 The allowance does not include incidental labour required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labour to assist the testing agency shall be included in the Contract Sum.
- .3 Costs of services not required by the Contract Documents are not included in the allowance.
- .4 At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

- .1 Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - .1 Include installation costs in purchase amount only where indicated as part of the allowance.
 - .2 If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - .3 Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - .4 Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- .2 Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labour, installation, overhead, and profit.
 - .1 Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - .2 No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- .1 Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- .1 Allowance No. 1: Quantity Allowance: Include 7 sq. m for patch and repairing existing floor finish affected by demolition at nurse station F121.

- .2 Allowance No. 2: Lump-Sum Allowance: Include the sum of \$50,000 for asbestos abatement work according to Owner's written instructions
- .1 Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section 01 22 00 "Unit Prices."

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section includes but is not limited to administrative and procedural requirements governing unit prices.
- .3 Scope of Work: The Scope of this Project includes Work that may be performed on a Unit Price basis. Work items designated in this Section may be added to or deleted from the Work at any time during the duration of the Contract when authorized by written Change Order.
 - .1 Unit Price Specifications: Perform Work designated by each Unit Price Item in accordance with Specifications applicable for the materials, products and equipment included in the Unit Price Items. Refer to Sections referenced in the Unit Price Schedule for materials, methods, and additional requirements. A "Unit Price Schedule" is included at the end of Part 3 of this Section.

1.2 DEFINITIONS

- .1 Unit price is an amount incorporated into the Contract, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Price by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- .1 Unit Prices:
 - .1 Each unit price shall include the following costs:
 - .1 Net cost of product and material to Contractor, considering trade discounts.
 - .2 Delivery to Place of the Work.
 - .3 Job site unloading and handling, including uncrating and storage, clean-up, and disposal of waste.
 - .4 Protection from elements and from damage.
 - .5 Installation labor, finishing and cleaning.
 - .6 Other expenses required to complete installation.
 - .7 Applicable taxes, bonds, warranties and insurance.
 - .8 Overhead and profit.
- .2 Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

- .3 Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 SCHEDULE OF UNIT PRICES

- .1 Unit Price No. 1 – Fire-rating of Single Doors:
- .1 Description: Verification of fire rating of existing doors and replacing with new doors complete with frames and hardware in accordance with Section 08 11 13 "Hollow Metal Doors and Frame" and Section 08 14 16 "Flush Wood Doors."
 - .2 Unit of Measurement: 6 leaf of single doors.
 - .3 Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."
- .2 Unit Price No. 2 – Fire-rating of Double Doors:
- .1 Description: Verification of fire rating of existing doors and replacing with new doors complete with frames and hardware in accordance with Section 08 11 13 "Hollow Metal Doors and Frame" and Section 08 14 16 "Flush Wood Doors."
 - .2 Unit of Measurement: 1 pair of double doors.
 - .3 Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."
- .3 Unit Price No. 3 – Exit Diversion Murals:
- .1 Description: Exit diversion murals to exit doors / elevator doors in accordance with Section 09 77 26 "Interior Surfacing."
 - .2 Unit of Measurement: 6 units.
 - .3 Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."
- .4 Unit Price No. 4 – Patch and Repair Existing Floor Finish:
- .1 Description: Patch and repair existing floor finish in accordance with Section 09 65 16 "Resilient Sheet Flooring."
 - .2 Unit of Measurement: 7 square metre.
 - .3 Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."

END OF SECTION

Part 1 General

1.1 SUBSTITUTIONS - GENERAL

- .1 There is no obligation on the part of the Owner or Consultant to accept proposed substitutions.
- .2 Materials and products specified without the "or accepted alternate" clause, following the name of the material or product shall be provided without substitution.
- .3 Where the Specifications allow "or accepted alternate" or "or equal" clause, the Bid Price shall include the specified products. Contractor cannot presume that alternate material will be accepted. Submit request for acceptance of "or equal" products in accordance with requirements in this Section.
- .4 Requests for substitutions will not be considered during the Bidding period, before the Bids are submitted.
- .5 Substitutions proposed with bid submission or unsolicited requests for substitutions after award of Contract will be considered only under the following conditions:
 - .1 if the materials and products specified are not available; or
 - .2 if substitute materials and products to those specified which are brought to the attention of and considered by the Consultant as equivalent to those specified, will result in a credit to the Contract Price; or
 - .3 if substitute materials and products to those specified which are brought to the attention of and considered by the Consultant as superior to those specified, will not change the Contract Price; or
 - .4 if a material or product is specified together with a requirement for performance and, in the opinion of the Contractor, the specified material or product will not produce the required results; or
 - .5 if the specified product cannot be delivered to maintain the construction schedule for reasons beyond the Contractor's control; or
 - .6 when a substitution is otherwise advantageous to the Owner or to the execution of the Work.
- .6 Any alternative product or material utilized without acceptance from the Consultant will be removed from the site and replaced with that specified at no extra cost to the Owner.
- .7 In making a substitution Contractor represents that:
 - .1 They have investigated substitute product and/or manufacturer and has determined that it meets or exceeds the product criteria specified;
 - .2 They will make any changes to the Work necessitated by the substitution as required for the Work to be complete in all respects;
 - .3 They waive claims for additional costs and time caused by substitution that may subsequently become apparent.

.8 Consultant responsibilities:

- .1 Consultant will consider requests for substitutions made in accordance with the requirements noted in this Section. Incomplete or repeated requests for substitutions for a specified material will only be considered if payment for Consultant's time is agreed to. The Owner will deduct administration expenses from the contract in accordance with the Consultant's billing rates.
- .2 When several alternative products or materials have been listed in the specifications, a request for substitution will only be considered if payment for Consultant's time is agreed to. The Owner will deduct administration expenses from the contract in accordance with the Consultant's billing rates.
- .3 Substitutions which require changes to the Contract Documents will not be considered unless agreement exists between the Owner and the Contractor to compensate the Consultant for costs required to execute such changes.

1.2 REQUEST FOR ACCEPTANCE OF ALTERNATE AND SUBSTITUTIONS REQUEST

- .1 For approval of products other than those specified, submit a request in writing. Requests shall clearly define and describe the product for which review is requested. Requests are to be accompanied by two copies of manufacturer's literature, specifications, drawings, cuts, performance data or other information necessary to completely describe the item. Review and acceptance of the alternate by the Owner will be in the form of written instruction from the Consultants.
- .2 No substitutions will be permitted without acceptance of the Owner communicated in a written instruction from the Consultant, issued prior to the substitution proceeding.
- .3 Substitutions proposed by the Contractor shall comply with the following requirements:
 - .1 Confirmation the substitution meets UHN internal testing standards, i.e. Manufacturers are to provide third-party validation of product testing for hospital-approved disinfectants: Healthcare Clorox.
 - .2 When proposing substitutions, submit in duplicate the material and product names and complete specifications substantiating compliance of the proposed substitution with the requirements of the Contract Documents including:
 - .1 Reason for the substitution
 - .2 product identification;
 - .3 detailed, item by item comparison between the properties and characteristics of the specified material or product and the proposed substitution;
 - .4 manufacturer's name, address and telephone number;
 - .5 manufacturer's literature;
 - .6 performance and test data;

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- .7 reference standards;
 - .8 product limitations;
 - .9 samples;
 - .10 list of existing installations;
 - .11 changes to the Contract Time;
 - .12 changes to the Contract Price.
- .3 Should the proposed substitution be accepted either in part or in whole, assume full responsibility when the substitution affects any other part of the Work.
- .4 When proposing substitutions, satisfy all design conditions and other specified requirements. Properties including but not limited to the following, as applicable, will be considered:
- .1 Physical dimension requirements to satisfy the space limitations, static and dynamic weight limitations, structural properties, audible noise levels, vibration generation, interchange ability of parts or components, accessibility for maintenance, possible removal or replacement, colours, textures and compatibility with other materials, products, assemblies and components.
- .5 Submit request together with all necessary evidence of equality and compatibility to support the request. The amount of credit, or the additional cost involved, is to be clearly indicated, so that adjustment to the Contract can be made.
- .6 All requests must be submitted through the Contractor who shall advise the Consultant of all adjustments and changes necessary in the Work to accommodate the substitution. The decisions of the Consultant as to whether the substitution proposed is acceptable is final.
- .7 If no substitution is approved, and if no provisions to the contrary have been made in the Contract for the item in question, provide the item named to these Specifications.
- .8 Should the proposed substitution be accepted either in part or in whole, assume full responsibility when substitution affects the Work of any other Section of the Specifications.
- .9 Ensure that substitutions are accommodated by space allotted for the specified materials, products, methods of processes.
- .10 Be responsible for the cost of changes in the Work of all Sections necessitated by the use of proposed substitutions.
- .11 Be responsible for substitutions to methods or processes concerning such Work, and ensure that the warranties covering all Work for the Project are not affected.

1.3 SUBSTITUTIONS - CODE REQUIREMENTS

- .1 Ensure that proposed substitutions for materials, products, methods and processes meet the requirements of the applicable building code, and other requirements of

authorities having jurisdiction.

- .2 Ensure that proposed substitute materials, products, methods and processes do not negate the compliance of adjacent materials, products and constructions with the requirements of the applicable building code and other requirements of authorities having jurisdiction, to which the proposed substitutions may be applied or attached.
- .3 Obtain written approval of proposed substitutions from the authority having jurisdiction and submit the approval with the proposed substitutions for the Consultant's consideration.

1.4 CREDITS ARISING FROM SUBSTITUTIONS

- .1 Credits arising from accepted substitutions will be credited to the Contract in such sums as may be agreed upon between the Owner and the Contractor after being assessed by the Consultant, and the Contract Price will be adjusted accordingly.

1.5 MECHANICAL/ELECTRICAL SPECIFIED AND ACCEPTABLE MANUFACTURERS

- .1 If materials or apparatus manufactured and/or supplied by a manufacturer named as acceptable are used in lieu of the manufacturer specified, ensure that the substituted material or apparatus is equivalent in performance and operating characteristics to the specified materials or apparatus and pay costs for Drawing changes required as a result of acceptance of such substitutions.

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 SECTION INCLUDES

- .1 Procedures for making changes to work.
- .2 Request for additional information, clarifications, and the RFI process.

1.2 RELATED SECTIONS

- .1 Cash allowances: Section 01 20 00
- .2 Payment procedures: Section 01 29 00

1.3 REQUESTS FOR INFORMATION

- .1 Maintain a Request for Information system for questions regarding clarifications. A Request for Information (RFI) will be a written document that includes, as a minimum, the following details:
 - .1 Date, number and author's name.
 - .2 References to drawings and/or specifications.
 - .3 Location of the Work item in question.
 - .4 Complete description of the question.
 - .5 Affect this item will have on other Work.
 - .6 Suggestions to resolve this question.
 - .7 Date that response information is required.
- .2 An RFI form is to be prepared with headings and spaces for this information to be filled in.
Provide blank space at bottom of form for responses.
- .3 Allow 5 working days for response to RFI.

1.4 CHANGES TO THE SCOPE OF WORK

- .1 The cost of changes to Work not covered by Itemized Prices, or Alternative Prices, shall be established by using current labour rates, including mandatory benefits, prevailing local market prices of materials and/or equipment, taxes, specific fees related to the change only, and conforming to the requirements of Supplementary and General Conditions.
- .2 The standard documentation for processing contemplated changes in the Work shall be as described in the Owner's approval process for PC's, CD's and CO's, bound into the project manual.
 - .1 It is the Contractor's responsibility to ensure that no work is carried out that may

-
- increase the cost of the proposed change until a decision on the acceptance or rejection of the Proposed Change is made.
- .2 Contractor's quotation submitted to the Consultant showing amount by which the Contract amount should be adjusted by way of increase or decrease if the change is approved. Contractor's submittal to include complete breakdown of costs:
- .1 Quantity of each material
 - .2 Unit cost of each material, including copies of quotations from material suppliers.
 - .3 Man hours involved, for each trade
 - .4 Labour costs per hour
 - .5 Copies of all Subcontractor quotations
 - .6 Impact on the project completion schedule and supporting documentation as described in Section 01 32 16 Construction Schedule.
 - .7 Overhead and profit as applicable.
- .3 The standard documentation for expediting necessary changes immediately in the Work shall be as described in the Owner's approval process for PC's, CD's and CO's, bound into the project manual.
- .1 Contractor proceeds immediately with the work without delay. Contractor maintains detailed records of the workforce provided by each trade, work performed, deliveries made and materials supplied. Contractor will submit all time sheets together with receipts for materials purchased. These are to be submitted immediately upon completion of the work.
 - .2 In the event that the change to the Work continues past the date for a normal progress billing, costs for additional work may be included in the progress application so long as proper documentation is provided.
 - .3 Upon completion of the change to the Work, Contractor to advise the affect, if any, on project completion schedule. Provide supporting documentation as described in Section 01 32 16 Construction Schedule.

1.5 PRICING CHANGES

- .1 Quote material prices which shall be the net price paid by the Contractor (or Subcontractor) after deduction of all trade and cash discounts and the like other than reasonable discount for prompt payment.
- .2 Quote labour costs which shall be the actual rate paid to the Workmen plus a mark-up percent based on Union Agreement to cover Welfare contribution, Pension contribution, Vacation Pay, Trade Improvement Fund, Promotional Fund, Training Fund, Supplementary Unemployment Benefits, Check Off, Apprenticeship, Trust Fund and similar labour contract payments; Worker's Compensation Insurance, Canada Pension Scheme and other statutory charges on labour.
- .3 The issuance of a Change Order shall be deemed to be formal acceptance by the Owner

of the Contractor's quotation. Following the issue of a Change Order the Owner will not entertain claims for extra payments due to errors alleged to have been made in the Contractor's Quotation.

- .4 The intention is that quotations submitted in response to Proposed Changes shall be fair and reasonable and reflect current market prices in line with prices in original Bid. The Contractor shall check subcontractor's quotations for compliance with this requirement before submission to Consultant.
- .5 Where it is proposed that a change in the scope of work affects the Construction Schedule, this must be identified at the time of submission of quotation. Claims to access the impact of changes on the schedule at a later date will be rejected. Time extensions to the project schedule will be considered only where it can be shown with the overall project schedule, that the work area and or trades affected by the change are on the critical path. Time extensions granted for changes to the scope of work will not give rights to claim any additional costs.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF THIS SECTION

Part 1 General

1.1 SUMMARY

- .1 Administrative and procedural requirements necessary to prepare and process applications for payment.

1.2 REFERENCES

- .1 Schedule of Values: A statement furnished by Contractor allocating portions of the Contract sum to various portions of the Work and used as the basis for reviewing Contractor's applications for payment.

1.3 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Prior to submission of the initial application for payment, no later than fifteen (15) Working Days before the date scheduled for submittal of the initial application for payment:
 - .1 Confirm with Consultant and/or Owner where invoices should be submitted.
 - .2 Submit a proposed schedule of values for review and approval by the Consultant.
The schedule of values for parts of Work, aggregating total amount of Contract Price, to facilitate evaluation of application for payment. Include a line item for the value of the as-builts and other close out documentation.
- .2 Make applications for payment on account monthly as Work progresses.
- .3 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of the Work at that date.
- .4 Submit applications for payment in a format acceptable to Consultant.
- .5 Progress invoices are to be accompanied by a current clearance certificate from the workers' compensation agency for the Place of the Work.
- .6 Second and subsequent progress invoices are to be accompanied by a statutory declaration on the appropriate contract form.

1.4 SCHEDULE OF VALUES

- .1 Provide Schedule of Values supported by evidence as Consultant may reasonably direct and when accepted by Consultant be used as basis for Application For Payment.

- .2 Include statement based on schedule of values with each Application For Payment.
- .3 Claims for products delivered to the place of work within the last agreed monthly payment period, but not yet incorporated into the work, will not be considered.
- .4 Submit Schedules of Values in a format acceptable to Consultant.

1.5 PROGRESS PAYMENT

- .1 Consultant shall issue to Owner, no later than ten (10) Working Days after receipt of an Application For Payment, certificate for payment in amount applied for or in such other amount as Consultant determines to be due. If Consultant amends application, Consultant will give notification in writing giving reasons for amendment.

1.6 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work or substantial performance of designated portion of Work when Work is substantially performed if permitted by lien legislation applicable to Place of the Work designated portion which Owner agrees to accept separately is substantially performed. Failure to include items on list does not alter responsibility to complete Contract.
- .2 No later than ten (10) Working Days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than seven (7) Working Days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.
- .3 Consultant: state date of Substantial Performance of the Work or designated portion of Work in certificate.
- .4 Immediately following issuance of certificate of Substantial Performance of the Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.7 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

- .1 After issuance of certificate of Substantial Performance of Work:
- .2 Submit application for payment of holdback amount.
- .3 Submit sworn statement that accounts for labour, subcontracts, Products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of the Work and for which Owner might in be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.
- .4 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.

- .5 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of the Work. Where lien legislation does not exist or apply, holdback amount is due and payable in accordance with other legislation, industry practice, or provisions which may be agreed to between parties. Owner may retain out of holdback amount sums required by law to satisfy liens against Work or, if permitted by lien legislation applicable to Place of the Work, other third-party monetary claims against Contractor which are enforceable against Owner.

1.8 FINAL PAYMENT

- .1 Submit application for final payment when Work is completed.
- .2 Consultant will, no later than ten (10) Working Days after receipt of application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than seven (7) Working Days after reviewing Work.
- .3 Consultant will issue final certificate for payment when application for final payment is found valid.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section includes administrative requirements for:
 - .1 Errors, omissions, ambiguities, conflicts, and discrepancies.
 - .2 Schedule of submittals.
 - .3 Warranties.
 - .4 Certificates and transcripts.
 - .5 Contractor personnel and Subcontractor changes.
 - .6 Governmental safety requirements.
 - .7 Environmental procedures for hazardous materials.

1.2 ERRORS, OMISSIONS, AMBIGUITIES, CONFLICTS, AND DISCREPANCIES.

- .1 Contract Documents are intended to follow federal, provincial and municipal laws, by-laws, regulations and other requirements of authorities having jurisdiction. Perform Work in conformity with such requirements. If errors, omissions, ambiguities, conflicts and discrepancies are suspected, notify the Consultant at in writing with reasonable time so such ambiguities, conflicts and discrepancies may be resolved in writing. Comply with the Consultant's written instructions or explanations.
- .2 Where there is conflict between Contract Documents, most stringent requirements shall prevail.
- .3 Promptly and not later than ten (10) Working Days of becoming aware of circumstances which may require a change in the Work or other directions, give written notice to the Owner outlining such circumstances and request written directions. Do no work in affected area, or that would prevent the Consultant from assessing situation or evaluating change, without its prior written approval. Consultant shall act promptly to give written directions, so the Work is not unreasonably delayed.

1.3 SCHEDULE OF SUBMITTALS

- .1 Submit to Consultant for review as specified the following submittals:
 - .1 Shop drawings.
 - .2 Samples.
 - .3 Product data.
 - .4 Certification and verification of performance.
 - .5 Mock-ups and quality control panels.
 - .6 Operating and maintenance manuals.
 - .7 As-built documents.
 - .8 Progress photographs.
 - .9 Progress and submittals schedules.

- .10 Progress and daily reports.
 - .11 Inspection and test reports.
 - .12 Warranties.
 - .13 Certificates and transcripts.
 - .14 Waste audit and reduction plans
-
- .1 Submit submittals with reasonable promptness and in an orderly sequence so as to not cause delay in the work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default shall be allowed.
 - .2 Work affected by the submittal shall not proceed until review is complete.
 - .3 Review submittals prior to submission to the Consultant. The review represents that necessary requirements have been determined and verified, or shall be, and that each submittal has been checked and coordinated with the requirements of the Work as indicated in the Contract Documents.
 - .4 Submittals not stamped, signed, dated and identified as to the specific project shall be returned without being examined and shall be considered rejected.
 - .5 Verify field measurements and affected adjacent work are coordinated.
 - .6 Contractor's responsibility for errors and omissions in submission is not relieved by Consultants' review of submittals.
 - .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultants' review.
 - .8 Keep one reviewed copy of each submission at the Place of the Work.

1.4 WARRANTIES

- .1 Warranties shall be governed by the Contract General Conditions and Supplementary Conditions of the Contract in accordance with Division 00, Section 00 73 00 Supplementary Conditions.
- .2 In instances where part of the Work cannot be completed for reasons (eg. climatic conditions, strikes) beyond the control of the Contractor, a separate certificate of Substantial Performance of the Work shall be required and warranties shall be adjusted accordingly.
- .3 Submit copies of warranties as specified in respective specification sections for inclusion in Operations and Maintenance Manuals specified in Division 01, Section 01 78 23 "Operations and Maintenance Data". Include the following:
 - .1 Proper name of the Owner and Project.
 - .2 Dates warranty commences and terminates. Commencement date is the same date as Certificate of Substantial Performance unless especially agreed otherwise by the Consultant in writing.
 - .3 Precise terms and conditions of the warranty and the extent of remedial action to

be performed.

- .4 Signature of an authorized official of the company issuing the warranty, and where applicable, the seal of the company.
- .4 Owner, through the Consultant, shall promptly give the Contractor notice in writing of observed defects and deficiencies that occur during the warranty period.
- .5 Correct or pay for damage resulting from corrections made herein.
- .6 Be responsible for obtaining product warranties in excess of one year on behalf of the Owner from the manufacturer. These product warranties shall be issued by the warrantor in the name of the Owner.
- .7 Remedial work shall be carried out at a time convenient to the Owner.
- .8 Contractor shall be responsible for the proper performance of the work to the extent that the design and Contract Documents permit such performance
- .9 Any Products replaced under warranty shall be covered by a new warranty equal in duration to the original warranty, commencing on the date the remediation or corrective work is completed.

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of the Contract and when instructed by the Consultant submit Workplace Safety and Insurance Board status, transcription of insurances, Performance Bond and Labour and Material Payment Bond.

1.6 CONTRACTOR PERSONNEL AND SUBCONTRACTOR CHANGES

- .1 Consult with the Owner prior to making changes to its organization on the Project and shall obtain the Owner's approval prior to removing or changing its' Project Manager or General Superintendent, all at no extra cost to the Owner.
- .2 If any of the Contractor's Project staff leave its employment before completion of the Project, such staff must be replaced immediately with staff of equal or better qualifications, as accepted by the Owner.
- .3 Do not use or change a Subcontractor without prior approval from the Owner.

1.7 GOVERNMENTAL SAFETY REQUIREMENTS

- .1 Maintain safety at all times to the satisfaction of the authorities having jurisdiction and the Owner.
- .2 WHMIS legislation requires that all employers train their direct line employees on all aspects of WHMIS. Notify the Owner immediately of any accident occurring at the Place of the Work and submit copies of accident reports.
- .3 Comply with the requirements of the Government of Ontario, Fire and Emergency Services office having jurisdiction.

- .4 Comply with Covid-19 restrictions in accordance with local authorities having jurisdiction over the Place of the Work.

1.8 ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS

- .1 Immediately report unexpected discovery of material that may contain a designated substance regulated by an authority having jurisdiction. Stop work in the area until Owner authorizes continuation of Work.
- .2 Work involving designated substance-containing materials shall be performed in accordance with the applicable regulations governing designated substances.
- .3 For the protection of building occupants, the Owner's designated substance consultant shall provide project inspection and air monitoring services for designated substance-related work. Costs associated with designated substance-related work (i.e., precautions, site inspections, air monitoring, etc.) shall be the direct responsibility of the Contractor.
- .4 Provide documentation identifying any designated substances found and detailing the means, method and location of disposal.

END OF SECTION

Part 1 General

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to administrative provisions for coordinating and managing construction operations on Project including, but not limited to, the following:
 - .1 Construction administration process.
 - .2 Information submittals
 - .3 General coordination requirements and procedures.
 - .4 General coordination.
 - .5 Coordination drawings.
 - .6 RFI's.

1.2 REFERENCES

- .1 Definitions:
 - .1 RFI: "Request for Information / Interpretation:" Request from Owner, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATION SUBMITTALS

- .1 Subcontract List: Prepare a written summary identifying individuals or firms proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Include the following information in tabular form:
 - .1 Name, address, and telephone number of entity performing subcontract or supplying products.
 - .2 Number and title of related Specification Section(s) covered by subcontract.
 - .3 Drawing number and detail references, as appropriate, covered by subcontract.
- .2 Digital Coordination Drawings: Two-dimensional documents, such as schedules, shop drawings, product data, and general information, shall be submitted electronically in portable document format (PDF) file.
- .3 Key Personnel Names: Within 15 working days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - .1 Post copies of list in project meeting room, in temporary field office and by each temporary telephone. Keep list current at all times.

1.4 GENERAL COORDINATION

- .1 Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - .1 Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - .2 Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - .3 Make adequate provisions to accommodate items scheduled for later installation.
 - .4 Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- .2 Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - .1 Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

1.5 COORDINATION DRAWINGS

- .1 Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 - .1 Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - .1 Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - .2 Provide coordinated composite drawings, drawn at a scale not less than 1/4 inch per foot in both plan and elevation, including, but not limited to, equipment, ducts, pipe sleeves, piping including plumbing and sprinkler systems, lighting, special supports and other items contained within the space and finished ceiling. Show mechanical and electrical services and architectural and structural features drawn to scale.
 - .3 Provide composite drawings for corridors, specialty spaces, mechanical rooms, shafts, tunnels, and other areas of limited space with complex systems. Distribute copies of composite drawings to all trades to assure a complete, coordinated installation of work within the space available.
 - .4 Include elevation drawings indicating finish ceiling heights, and heights above finished floor to bottom of ductwork, piping, conduit and other overhead fixtures and equipment.
 - .5 Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40

- inches.
- .6 Draw required details at a scale not less than 3/4 inch per foot.
 - .7 Indicate functional and spatial relationships of components of architectural, mechanical, and electrical systems.
 - .8 Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - .9 Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - .10 Indicate required installation sequences.
 - .11 Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Consultant indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations shall not be considered changes to the Contract.
 - .12 Refer to Sections of Division 23 and Division 26 for specific Coordination Drawing requirements for mechanical and electrical installations.
 - .13 Indicate relationship of components shown on separate Shop Drawings.
 - .14 Electronic Data: Electronic digital data files of the Contract Drawings shall be provided by Consultant for Contractor's use in preparing submittals upon execution of the "Electronic Data Transfer Agreement" included at the end of Section 01 78 39 Project Record Documents.
- .2 Coordination Drawing Organization: Organize coordination drawings as follows:
- .1 Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work. Designate fire-rated walls, partitions and floors.
 - .2 Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 - .3 Mechanical and Electrical Rooms: Provide coordination drawings for mechanical and electrical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 - .4 Structural and Through Penetrations: Indicate fire-rated and non-fire-rated penetrations and openings required for all disciplines through interior and exterior walls, interior partitions, foundation walls, and floor slabs.
 - .5 Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, curtain wall anchorage, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping and equipment pads, and similar items.
 - .6 Show the following Mechanical and Plumbing Work:
 - .1 Sizes and bottom elevations of ductwork, supply piping, sanitary, floor drain piping, and conduit runs, including insulation, bracing, flanges, and

- support systems. Indicate access points and required maintenance areas.
- .2 Dimensions of major components, such as control boxes, dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
- .3 Fire-rated enclosures around ductwork.
- .4 Sleeves and capped utilities for future work.
- .7 Show the following Electrical Work:
 - .1 Runs of vertical and horizontal conduit 32 mm (1-1/4 inches) in diameter and larger.
 - .2 Light fixture, exit light, electrified door hardware, access controls, emergency battery pack, smoke detector, and other fire-alarm locations.
 - .3 Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - .4 Location of pull boxes and junction boxes, dimensioned from column center lines.
- .8 Show the following Fire-Protection System components:
 - .1 Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- .9 Review: Consultant shall review coordination drawings to confirm that the Work is being coordinated, Consultant shall review Coordination Submittals for assessment of completion and aesthetic considerations such as finishes and layouts; not for accuracy or content, but not for the details of the coordination, which are Contractor's responsibility. If it is determined that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Contractor shall be informed and requested to make changes as directed and resubmit for review.
- .3 Coordination Digital Data Files:
 - .1 Prepare coordination digital data files according to the following requirements:
 - .1 File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 - .2 File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
 - .3 Consultant shall furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - .1 Consultant makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - .2 Digital Data Software Program: Drawings are available in REVIT.
 - .3 Contractor shall execute an electronic data licensing agreement in the form of Electronic Data Transfer Agreement included at the end of Section 01 78 39 "Project Record Documents".

1.6 REQUESTS FOR INTERPRETATION (RFI)

- .1 Immediately on discovery of the need for interpretation of the Contract Documents, prepare and submit an electronic RFI in writing to the Consultant, with copy to the Owner.
 - .1 RFIs shall originate with Contractor.
 - .2 Rejection: The following Contractor-generated RFI's shall be deemed frivolous and returned without action:
 - .1 Requests for approval of submittals.
 - .2 Requests for approval of substitutions.
 - .3 Requests for approval of Contractor's means and methods.
 - .4 Requests for resolution of construction deficiencies or failed inspections.
 - .5 Requests for coordination of information already indicated in the Contract Documents.
 - .6 Requests for adjustments in the Contract Time or the Contract Sum.
 - .7 Requests for interpretation of Consultant's actions on submittals.
 - .8 Incomplete RFI's or inaccurately prepared RFI's.
 - .9 Solicit clarification of comments that have been communicated to the Contractor by the Consultant during shop drawing review or the review of other required submittals.
 - .3 The Owner reserves the right to assess the Contractor for the cost (based on time and materials) of the review process performed by the Consultant and/or any of the Consultant's or Owner consultants when RFI's fail to conform to the requirements stated herein, or in the opinion of the Consultant, are unnecessary or frivolous (i.e.; the subject of the inquiry noted in the RFI is suitably and/or clearly addressed in the Contract Documents or meet requirements for rejection).
- .2 Submit an RFI if one of the following conditions occur:
 - .1 Contractor discovers an unforeseen condition or circumstance that is not described in the Contract Documents.
 - .2 Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents.
- .3 Content of the RFI:
 - .1 Include a detailed, legible description of item needing information or interpretation and the following:
 - .1 Project name.
 - .2 Project number,
 - .3 Date
 - .4 Name of Contractor.
 - .5 RFI number, numbered sequentially.
 - .6 RFI subject.
 - .7 Specification Section number and title and related paragraphs, as appropriate.
 - .8 Drawing number and detail references, as appropriate.

- .9 Field dimensions and conditions, as appropriate.
- .10 Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
- .11 Contractor's signature.
- .12 Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- .13 Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- .2 Limit each RFI to one subject.
- .4 RFI Forms: Use electronic facsimile RFI Form to the acceptance of the Consultant.
- .5 RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly with not less than the following:
 - .1 Project name.
 - .2 Name and address of Contractor.
 - .3 Name and address of Consultant.
 - .4 RFI number including RFI's that were returned without action or withdrawn.
 - .5 RFI description.
 - .6 Date the RFI was submitted.
 - .7 Date Consultant's response was received.
- .6 Consultant's Action: At a minimum, allow an average of seven (7) seven Working Days for Consultant's response for each RFI. At a minimum allow an average of one (1) additional Working Days for each RFI issued within the three (3) Working Days of the previous RFI.

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 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to administrative and procedural requirements for project meetings (also noted as conferences) including, but not limited to, the following:
 - .1 Preconstruction conference.
 - .2 Preinstallation conferences.
 - .3 Progress meetings.
 - .4 Project closeout conference.

Part 2 Products

2.1 PROJECT MEETINGS

- .1 General: Contractor shall schedule and conduct regular Project meetings and conferences, at intervals of not longer than two (2) weeks, at Project site unless otherwise indicated.
- .2 Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Consultant of scheduled meeting dates and times.
- .3 Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
- .4 Minutes: Entity responsible for conducting meeting shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Consultant, within three (3) Working Days of the meeting.
- .5 Contractor shall organize and preside over project meetings with Subcontractor and suppliers as required to coordinate, schedule and expedite the work. Hold these meetings separate from meetings with the Owner, Consultant and Engineers.

2.2 PRECONSTRUCTION CONFERENCE

- .1 Preconstruction Conference: Consultant shall schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Consultant, but no later than ten (10) Working Days after execution of the Contract.
 - .1 Conduct the conference to review responsibilities and personnel assignments.
 - .2 Attendees: Authorized representatives of Owner, Consultant, and their consultants; Contractor and its superintendent; Subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - .3 Agenda: Discuss items of significance that could affect progress, including the

following:

- .1 Tentative construction schedule.
- .2 Phasing.
- .3 Critical work sequencing and long-lead items.
- .4 Designation of key personnel and their duties.
- .5 Lines of communications.
- .6 Procedures for processing field decisions and Change Orders.
- .7 Procedures for RFIs.
- .8 Procedures for testing and inspecting.
- .9 Procedures for processing applications for payment.
- .10 Procedures for Request for Substitution Form specified in Section 01 60 00.
- .11 Distribution of the Contract Documents.
- .12 Submittal procedures.
- .13 Preparation of as-built documents.
- .14 Use of the premises and existing building.
- .15 Work restrictions.
- .16 Working hours.
- .17 Owner's occupancy requirements.
- .18 Responsibility for temporary facilities and controls.
- .19 Procedures for moisture and mold control.
- .20 Procedures for disruptions and shutdowns.
- .21 Construction waste management and recycling.
- .22 Parking availability.
- .23 Office, work, and storage areas.
- .24 Equipment deliveries and priorities.
- .25 Security.
- .26 Progress cleaning.
- .27 Minutes: Entity responsible for conducting meeting shall record and distribute meeting minutes.

2.3 PREINSTALLATION CONFERENCES

- .1 Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
 - .1 Preinstallation conferences shall take place on the same day as progress meetings.
 - .2 Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with

other materials and installations that have preceded or shall follow, shall attend the meeting. Advise Consultant of scheduled meeting dates.

- .3 Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - .1 Contract Documents.
 - .2 Options.
 - .3 Related RFI's.
 - .4 Related Change Orders.
 - .5 Supplemental instructions or site instructions.
 - .6 Purchases.
 - .7 Deliveries.
 - .8 Submittals.
 - .9 Review of mockups.
 - .10 Possible conflicts.
 - .11 Compatibility requirements.
 - .12 Time schedules.
 - .13 Weather limitations.
 - .14 Manufacturer's written instructions.
 - .15 Warranty requirements.
 - .16 Compatibility of materials.
 - .17 Acceptability of substrates.
 - .18 Temporary facilities and controls.
 - .19 Space and access limitations.
 - .20 Regulations of authorities having jurisdiction.
 - .21 Testing and inspecting requirements.
 - .22 Installation procedures.
 - .23 Coordination with other work.
 - .24 Required performance results.
 - .25 Protection of adjacent work.
 - .26 Protection of construction and personnel.
- .4 Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- .5 Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
- .6 Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

2.4 PROGRESS MEETINGS

- .1 Conduct progress meetings at biweekly intervals.
 - .1 Coordinate dates of meetings with preparation of payment requests.
 - .2 Attendees: In addition to representatives of Owner and Consultant, each Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - .3 Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - .1 Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule shall be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities shall be completed within the Contract Time.
 - .1 Review schedule for next period.
 - .2 Review present and future needs of each entity present, including the following:
 - .1 Interface requirements.
 - .2 Sequence of operations.
 - .3 Resolution of BIM component conflicts.
 - .4 Status of submittals.
 - .5 Deliveries.
 - .6 Off-site fabrication.
 - .7 Access.
 - .8 Site utilization.
 - .9 Temporary facilities and controls.
 - .10 Progress cleaning.
 - .11 Quality and work standards.
 - .12 Status of correction of deficient items.
 - .13 Field observations.
 - .14 Status of RFI's.
 - .15 Status of proposal requests.
 - .16 Pending changes.
 - .17 Status of Change Orders.
 - .18 Pending claims and disputes.
 - .19 Documentation of information for payment requests.

- .4 Minutes: Entity responsible for conducting the meeting shall record and distribute the meeting minutes to each party present and to parties requiring information.
 - .1 Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

2.5 PROJECT CLOSEOUT CONFERENCE

- .1 Schedule and conduct a project closeout conference, at a time convenient to Owner and Consultant, but no later than sixty (60) days prior to the scheduled date of Substantial Performance of the Work.
 - .1 Conduct the conference to review requirements and responsibilities related to Project closeout.
 - .2 Attendees: Authorized representatives of Owner, Consultant, and their consultants; Contractor and its superintendent; Subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - .3 Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - .1 Preparation of as-built documents.
 - .2 Procedures required prior to inspection for Substantial Performance of the Work and for final inspection for acceptance.
 - .3 Submittal of written warranties.
 - .4 Requirements for preparing operations and maintenance data.
 - .5 Requirements for delivery of material samples, attic stock, and spare parts.
 - .6 Requirements for demonstration and training.
 - .7 Preparation of Contractor's punch list.
 - .8 Procedures for processing applications for payment at Substantial Performance of the Work and for final payment.
 - .9 Submittal procedures.
 - .10 Installation of Owner's furniture, fixtures, and equipment.
 - .11 Responsibility for removing temporary facilities and controls
 - .4 Minutes: Entity conducting meeting shall record and distribute meeting minutes.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - .1 Coordination.
 - .2 Construction schedule.
 - .3 Reports.
 - .4 Cost breakdown and cash flow schedule.
 - .5 Submittal schedule.
- .3 Related Requirements:
 - .1 Refer to Division 01, Section 01 31 13 "Project Management and Coordination" for coordination drawings.
 - .2 Refer to Division 01, Section 01 31 19 "Project Meetings" for meeting minutes administrative and procedural requirements.

1.2 DEFINITIONS

- .1 Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - .1 Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - .2 Predecessor Activity: An activity that precedes another activity in the network.
 - .3 Successor Activity: An activity that follows another activity in the network.
- .2 Event: The starting or ending point of an activity.

1.3 COORDINATION

- .1 Coordinate Contractor's construction schedule with the Schedule of Values, list of subcontracts if applicable, submittal schedule, progress reports, payment requests, and other required schedules and reports.
- .2 Secure time commitments for performing critical elements of the Work from entities involved.
- .3 Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.4 PRELIMINARY CONSTRUCTION SCHEDULE

- .1 Bar-Chart Schedule: Submit a preliminary horizontal bar-chart construction schedule within five (5) Working Days of date established for the Notice to Proceed.
- .2 Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cost requirement prediction based on indicated activities.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT)

- .1 Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within ten (10) Working Days of date established for Contract commencement. Base schedule on the Preliminary Construction Schedule and additional information received since the start of Project.
- .2 Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Performance of the Work.
 - .1 Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - .2 Include the following:
 - .1 Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule.
 - .2 Submittal review time.
 - .3 Startup and testing time.
 - .4 Substantial Performance of the Work.
 - .5 Punch list and final completion.
 - .6 Constraints and work restrictions.
- .3 Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - .1 Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - .2 Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - .3 As the Work progresses, indicate final completion percentage for each activity.
- .4 Distribution: Distribute copies of approved schedule to Consultant and Owner, separate contractors as applicable, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - .1 Post copies in Project meeting rooms and temporary field offices.
 - .2 When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in

performance of construction activities.

- .5 Submit Contractor's Construction Schedule with Submittal Schedule, Progress Reports, Payment Requests, and other required schedules and reports.
- .6 Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Performance of the Work, and final completion.

1.6 REPORTS

- .1 Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - .1 List of Subcontractors at Project site.
 - .2 List of separate contractors at Project site as applicable.
 - .3 Approximate count of personnel at Project site.
 - .4 Equipment at Project site.
 - .5 Material deliveries.
 - .6 High and low temperatures and general weather conditions, including presence of rain or snow.
 - .7 Accidents.
 - .8 Meetings and significant decisions.
 - .9 Unusual events (see special reports).
 - .10 Stoppages, delays, shortages, and losses.
 - .11 Meter readings and similar recordings.
 - .12 Emergency procedures.
 - .13 Orders and requests of authorities having jurisdiction.
 - .14 Change Orders received and implemented.
 - .15 Work change authorizations received and implemented.
 - .16 Services connected and disconnected.
 - .17 Equipment or system tests and startups.
 - .18 Partial completions and occupancies.
 - .19 Substantial Performance of the Work authorized.
- .2 Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
 - .1 Material stored prior to previous report and remaining in storage.
 - .2 Material stored prior to previous report and since removed from storage and installed.
 - .3 Material stored following previous report and remaining in storage.

- .3 Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- .4 Progress Reports:
 - .1 Submit to the Consultant monthly progress reports with each progress payment claim consisting of a concise description and a marked-up schedule showing physical percentage complete by item and in total.
 - .2 Include two (2) week and six (6) week look-ahead.

1.7 SPECIAL REPORTS

- .1 General: Submit special reports directly to Owner within three (3) Working Days of an occurrence. Distribute copies of report to parties affected by the occurrence.
- .2 Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1.8 COST BREAKDOWN AND CASH FLOW SCHEDULE

- .1 Prepare a cost breakdown for each section of the work and a monthly cash flow schedule coordinated with the construction progress schedule.
- .2 Submit a draft format for acceptance by the Consultant.
- .3 Submit the cost breakdown and the cash flow schedule fifteen (15) days or more prior to the first application for payment. The application for payment shall not be considered to have been submitted until after the cost breakdown and cash floor schedule have been reviewed.
- .4 Keep the cash flow schedule up to date with the progress schedule and advise the Consultant of changes.
- .5 Issue revised copies to the Consultant at time of each change.

1.9 SUBMITTAL SCHEDULE

- .1 Submittal Schedule: Submit a master schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include the time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Consultant and additional time for handling and reviewing submittals required by those corrections.
 - .1 Coordinate submittal schedule with list of subcontracts, the Schedule of Values, and Contractor's construction schedule.
 - .2 Refer to Schedule of Submittals to be reviewed by Consultant as outlined in Section 01 30 00 Administrative Requirements and additional administrative

requirements.

- .3 Six-Week Look-Ahead Schedules: Maintain and update submittal schedules to reflect current conditions at the project site and project status. Submit revised submittal schedules highlighting the submittals planned in the subsequent six weeks.
- .4 Format: Arrange the following information in a tabular format:
 - .1 Scheduled date for first submittal.
 - .2 Specification Section number and title.
 - .3 Submittal category: Action verse informational.
 - .4 Name of Subcontractor.
 - .5 Description of the Work covered.
 - .6 Scheduled date for Consultant's final release or approval.
 - .7 Scheduled date of fabrication.
- .5 Submittal Schedule Draft Review: Consultant shall review the submittal schedule. Make necessary adjustments requested by the Consultant.
- .6 Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
- .7 Submit revised submittal schedule to reflect changes in current status and timing for submittals.

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 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section includes administrative requirements and procedures for photographic documentation.

1.2 DIGITAL PHOTOGRAPHIC DOCUMENTATION

- .1 Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Include same information as corresponding photographic documentation.
- .2 Submit image files within three (3) Working Days of taking photographs.
- .3 Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- .4 Digital Camera: Minimum sensor resolution of 10 megapixels.
- .5 Format:
 - .1 Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
 - .2 Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas shall not be accepted.
- .6 Identification: Provide the following information with each image description in file metadata tag:
 - .1 Name of Project.
 - .2 Name and contact information for photographer.
 - .3 Name of Consultant.
 - .4 Name of Contractor.
 - .5 Date photograph was taken.
 - .6 Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - .7 Unique sequential identifier keyed to accompanying key plan.
- .7 Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Consultant.
 - .1 Flag construction limits before taking construction photographs.
 - .2 Take minimum thirty (30) photographs to show existing conditions adjacent to

property before starting the Work.

- .3 Add additional photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
- .4 Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- .8 Periodic Construction Photographs: Take approximately thirty (30) photographs bi-weekly, coinciding with the cutoff date associated with each application for payment. Select vantage points to show status of construction and progress since last photographs were taken.
- .9 Final Completion Construction Photographs: Take approximately thirty (30) photographs. Select vantage points to show status of construction and progress since last photographs were taken.
- .10 Consultant-Directed Construction Photographs: From time to time, Consultant shall instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- .11 Field Office Hard Copy Construction Photograph Prints: Maintain progress images in the field office at Project site, available at all times for reference. Identify images the same as for those submitted to Owner.

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 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to administrative and procedural requirements for submitting submittals such as Shop Drawings, Product data, samples, and other submittals.

1.2 REFERENCES

- .1 Definitions:
 - .1 Schedule of Values: A statement furnished by Construction Manager allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Construction Manager's Applications for Payment.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- .1 Electronic Data: Where electronic digital data files of the Contract Documents are made available to the Contractor's and Subcontractor's use in preparing submittals, the Contractor and Subcontractor's shall at the discretion of the Consultant sign an electronic agreement for use of such electronic digital data files and the Consultant may charge a fee for the use of such electronic digital data files.
- .2 Electronic Data: Electronic digital data files of the Contract Drawings shall be provided by Consultant for Contractor's and Subcontractor's use in preparing submittals upon execution of the "Electronic Data Transfer Agreement" included at the end of Division 01 Section 01 78 39 "Project Record Documents."
 - .1 The Consultant's digital data drawings convey design intent and are not considered construction drawings. Contractors and Subcontractors are given the digital data drawings to help facilitate their work. Contractors and Subcontractors are required to prepare and submit construction Shop Drawings that detail the construction of their work, coordinating with adjacent materials, assemblies, and components for the purpose of building the project. Submission of the Consultant or subconsultants digital data drawing files in lieu of Shop Drawings is not acceptable.
- .3 Process: The Consultant shall use the Consultant's web-based Construction Contract Administration (CCA) software system for tracking and responding to communications from the Contractor and for submitting requests and information to the Contractor.
 - .1 Contractor shall prepare requests and submittals on electronic forms acceptable to Consultant and Owner provided the data included is consistent with the requirements included in this Section.
- .4 Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - .1 Coordinate each submittal with fabrication, purchasing, testing, delivery, other

- submittals, and related activities that require sequential activity.
- .2 Submittal items required for each Specification Section shall be submitted concurrently unless partial submittals for portions of the Work are indicated on final reviewed submittal schedule.
 - .3 Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - .4 Coordinate transmittal of different types of submittals for related parts of the Work so processing shall not be delayed because of need to review submittals concurrently for coordination.
 - .5 Consultant reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - .6 Arrange for preparation of required submittals in sufficient detail to permit analysis and review by Consultant, sufficiently early to allow for review, and accommodate the rate of construction progress required under the Contract. Delete or mark out extraneous material not relevant to the Project.
- .5 Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on the first full Working Day following Consultant's receipt of submittal.
- .1 Submittals received by the Consultant after 1:00 pm on weekends shall be considered as received the following Working Day.
 - .2 No extension of the Contract Time shall be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - .3 Initial Review: Allow an average of ten (10) consecutive Working Days for initial review of each submittal. Allow additional time if processing shall be delayed permitting coordination with subsequent submittals or if concurrent review is required. Consultant shall advise Contractor when a submittal being processed shall be delayed for coordination or concurrent review.
 - .4 Resubmittal Review: Allow an average of ten (10) consecutive Working Days for review of each resubmittal.
 - .5 The Consultants shall review each submittal a maximum of three (3) times; the initial submittal plus two (2) resubmittals. The Contractor shall process submittals in complete packages to allow Submittal reviews to be completed within the requisite three (3) review period. The Owner has the right to back charge the Contractor for the Consultant's time for review of resubmittals beyond three.
 - .6 Extended Review: Allow an average twenty (20) Working Days for initial review of the following submittals:
 - .1 Coordination drawings.
 - .2 Delegated design fabrications.
 - .3 Casework drawings.
 - .4 Door hardware.
 - .5 Electronic security systems.
 - .6 HVAC temperature controls.

- .7 HVAC balancing report.
 - .8 The Contractor shall prioritize submission and processing submittals in accordance with the Project Construction Schedule. No more than five (5) Submittals of a single Subcontractor may be received and processes in one week, with a maximum 50 pages.
- .6 Electronic Submittals: Two (2) dimensional documents, such as schedules, Shop Drawings, Product data, and general information, shall be submitted electronically in PDF file. Identify and incorporate information in each electronic submittal file as follows:
- .1 Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single specification Section and transmittal form with links enabling navigation to each item.
 - .2 File Naming: Each Submission shall have a file name consisting of project name, submittal section name, item number, and revision number. The Consultant Project Shop Drawing review stamp shall read and incorporate this file name. It is therefore imperative that each submittal file use the following naming convention:
 - .1 Each Submittal shall be created with a four-part alpha numeric file naming system, with each part separated by a dash. For illustration purposes only, each item is bolded and underlined to draw attention to it in the examples below:
 - .1 The first part is the project abbreviation (e.g. **IDENT-061000-0001-01**).
 - .2 The second part is the specification section number (e.g. IDENT-**061000**-0001-01.
 - .3 The third part is the item number of each submittal required in that specific specification section. Each item shall have an individual number. Do not group multiple items in a single item number, as they shall be returned not logged in and without an action reserved for proper submissions. The first item shall be 0001, the next item 0002, etc. (e.g. IDENT—061000-**0001**-01).
 - .4 The fourth part represents the number of times the item has been submitted for review. No submission shall start with 00. The first submission shall be 01, the second submission shall be 02, etc. (e.g. IDENT-061000-0001-**01**).
 - .5 A brief two-word description of the submittal may follow the number to further clarify the content of the submittal. (e.g. IDENT-061000-001-01-**plywood.pdf**).
 - .6 Place a single dash between each part of the file name.
 - .3 Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Consultant.
 - .4 Transmittal Form for Electronic Submittals: Use electronic form acceptable to the Consultant, containing the following:
 - .1 Project name.
 - .2 Date.
 - .3 Name and address of Consultant.

- .4 Name of Contractor.
- .5 Name of Entity or firm that prepared the submittal.
- .6 Names of subcontractor, manufacturer and supplier.
- .7 Category and type of submittal.
- .8 Submittal purpose and description.
- .9 Specification Section number and title.
- .10 Specification paragraph number or drawing designation and generic name for each of multiple items.
- .11 Drawing number and detail references, as appropriate.
- .12 location(s) where product is to be installed, as appropriate.
- .13 Related physical samples submitted directly.
- .14 Indication of full or partial submittal.
- .15 Transmittal number, numbered consecutively.
- .16 Submittal and transmittal distribution record.
- .17 Other necessary identification.
- .18 Remarks.
- .5 Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - .1 Project name.
 - .2 Number and title of appropriate Specification Section.
 - .3 Manufacturer name.
 - .4 Product name.
- .6 Include Contractor's certification/approval stamp stating that information submitted complies with requirements of the Contract Documents.
- .7 Transmittal for Paper Submittals: Assemble each final submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Consultant shall discard submittals received from sources other than Contractor.
- .8 Options: Identify options requiring selection by Consultant.
- .9 Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Consultant on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals. Provide accompanying detailed written explanation for each deviation. Include same identification information as related submittal.
- .10 Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - .1 Note date and content of previous submittal.
 - .2 Note date and content of revision in label or title block and clearly indicate extent of revision.

- .3 Resubmit submittals until they are marked with approval notation from Consultant's action stamp.
- .4 Transmittal shall contain the same information as the first transmittal except that numbers shall run consecutively following naming and numbering protocol.
- .5 No new material shall be included on the same transmittal for a resubmission.
- .6 On resubmissions of Shop Drawings, the Consultant's review shall be generally restricted to review of revisions to the original Shop Drawing. Changes (revisions) to re-submitted Shop Drawings shall be clearly encircled or otherwise highlighted.
- .11 Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- .12 Use for Construction: Retain complete copies of submittals on Project site. action stamp.

1.4 CLOSEOUT SUBMITTALS

- .1 Closeout Submittals and Maintenance Material Submittals: Provide copies of final Shop Drawings, substitutions, and copies of other final submittals specified in this section with a record copy to the Owner at Substantial Performance of the Work. Comply with requirements specified in Division 01, Section 01 77 00 "Closeout Procedures."
- .2 Project Record Documents: Comply with requirements specified in Division 01, Section 01 78 39, "Project Record Documents."
- .3 Maintenance Data: Comply with requirements specified in Division 01, Section 01 78 23 "Operation and Maintenance Data."
- .4 Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- .5 Final Completion Construction Photographs: Arrange with Owner, Subcontractors, Consultants, and other interested parties for photographs of the finished construction. Provide , at a minimum, photographs of each interior finishes and notable portions of the building. When requested by the Owner, take photographs of adjacent spaces to document condition at the end of construction.

1.5 CONTRACTOR'S REVIEW

- .1 Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Consultant.
 - .1 Ensure submittal is specifically required by the Contract Documents. Submittals not required shall not be submitted and shall not be processed or reviewed by the Consultant.
 - .2 Verify:
 - .1 Field measurements.

- .2 Field construction criteria.
 - .3 Catalog numbers and similar data.
 - .4 Proper interface with adjacent or related work.
 - .3 Coordinate each submittal with adjacent work and requirements of Contract Documents.
 - .4 Coordinate each submittal with previous transmittal requirements for numbering each submittal.
 - .5 Each specified material, product, or item shall be submitted individually, as a separate, uniquely identified submittal complying with file numbering system specified. Assembled booklets containing multiple products or systems from different sections shall not be permitted and shall be returned without action.
- .2 Contractor's Approval Stamp: Insert a uniform, approval stamp on each submittal. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and reviewed for compliance with the Contract Documents.
- .1 Language on the Contractor's submittal review stamp shall be consistent with the Agreement and requirements of the General Conditions of the Contract. A stamp containing language which defers or assigns Contractor's responsibilities to Subcontractor shall not be permitted.
 - .2 Consultant shall take no action on submittals that do not have the Contractor's stamp and that have not been certified.
 - .3 Any delay due to such rejections shall not be grounds for an extension of time.

1.6 CONSULTANT'S ACTION

- .1 General: Consultant shall not review submittals that do not bear Contractor's approval stamp and shall return them without action.
- .2 Action Submittals: Consultant shall review each submittal, make marks to indicate corrections or revisions required, and return it. Consultant shall insert an action stamp on each submittal, marked appropriately to indicate required action, as follows:
 - .1 REVIEWED: Submittal has been reviewed for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and no exceptions are taken. Proceed with work represented in Submittal. The Consultant's review is not for determining the accuracy or completeness of other details, such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment and systems, remain the responsibility of the Contractor. Review shall not constitute approval of safety precautions, or of construction means, methods and techniques, sequences or procedures. Approval of a specific item shall not indicate approval of an assembly of which the item is a component. Comments and corrections do not authorize changes to the Contract Documents.
 - .2 REVIEWED AS NOTED: Submittal has been reviewed as stated in Subparagraph 1, above, but certain exceptions are noted. Contractor may proceed with work represented in submittal, provided Contractor agrees to incorporate comments and corrections noted by Consultant. Resubmittal is not required. Comments do not authorize changes to Contract Documents.

- .3 REVISE AND RESUBMIT: Submittal has been reviewed as stated in Subparagraph 1, above, but certain comments and corrections are noted, that as a minimum, are necessary for conformance with the design concept expressed in the Contract Documents. Do not proceed with the Work covered by this Submittal. Revise Submittal responding to comments and corrections and resubmit to the Consultant for review until "REVIEWED" or "REVIEWED AS NOTED" action is given. In resubmissions, limit corrections made to items noted in this Submittal.
- .3 Informational Submittals: Consultant is not required to review informational submittals. Informational submittals shall be returned if contradictions are discovered with the following actions:
 - .1 NOT REVIEWED: Submittal has been processed for information only.
- .4 Delegated Design/Engineering Review: The Consultant is entitled to rely upon the adequacy, accuracy and completeness of design/engineering services provided by the Contractor and the Contractor's Design Professional. The Consultant's review of delegated design submittals shall be limited to verification that the Contractor's design:
 - .1 Is in general conformance with the design intent, including design criteria, performance requirements contained in technical sections of the specifications, and other requirements of the Contract Documents
 - .2 Is in general conformance with the overall Project Design, and
 - .3 Can be integrated into the overall Project Design.
- .5 The review of Shop Drawings by the Consultant is for the sole purpose of ascertaining conformance with the design concept and general arrangement for architectural features only, and does not in any way constitute review of the design of engineering elements which form part of the Contract Documents prepared by others. This review shall not mean that the Consultant approves the detail design inherent in the Shop Drawings, responsibility for which shall remain with the Contractor submitting same and such review shall not relieve the Contractor of his responsibility for errors or omissions in the Shop Drawings or of his responsibility for meeting all requirements of the Contract Documents. Confirm dimensions correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of the work of Subcontractors/
- .6 Do not construct, fabricate or deliver parts of the Work requiring Shop Drawings prior to receiving Shop Drawings stamped "REVIEWED" or "REVIEWED AS NOTED" by the Consultant.
- .7 Noted comments made on Shop Drawings by the Consultant are not authorization for changes to the Contract Price or Contract Time. If comments affect the value of the Work or the schedule, state such in writing to the Consultant prior to proceeding with the Work.
- .8 Partial submittals prepared for a portion of the Work shall be reviewed when use of partial submittals has received prior approval from Consultant.
- .9 Incomplete submittals and submittals with errors are unacceptable, shall be considered nonresponsive, and shall be returned for resubmittal without review.
- .10 Submittals not required by the Contract Documents, or including manufacturer's

instructions to the Contractor relative to Contractor's responsibility for means, methods, procedures and safety precautions, may be returned or discarded by the Consultant without action.

1.7 ACTION SUBMITTALS

.1 Product Data:

- .1 Collect information into a single submittal for each element of construction and type of product or equipment.
- .2 If information shall be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product data.
- .3 Mark each copy of each submittal to show which products and options are applicable. Delete or mark out extraneous material that is not applicable to the Work. Edit material to conform to project requirements, and to clearly show model number, type and size proposed. Provide additional information as necessary to supplement standard information. Include the following information, as applicable:
 - .1 Manufacturer's catalog cuts.
 - .2 Manufacturer's product specifications.
 - .3 Manufacturer's written recommendations.
 - .4 Standard colour charts.
 - .5 Statement of compliance with specified referenced standards.
 - .6 Testing by recognized testing agency.
 - .7 Application of testing agency labels and seals.
 - .8 Notation of coordination requirements.
 - .9 Availability and delivery time information.
- .4 For equipment, include the following in addition to the above, as applicable:
 - .1 Wiring diagrams showing factory-installed wiring.
 - .2 Printed performance curves.
 - .3 Operational range diagrams.
 - .4 Mill reports.
 - .5 Standard product operating and maintenance manuals.
 - .6 Compliance with recognized Subcontractor trade association standards.
 - .7 Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- .5 Submit Product data before or concurrent with samples.
- .6 Submit Product data in PDF electronic file format

.2 Shop Drawings:

- .1 Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed

- data.
- .2 General: Submittals containing reproduction of Contract Drawings are not considered Shop Drawings and shall be returned without action. Any delay due to such rejection shall not be grounds for an extension of Contract Time.
 - .3 Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - .1 Dimensions.
 - .2 Identification of products.
 - .3 Fabrication and installation drawings.
 - .4 Roughing-in and setting diagrams.
 - .5 Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.
 - .6 Shop fabrication instructions.
 - .7 Templates and patterns.
 - .8 Schedules.
 - .9 Design calculations.
 - .10 Compliance with specified standards.
 - .11 Notation of coordination requirements.
 - .12 Notation of dimensions established by field measurement.
 - .13 Relationship and attachment to adjoining construction clearly indicated.
 - .14 Design calculations with seal and signature of professional engineer if specified.
 - .15 Highlight deviations from the Contract Documents.
 - .4 Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 inches (25 mm) by 11 inches (280 mm), but no larger than 36 inches (915 mm) by 48 inches (1,220 mm).
 - .5 Shop drawings shall be prepared in metric. Sizes and dimensions shown on Shop Drawings shall be either in metric alone or shown in both metric and imperial.
 - .6 Number each Shop Drawing sheet uniquely complying with file numbering system specified.
 - .7 Do not use Shop Drawings for ordering, fabrication, or construction without an appropriate final stamp from the Contractor and Consultant indicating action taken in connection with construction.
 - .8 Submit Shop Drawings in PDF electronic file format. Consultant shall return one (1) copy.
- .3 Samples:
- .1 Submit samples required by the technical sections of the specifications, for review of size, kind, colour, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

- .2 Submit samples also for:
 - .1 Comparable products.
 - .2 Substitutions.
 - .3 Custom fabricated items.
 - .4 Custom colours.
 - .5 And when the specified item is no longer available, the manufacturer's current catalog numbers vary from those specified, or named manufacturer's Product data differs from requirements, specified. or where custom colours require evaluation.
- .3 Transmit samples that contain multiple, related components such as accessories together in one submittal package.
- .4 Mount, or display, samples to facilitate review of qualities specified. Prepare samples to match the Consultant's sample. Include the following identification label on unexposed side of samples that includes the following:
 - .1 Generic description of sample.
 - .2 Product name and name of manufacturer.
 - .3 Sample source.
 - .4 Number and title of applicable Specification Section.
 - .5 Specification paragraph number, submittal number, and generic name of each item.
 - .6 Compliance with recognized standards.
 - .7 Availability and delivery time.
- .5 For projects where electronic submittals are required, provide corresponding electronic submittal of sample transmittal, digital image file illustrating sample characteristics, and identification information for record.
- .6 Disposition: Maintain sets of final reviewed samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - .1 Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such samples shall be in an undamaged condition at time of use.
 - .2 Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- .7 Samples for Initial Selection:
 - .1 Submit manufacturer's colour charts consisting of units or sections of units showing the full range of colours, textures, and patterns available. Colour charts shall show actual colours. Photographic representations or reproductions shall not be accepted.
 - .1 Number of Samples: Submit three (3) full sets of available choices where colour, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Consultant shall return submittal with options selected.

- .8 Samples for Verification:
 - .1 Submit full-size units or samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of colour and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing colour, texture, and pattern; colour range sets; and components used for independent testing and inspection.
 - .1 Number of Samples: Submit four (4) full sets of samples. Consultant, through shall return three (3) sample sets. Construction Manager shall retain one (1) returned sample set as a project record sample.
 - .1 Submit a single sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - .2 If variation in colour, pattern, texture, or other characteristic is inherent in material or product represented by a sample, submit at least 4 sets of paired units that show approximate limits of variations.

1.8 INFORMATION SUBMITTALS

- .1 Photographs: Comply with requirement specified in Division 01, Section 01 32 33 "Photographic Documentation".
- .2 Submittal Schedule: Comply with requirements of Division 01, Section 01 32 00 "Construction Progress Documentation".
- .3 Contractor's Construction Schedule: Comply with requirements specified in Division 01, Section 01 32 00 "Construction Progress Documentation."
- .4 Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- .5 Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section 01 31 13 "Project Management and Coordination."
- .6 Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section 01 29 00 "Payment Procedures."
- .7 Product Schedules: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - .1 Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - .2 Manufacturer and product name, and model number if applicable.

- .3 Number and name of room or space.
- .4 Location within room or space.
- .5 Submit product schedule in the following format:
- .8 Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - .1 Name, address, and telephone number of entity performing subcontract or supplying products.
 - .2 Number and title of related Specification Section(s) covered by subcontract.
 - .3 Drawing number and detail references, as appropriate, covered by subcontract.
- .9 Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Consultants and owners, and other information specified.
- .10 Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01, Section 01 40 00 "Quality Requirements."
- .11 Certificates:
 - .1 Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
 - .2 Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 - .3 Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 - .4 Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- .12 Test Reports:
 - .1 Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 - .2 Manufacturer's Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, or on comprehensive tests performed by a qualified testing agency.
 - .3 Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - .1 Name of evaluation organization.

- .2 Date of evaluation.
 - .3 Time period when report is in effect.
 - .4 Product and manufacturers' names.
 - .5 Description of product.
 - .6 Test procedures and results.
 - .7 Limitations of use.
- .4 Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- .5 Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- .13 Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - .1 Preparation of substrates.
 - .2 Required substrate tolerances.
 - .3 Sequence of installation or erection.
 - .4 Required installation tolerances.
 - .5 Required adjustments.
 - .6 Recommendations for cleaning and protection.
- .14 Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - .1 Name, address, and telephone number of factory-authorized service representative making report.
 - .2 Statement on condition of substrates and their acceptability for installation of product.
 - .3 Statement that products at Project site comply with requirements.
 - .4 Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - .5 Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - .6 Statement whether conditions, products, and installation shall affect warranty.
 - .7 Other required items indicated in individual Specification Sections.
- .15 Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a

summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

1.9 DELEGATED DESIGN SUBMITTALS

- .1 Delegated Design: When identified in the Contract Documents, the Consultant responsible for the overall professional design services of the Project may delegate design, fabrication, and engineering services required for components related to systems, materials or equipment to the Contractor.
 - .1 The Consultant's Drawings for delegated design, fabrication, and engineering may be diagrammatic, may not identify or imply solutions to design/engineering, but are intended to show the:
 - .1 Design intent, profiles and overall dimensions, shapes and forms,
 - .2 Materials and relationships between items,
 - .3 Location, identification of assemblies, components, accessories and other items,
 - .4 Schematic attachment details and diagrams of connections.
 - .2 The Consultant's specifications for delegated design shall identify performance criteria required.
 - .1 If performance criteria specified or indicated are not sufficient to perform services, submit a written request for additional information to Consultant.
- .2 Contractor's Responsibility: Engage an engineering professional to provide engineering services; including but not limited to, signed and sealed Shop Drawings, Product data and calculations using the design criteria, performance specifications, and other requirements provided in the Contract Documents. Be responsible for the following:
 - .1 Maintaining design intent, conforming to the design shown on the Drawings and the performance requirements in the specifications.
 - .2 Providing fabrication assemblies including materials, products, components, and accessories required for a complete design, whether or not such items are indicated on the Drawings or in the specifications.
 - .3 Providing anchors, attachments, inserts, fasteners, clips, bracing, framework, connections and similar items required to comply with specified design performance requirements.
 - .4 Securely attaching delegated design Work to adjacent supports, related adjoining work; whether or not such items are indicated on the Drawings or in the Specifications.
- .3 Deviations: In the interest of certain fabrication or erection methods, minor dimensional changes and detailing adjustments to the original design communicated in the Contract Documents may become necessary.
 - .1 Identify proposed changes and deviations clearly in the delegated design submittal, highlighting items and bringing deviations to the Consultant's attention for review.
- .4 Delegated-Design Services Certification: Submit digitally signed and sealed PDF electronic Shop Drawings, Product data, design/engineering calculation files and other

required submittals, signed and sealed by the responsible qualified design professional responsible for preparation of design services.

- .1 Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- .5 Substituted Design/Engineering Design: The Consultant has provided design for elements of the Project based on design criteria, performance specifications, and other requirements as documented in the Contract Documents.
 - .1 Where Contractor proposes to vary from the design indicated in the Contract Documents, the Contractor shall engage an engineering design professional to provide delegated design and shall be the Professional Engineer of record for those components that are substituted design.
 - .2 Submittals for substituted design/engineering shall comply with processes outlined in Section 01 25 13 "Product Substitution Procedures".
 - .3 If performance criteria indicated are not sufficient to perform services, submit a written request for additional information to Consultant.
- .6 Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
- .7 Delegated Design Data: Submit comprehensive engineering calculations demonstrating conformance to the requirements of the Contract Documents and comply with requirements of authorities having jurisdiction.
 - .1 Calculations shall be legible and incorporate sufficient cross-references to Shop Drawings to make calculations readily understandable and reviewable.
 - .2 At a minimum, engineering calculations shall contain:
 - .1 Analysis of design elements or component members;
 - .2 Section property computations for structural framing members;
 - .3 Analysis of anchors, including anchors embedded in concrete;
 - .4 Signature and seal of the qualified licensed professional engineer responsible for their preparation.
 - .3 Test reports are not an acceptable substitute for calculations.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 GENERAL INSTRUCTIONS

- .1 Read and be governed by Conditions of the Contract and other Sections of Division 1.
- .2 The purposes of the special project procedures are as follows:
 - .1 Special project procedures shall be required for the full duration of the Work of this Contract for the renovation of the existing healthcare facility as indicated on the Drawings and specified in the Specifications, so that at the same time the existing building which is under renovation can be maintained safe and fully operational, while providing healthcare services for patients and access by visitors and the Public, including healthcare support, maintenance and administration personnel.
 - .2 Special project procedures shall also ensure the Contractor provides full accessibility to the existing building under renovation forming the Work of the Contract to the visitors and the Public including healthcare support staff, maintenance and administration personnel, suppliers and other contractors.
 - .3 Special project procedures shall apply to each part of the Work of the Contract related to the existing building performed by the trade persons specializing in such work.

1.2 DEFINITIONS

- .1 Occupied Areas: "Occupied areas" or similar wording wherever it appears, for the purposes of special project procedures for healthcare facilities shall herein be defined as areas of the healthcare facility other than those under renovation and enclosed with temporary construction enclosures.
- .2 Humber River Hospital (HRH) Project Manager: Humber River Hospital (HRH) project manager for the purposes of special project procedures for healthcare facilities shall herein be defined as the person appointed by the health care facility administrator, the healthcare director of care and the healthcare director of support services to liaise with the staff employed by the healthcare facility, the Contractor and the Consultant.
- .3 Humber River Hospital (HRH) Fire Safety Officers: Humber River Hospital (HRH) fire safety officers for the purposes of special project procedures for healthcare facilities shall herein be defined as the person appointed by the health care facility administrator, the healthcare director of care and the healthcare director of support services to have oversight on fire safety in the healthcare facility.
- .4 Humber River Hospital (HRH) Infection Control Officers: Humber River Hospital (HRH) infection control officers for the purpose of special project procedures for healthcare facilities shall herein be defined as the person appointed by the health care facility administrator, the healthcare director of care and the healthcare director of support services to have oversight on infection control in the healthcare facility.
- .5 Construction Personnel: Construction personnel for the purposes of for the purposes of special project procedures for healthcare facilities shall herein be defined as self-employed persons, personnel on the payroll of Contractor and/or Trade Subcontractors, suppliers and service companies, working on their own behalf and/or on the behalf of

their employers on and/or within the property of the long term health care facility.

- .6 Making Good: The term "making good" shall mean repairing or filling operations performed on existing floors, walls, ceilings or any other exposed surfaces. Making good also means repairing, restoring, refurbishing, rehabilitating, or performing filling operation on any existing components disturbed due to Work of the Contract, to at least the condition existing at the commencement of the Work, in terms of construction integrity, finishes, alignment with existing adjoining surfaces, compatibility of materials, sound attenuation criteria, exfiltration/infiltration requirements, air/vapour barrier and thermal continuity. It is intended that finished surfaces match existing in every respect, compatible and line with existing adjoining surfaces.

1.3 HUMBER RIVER HOSPITAL - SAFETY REGULATIONS AND INSTRUCTIONS FOR CONTRACTORS

- .1 Comply with requirements of the Section 01 35 13.19.01 Humber River Hospital - Safety Regulations and Instructions for Contractors.

1.4 RULES AND REGULATIONS FOR CONSTRUCTION PERSONNEL

- .1 Fundamental to any and/or all rules and regulations, whether written and/or unwritten, is the fact that the healthcare facility is the guardian of, and has full responsibility for the welfare and wellbeing of the patients receiving healthcare at the healthcare facility.
- .2 Where the following rules and regulations for construction personnel attempt as much as possible to foresee all circumstances which may affect the Work of this Contract carried out by construction personnel, the healthcare facility in its sole opinion and judgment may so decide that any act of omission or commission is detrimental to the patients, and the healthcare facility's opinions and judgments are final.
- .3 The following rules and regulations shall be construed as being general in nature and designed a guide for behaviour of construction personnel while performing the Work of this Contract in and/or on the properties of the healthcare facility:
- .1 Where the Work of this Contract causes results which are detrimental to the operations of the healthcare facility, or is distressing to patients, to the point where the HRH Project Manager feels that such work should stop until conditions change, then such work shall stop on order of the aforementioned person.
- .2 Where construction personnel perform Work of this Contract in more than one area of the healthcare facility, such work shall be scheduled so that patient areas are avoided during meal times, bath times and evening hours. Where the aforementioned regulation is not possible, the Contractor shall have a frank discussion with the HRH Project Manager and amicable arrangements shall be made. As a general rule, such arrangements shall be made in conjunction with, and in the presence of those persons, or their delegates as defined herein as being authorized representatives of the healthcare facility.
- .3 Construction personnel shall review all construction procedures with the HRH Fire Safety Officer(s) in which open flame is used as part of the Work of this Contract, including any procedures which shall give off hazardous fumes and/or odours strong enough to harm and/or cause discomfort to the healthcare facility personnel/staff, patients, visitors and the Public, as these fumes and/or odours will be carried by air currents of the mechanical ventilation distribution system to the remote corners of the healthcare facility. Construction personnel shall follow

the recommendations of the HRH Fire Safety Officer(s). In addition to the aforementioned regulation, construction personnel shall limit the amounts of volatile mixtures, flame producing apparatus and the like, within the healthcare facility to an amount no greater than that required for one day's use. Items of volatile mixtures, flame producing apparatus and the like shall not be stored overnight in the healthcare facility.

- .4 Construction personnel shall comply with and enforce the healthcare facility rules with regards to smoking and profane language. Smoking by construction personnel within the healthcare facility shall not be permitted. Also, transporting of lit tobacco products of any description through or in the healthcare facility shall not be tolerated.
- .5 Construction personnel shall not bring and/or drink alcoholic beverages on the property of the healthcare facility. In addition to the aforementioned, noisy behaviour and/or "horse play" of any type by construction personnel is strictly forbidden, and when so discovered or advised by the HRH Project Manager, immediately remove the cause(s) and the construction personnel involved from the healthcare facility property.
- .6 Operation of air compressors, drilling machines, tamping devices, tractors, tractor trailers, floats and other noise making equipment shall be restricted to the time period between 8:00 a.m. to 5:00 p.m., Monday through Saturday, or other time periods established with the HRH Project Manager.
- .7 Construction personnel shall pay particular attention to the limiting features such as; doorways, stairwells and elevators. Under no circumstances shall the existing elevators be overloaded, their governing mechanisms distorted, or be required to perform service unusual to their normal every day operation.
- .8 In the interests of cleanliness and appearance, construction personnel shall not work or remain in occupied areas of the healthcare facility in soiled clothing. Clothing worn in occupied areas of the building shall be clean. The healthcare facility requires all construction personnel in soiled clothing to leave occupied areas of the healthcare facility.
- .9 Construction personnel shall wear a legible numbered identification patch or tag on their person at all times on which the name of their personal name and their employer company name are clearly indicated.
- .10 For hygienic reasons, food shall not be consumed by construction personnel within the construction enclosures.
- .11 Construction personnel shall not use washrooms at the healthcare facility unless authorized to use only designated washrooms as instructed by the HRH Project Manager.
- .12 Communication with the healthcare facility personnel/staff shall all be routed through the HRH Project Manager.

1.5 DAMAGE DOCUMENTATION

- .1 Prior to commencing active selective demolition or other work at the Place of the Work, Contractor shall examine existing work and items which are to remain or be re-used in the finished Work, and shall document damage to such work and items in writing to the Consultant. Items shall include floors, walls, ceilings and equipment on the designated access route to the construction enclosures.
- .2 Contractor's prepared damage documentation shall be reviewed by the Contractor with

the HRH Project Manager and Consultant prior to proceeding further with the Work.

- .3 Contractor shall furnish the HRH Project Manager and Consultant with copies of the above mentioned damage documentation.
- .4 Contractor shall be responsible for the making good, at his own expense, of any damage sustained by work and items which are to be re-employed in the finished Work throughout the duration of construction operations. Such making good shall be to the review and acceptance of the Consultant.

1.6 RESTRICTIONS

- .1 Work of the Contract shall be confined to the Place of the Work limits as indicated on Drawings and/or within area defined by property lines. Work on City of Toronto municipal property shall be carried out under regulations of respective of the City of Toronto and authorities having jurisdiction including without any limitations any associated fees, permits, insurance or bonding required.
- .2 Contractor shall assume responsibility for care, custody and control of the Place of the Work and perform the Work to extent covered in Contract Documents. Make good damage to the existing Site and existing building (if any) due to the Work of this Contract.
- .3 Bring the following restrictions to the attention of the construction personnel and workers on the Work of this Contract and enforce them:
 - .1 Restrict construction personnel and workers to Place of the Work and necessary access routes to it. Restrict non - construction personnel from the Place of the Work, except for Contractor's authorized visitors.
 - .2 Restrict construction activities in the Public, in occupied areas of the existing building, and in locations designated to off hours agreed in Preconstruction Meeting without additional cost to the Owner, and return these areas to normal operations as soon as possible.
- .4 Do not use explosives.

1.7 OCCUPANCY OF THE EXISTING BUILDING

- .1 Existing healthcare facility will remain in full use and occupancy throughout the duration of construction of the Work of this Contract. Contractor shall schedule and perform the Work of this Contract so that conflict is minimized.
- .2 Contractor shall perform the Work of this Contract in and around the existing building at approved times and as mutually agreeable to the HRH Project Manager, so not to inconvenience or hinder the occupation of the existing building by Hospital patients, visitors, Hospital staff and personnel, and the Public.
- .3 Give the HRH Project Manager and Consultant a minimum of seven (7) working days written notice of intention to commence work in a room, or area(s) of the existing building so that he may prepare the space(s).
- .4 Before the Work of this Contract begins and on a routine basis, construction personnel shall be thoroughly informed of the necessity to exercise extreme caution in any of their activities which may interrupt an essential service serving the "occupied areas" for which

an alternate supply, service or facility has not been provided.

- .5 Owner and/or his separate contractors reserves the right to enter the area(s) of Work of this Contract for the purpose of placing and/or fitting equipment before completion of the Work of this Contract. Such entry shall not interfere with or prevent the Contractor from performing the Work of this Contract. Also, such entry shall not in any way be considered as acceptance of the Work of this Contract by the Owner, or in any way relieve the Contractor from responsibilities under Work of this Contract.
- .6 Any interruption(s) of mechanical and electrical services to "occupied areas" must be pre-arranged with the HRH Project Manager and Consultant. Where any such interruption(s) is impossible to avoid, it shall be of the shortest duration possible and restricted to times acceptable to the Consultant in writing. Contractor shall apply in writing to the Consultant and copy the HRH Project Manager well in advance of any contemplated and/or intended interruption(s).
- .7 Construction personnel shall be confined to the enclosed construction areas except when absolutely necessary to perform works and duties directly connected to the Work of this Contract. Contractor shall make arrangements with the HRH Project Manager and Consultant well in advance of works and/or duties required outside the enclosed construction areas.
- .8 In order to reduce to a minimum the period of time required for Work of this Contract within the existing building, each area of Work of this Contract shall be pre-planned in complete detail and all materials for the entire Work within the area shall be on hand or readily available. Before work in each area of the Work of this Contract begins, Contractor shall well in advance make appointment(s) with the HRH Project Manager and Consultant to measure and review the areas to be renovated for the purposes of pre-planning.
- .9 HRH Project Manager and Consultant must be informed well in advance by the Contractor of any Work of this Contract which would likely affect the Hospital patients, visitors, Hospital personnel/staff, the Public, and/or the routine(s) of the existing building. The welfare of the Hospital patients, visitors, Hospital personnel/staff, the Public and preservation of the existing building operations must be the first concern at all times.
- .10 Contractor shall perform the Work of this Contract as quietly as possible in and around the existing building at all times the Hospital patients, visitors, Hospital personnel/staff and the Public are occupying the existing building.
- .11 Contractor shall maintain continuation of fire protection in existing building as specified herein.
- .12 Contractor shall maintain existing exits and ensure that proper and safe means of egress from all parts of existing building to open spaces are provided at all times to the approval of jurisdictional authorities. Locate and install exit lights, and illuminate temporary means of egress.
- .13 Contractor shall maintain access to service and delivery entrances as specified herein.
- .14 Contractor shall maintain security of the existing building during the Work of this Contract as specified herein.

1.8 CONTRACTOR'S USE OF THE EXISTING BUILDING

- .1 Limit access of the construction personnel to the existing building only at the locations acceptable to the HRH Project Manager and Consultant.
- .2 Ensure that the construction personnel perform work in the existing building only as required under the Work of the Contract.
- .3 Access to the work areas shall be through existing corridors and occupied areas as directed by the HRH Project Manager and Consultant.
- .4 Do not store or place demolition waste, construction materials, products and other supplies in the corridors and 'occupied areas'. The Owner shall not be responsible for, or pay for loss of construction materials, products, other supplies, tools and/or equipment left in corridors and occupied areas. Contractor shall maintain corridors and occupied areas clean and "free" of dust and debris from transportation of demolition waste, construction materials, products, equipment and other supplies.
- .5 Construction personnel shall occupy areas of the existing building for their purposes only as directed and only while the Work of the Contract is in progress. Keep assigned areas clean under the Work of this Contract, and return them to an "as was" condition at completion of construction. Replace, or make good as approved, damage to the existing building, fixtures and fittings caused during use by the construction personnel. Include cost of installation and making good of other works thereby affected in replacement.
- .6 Contractor shall assume total responsibility for the security of the area(s) of the existing building being renovated upon commencement of Work of this Contract, except for those areas specifically retained by the Hospital for its exclusive use during construction.

1.9 MECHANICAL AND ELECTRICAL SERVICES IN THE EXISTING BUILDING

- .1 Ensure that the existing Mechanical and Electrical services are not damaged during demolition and construction. Arrange with the mechanical and electrical Trade Subcontractors to immediately cut off and cap concealed services uncovered during the Work of the Contract.
- .2 Do not interrupt the Mechanical or Electrical services of the existing building, except for temporary close-downs to make connections to new work, and as approved by prior arrangements with the Consultant. Give HRH Project Manager a minimum of 72 hours written notice of intention to interrupt the Mechanical and/or Electrical services in the existing building, in any area.
- .3 In no case shall the Mechanical and/or Electrical service interruptions affect the total existing building.
- .4 Should existing Mechanical and/or Electrical services be accidentally uncovered and disrupted, make complete restoration immediately, and ensure adequate protection to avoid further disruption until alternative means of providing permanent continuation of the services are made.
- .5 Make payment for restoration work of uncovered or disrupted Mechanical and/or Electrical services as specified in the foregoing, at no additional cost to the Owner if, in the opinion of the Consultant, that such Work could have been reasonably foreseen by examination at time of tendering, and/or which has been caused by lack of proper care and protection.

- .6 Unless specified otherwise, restore the Mechanical and/or Electrical services on which the Work is performed to original condition.

1.10 REMOVAL OF EXISTING WORK AND SALVAGE

- .1 Before any Work of this Contract is commenced in any area(s) of the existing building, HRH Project Manager and Hospital personnel/staff may remove furnishings and movable furniture that do not require disconnecting from services, storing same in some other portion of building or off premises. Items not removed but required to stay, shall be protected with approved dust proof covering specified herein. Items not required shall be removed from premises by Contractor. Obtain HRH Project Manager's approval prior to removal.
- .2 Where existing items are designated for relocation or removal, relocate or remove these items unless specified elsewhere, or specified to be done by other contractors of the HRH Project Manager.
- .3 Demolish only those portions of the existing building as indicated on the Drawings and necessary for incorporation of the Work of this Contract.
- .4 Remove building elements, components, materials, and equipment as required by the Work of this Contract. Remove carefully items designated to be handed over to the HRH Project Manager.
- .5 Limit removal of items to smallest areas possible, and "make good" the disturbed existing works.
- .6 Relocate building elements, components, materials, and equipment as indicated on the Drawings.
- .7 Materials resulting from demolition and not required to be retained shall be removed promptly from the Place of the Work in accordance with requirements of authorities having jurisdiction and in safe manner to minimize danger at the Place of the Work and during disposal. Obtain the Consultant's approval prior to removal.
- .8 Unless specified otherwise or noted otherwise, or designated otherwise at the Place of the Work, building components, manufactured specialties, miscellaneous metals and other items which are noted to be moved but not relocated shall remain the property of the Hospital. Return such items to the HRH Project Manager in an adequately preserved and usable condition on the date of handover, or other mutually agreed date.
- .9 Materials and products recovered from the existing Work in the existing building which are not relocated or required by the Hospital shall become the property of the Contractor and shall be disposed of away from the Place of the Work.
- .10 Remove debris and accumulated dirt from the existing building immediately as it accumulates. Ensure that during removal operations through the existing building that existing works is not damaged and dirt, debris and dust is not spread. Repair of damages will be at the expense of the guilty party, and at no expense to the Owner.
- .11 Maintain the work areas in the existing building(s) constantly broom clean to avoid tracking of dirt, debris and dust into adjacent areas. Immediately clean up dirt, debris and dust resulting from the Work of Contract that is deposited in the existing building(s) outside of the work areas. Make a daily inspection to ensure that the work access areas

and construction access areas are maintained clean and undamaged as specified herein.

- .12 Comply with the requirements for cutting and patching requirements as specified herein.

1.11 NEW AND REPLACEMENT WORK

- .1 Make good existing materials, and prepare the surfaces and refinish all finished surfaces damaged, marred, replaced, or otherwise remedied in the existing building.
- .2 Finish the new surfaces flush with existing surfaces. Make junctions between the existing and new work, or at replaced or remedial work visually undetectable. Make surfaces adjacent to one another of the same material, unit sizes, colour, and texture. If this is impossible, make a proposal of intended method of "making good" for acceptance of HRH Project Manager and Consultant prior to installation.
- .3 Preparation for new finish flooring shall include, but not limited to the following:
- .4 Remove existing finish flooring.
- .5 Remove all evidence of the existing adhesive, grease, oil, soil and other encrustations of foreign material by washing, scraping, grinding and shot blasting as necessary.
- .6 Fill cracks and depressions with suitable filler or self-levelling cementitious underlayment for the sub-floor and new flooring as recommended by the flooring manufacturer, and finish smooth.
- .7 Grind protrusions level with the sub-floor and finish smooth.
- .8 Vacuum the sub-floor with clean water to remove dirt, debris and dust.
- .9 New control joints in the finished flooring shall be in the same location as the control joints in the sub-floor.
- .10 Trench new masonry work into existing masonry when installed in the existing building(s).

1.12 REPAIR TO EXISTING WORK

- .1 Make good surfaces and finishes damaged or disturbed due to the Work under this Contract to match existing. Ensure that materials used to repair damage is compatible with the existing work.
- .2 The term 'make good' shall mean as defined herein above.
- .3 Where existing openings are indicated as filled-in, blocked in, or new openings cut into walls, existing items removed or any form of alteration to the existing surface or material is made, the term "make good" shall be deemed to apply whether specifically noted or not.
- .4 Work of this Contract as shown or indicated on the Drawings, Schedules and Specifications may or may not be all the Work required to be done in the existing building. Make good and perform all necessary Work including incidentals to make a complete job of the alterations and renovations Work of this Contract.

1.13 RELOCATED COMPONENTS

- .1 Disconnect services on items for relocation forms part of the work of Divisions 21, 22, 23 and 26.
- .2 Disconnect fastening and anchorage of items to be relocated. Patch abandoned fastening and anchorage holes to match with and flush with adjacent surfaces.
- .3 Carefully relocate items indicated and repair any damage received as a result of relocation in accordance with the Consultant written directions. Install relocated items level, plumb, square and in accordance with manufacturer's instructions. Re - fasten and anchor securely in place. Services re-connection of relocated items shall form part of the work of Divisions 21, 22, 23 and 26.
- .4 Take delivery of existing components from the Hotel storage to be incorporated in locations indicated. Modify existing items to suit new design requirements. Where modifications of the existing components is not possible to suit new locations, then augment and supply new components matching existing in every respect. Contract Price shall include for such conditions.

1.14 EXISTING AREAS AND WORK OF OTHER CONTRACTORS

- .1 Commencement of parts of the Work of this Contract, in existing areas and in areas provided by other contractors, will be deemed to signify the Contractor's acknowledgment and acceptance of those parts of the Work of the Contract.
- .2 Immediately report defects, which affect quality and performance of the Work of this Contract, in writing to the Consultant.
- .3 Existing premises will remain occupied during the Work of this Contract. Perform the Work of this Contract to cause minimum interference with activities in existing premises and maintain maximum safety to the Hotel guests, visitors, The Public and Hotel personnel/staff. Take reasonable measures to minimize and control noise, dirt and dust during the Work of this Contract.
- .4 Before entering the existing premises to carry out the Work of this Contract, or to obstruct or take out of use any area of existing premises, or to cause any other interference, request and have a meeting with HRH Project Manager and Consultant in order to reach agreement as to time and length of time you may interfere, possess, obstruct or remove from use any such area or services.
- .5 Maintain temporary entrances to building(s) including enclosed hoardings as required by authorities having jurisdiction and to their approval standard. Maintain access to the existing service entrance(s) at all times, including ready access for fuel oil trucks and other delivery vehicles.

1.15 EMERGENCY EXITS, FIRE ROUTES AND FIRE SAFETY

- .1 Contractor shall not in any way interfere or impede the use of emergency exit facilities in occupied areas of the healthcare facility.
- .2 Contractor shall not block or in any way utilize vehicular fire routes in a manner which would adversely affect the usefulness of such routes for fire fighting and fire safety

purposes.

1.16 CONSTRUCTION, DELIVERY AND DISPOSAL VEHICLES

- .1 Construction, delivery and disposal vehicles must not at any time block driveways, roadways or loading dock areas.
- .2 Such vehicles must not at any time be parked in driveways, in roadways or at the loading dock to await unloading of construction materials, supplies or equipment.
- .3 Co-ordinate delivery and disposal times with the HRH Project Manager so that vehicles do not cause traffic congestion. Such delivery and disposal times shall be during restricted hours as determined by the HRH Project Manager.

1.17 PARKING

- .1 Parking at the Place of the Work for Contractor's, Trade Subcontractors, suppliers and/or their employee's vehicles is severely limited.
- .2 Contractor, Trade Subcontractors, suppliers and/or their employees shall make use of car-pooling or Public parking facilities.
- .3 The Hospital (Owner), HRH Project Manager and Hospital personnel/staff shall not be responsible for parking costs and/or fines incurred by the Contractor, Trade Subcontractors, suppliers and/or their employees.
- .4 For additional parking requirements refer to Section 01 50 00 - Temporary Facilities and Controls.

1.18 CONTRACTOR'S ACCESS TO THE WORK

- .1 All construction materials both new and from demolition shall only be moved to and from the construction enclosure between restricted hours and days established by the HRH Project Manager. Access route for moving construction materials and demolition waste shall be agreed upon and established well in advance with the HRH Project Manager.
- .2 Healthcare facility loading dock and loading dock area may be made available for deliveries of construction materials and equipment and removal of demolition materials, but only during restricted hours established by HRH Project Manager. At no time shall deliveries of construction materials and equipment or disposal of waste materials interfere with or delay staff, services deliveries of supplies or disposal of healthcare facility waste.
- .3 Contractor shall ensure that responsible construction personnel are on hand to receive materials and equipment where delivered. Healthcare facility shall not be responsible for receiving or storing construction materials, demolition waste and equipment.
- .4 Receipt of pre-fabricated items too large for designated access routes may be arranged for transport to the construction enclosures with HRH Project Manager well in advance of receiving pre-fabricated items.
- .5 Contractor shall establish procedures to minimize tracking mud, dirt and waste construction materials onto and/or into occupied areas of the healthcare facility for the

review and acceptance of the HRH Project Manager and Consultant.

1.19 CONSTRUCT MANAGER'S USE OF ELEVATORS

- .1 Healthcare facility shall allow use of one (1) service elevator near the area(s) of the Work of the Contract for the Contractor to transport tools and limited to smaller construction materials which easily fit in the elevator, to and from the areas of Work during restricted hours and days established by the HRH Project Manager.
- .2 Construction personnel shall have use of other elevator s as designated by the HRH Project Manager for transporting themselves only, to and from the renovation areas during restricted hours and days established by the HRH Project Manager.
- .3 Contractor shall co-ordinate delivery times of smaller construction materials with restricted hours of service elevator use.
- .4 Contractor shall provide and ensure that service elevator cab interior and landing jamb protection are in place and secure all times. All damages to elevator cab interior, doors, controls and landing jambs caused by the Contractor and Work of the Contract shall be repaired and/or replaced to the satisfaction of the Consultant at no extra costs to the Healthcare Facility (Owner).
- .5 Healthcare Facility (Owner) reserves the right at certain times and circumstances not to allow the Contractor use of the elevator, if it interferes with operation of the healthcare facility. If the preceding occurs, Contractor shall make arrangements with the HRH Project Manager for temporarily extending restricted hours use, or having alternate hours use of elevator.

1.20 NOISE CONTROL

- .1 Contractor shall be required at all times to keep to a minimum all noise of construction workers, construction equipment and machines, construction tools, vehicles and the like.
- .2 All construction equipment, machines and tools shall be selected on a minimum noise basis.
- .3 Electric rather than gasoline type compressors shall be used in the Work of this Contract.
- .4 Contractor shall schedule unavoidably noisy parts of the Work of the Contract likely to disturb Hospital patients, Hospital personnel/staff and/or the Public shall be during restricted hours, arranged in advance with the HRH Project Manager.
- .5 For additional noise control requirements refer to Section 01 50 00 - Temporary Facilities and Controls.

1.21 SECURITY REQUIREMENTS AND REGULATIONS

- .1 Perform the Work of this Contract in accordance with following security requirements and regulations:
 - .1 Ensure only necessary tools and equipment are brought to each work area where access by the Public is possible. Keep constant check on these items and, at end of each work shift, bring all tools and equipment to storage room as

directed.

- .2 Perform the Work between the hours approved by HRH Project Manager. Obtain prior written approval from the HRH Project Manager to perform the Work of this Contract on other days and times.
- .3 HRH Project Manager may require a security escort for the Work of this Contract in locations where HRH Project Manager deems it necessary.
- .4 HRH Project Manager may issue suitable keys to Contractor, where possible. Contractor shall sign receipt for keys issued and shall be responsible for admittance of its authorized personnel only to areas for which keys provide access. Contractor shall return keys to the HRH Project Manager immediately upon request.
- .5 Direct enquiries regarding security regulations to the Consultant, who will advise Contractor of any additional requirements.
- .6 Perform the Work of this Contract taking into consideration movement of Hospital patients, visitors, Hospital personnel/staff and the Public.

1.22 HOURS OF WORK

- .1 No work shall be performed outside the hours established by HRH Project Manager, except only in the case of urgent work and where absolutely necessary may be considered and allowed by the HRH Project Manager. Contractor shall make request for after-hours work to the HRH Project Manager and Consultant.
- .2 After-hours work required or requested by Contractor may require HRH Project Manager to provide after-hours security at the Place of the Work in the existing building. Contractor herein agrees to pay for the additional after hours security required for the Work of this Contract.

1.23 PREMIUM TIME

- .1 Work of the Contract shall be deemed to include for premium time when premium time is required in connection with the work in order to maintain mechanical and electrical services to occupied areas of the healthcare facility, or to meet construction schedule, or to restore interrupted mechanical and electrical services to occupied areas of the healthcare facility as quickly as possible, minimizing the duration of interruption of such services.

1.24 USE OF FLAME AND VOLATILE SUBSTANCES

- .1 Contractor shall schedule the use of flame, such as torches, and volatile substances well in advance with HRH Project Manager and Consultant.
- .2 HRH Project Manager may wish to have their Hospital personnel/staff standing by with fire extinguishing equipment, in the area(s) of the Work of the Contract where flame and/or volatile substances are being used. Contractor shall co-ordinate the scheduling of the use of flame and/or volatile substances with HRH Project Manager and HRH Fire Safety Officers.
- .3 Contractor shall exercise extreme caution in handling and using materials, products or tools which could conceivably cause fire or explosion.

- .4 All flammable liquids and volatile substances must be handled and stored in approved containers. Paint materials shall be stored and mixed only in approved locations as directed by HRH Project Manager and HRH Fire Safety Officers. All oily waste and rags after use must be placed in approved safety containers and removed at the end of each working day.

1.25 ALTERATIONS, CUTTING, PATCHING AND MAKING GOOD PROCEDURES

- .1 Set up and maintain permanent reference points and provide general dimensions and elevations for all work from time to time as required by individual trades, and be fully responsible for accuracy of such reference points. All trades shall be notified that lines and levels are to be obtained from Contractor for proper coordination.
- .2 Do not endanger the existing building, the Work or property by cutting, digging, or similar activities. No trade shall cut or alter the work of another trade unless such cutting or alteration is approved by the latter trade and the Consultant.
- .3 Provide products, materials, construction, workmanship and finish compatible matching existing in every respect unless indicated otherwise. Ensure new materials used to alter, repair damage works, patching and making good are compatible with existing components and materials.
- .4 Perform alterations, cutting, patching and making good work in a manner such as to cause a minimum of noise and interference to use of the existing premises and services. Provide maximum safety for Hospital patients, visitors, Hospital personnel/staff and the Public during the Work of this Contract.
- .5 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The trade performing work that penetrates fire, air, vapour, moisture, thermal or acoustic separations of the building shall pack voids tightly with mineral fibre fire stop material as may be required, seal the air, vapour and moisture barriers and caulk joints as may be required to ensure that no air movement through the penetration is possible.
- .6 Cutting, drilling and sleeving of the Work of this Contract shall be done only by the trade who has installed it. The trade requiring drilling and sleeving shall inform the trade performing the Work of the location and other requirements for drilling and sleeving.
- .7 Throughout entire construction period, provide proper and safe means of fire exit from all zones of existing building at all times, to approval of authorities having jurisdiction.
- .8 Wherever it becomes necessary to cut or interfere in any manner with existing apparatus for short periods of time, perform the Work at such times as agreed upon with the HRH Project Manager and Consultant. If required in critical locations prepare interference and/or installation drawings showing the work of various trades as well as existing installations. Submit to the Consultant and/or authorities having jurisdiction for written permission before commencement of Work of this Contract.
- .9 If unscheduled disturbance to use of existing premises and services is required to complete the Work of this Contract, inform the HRH Project Manager and Consultant with advance notice of minimum seven (7) working days. Provide information of requirements and perform the Work at times directed by the HRH Project Manager.
- .10 Make provisions to join new Work to existing and to install new supporting members, anchors and other items necessary for completion of the Work of this Contract. Provide

temporary bracing where required.

- .11 Proceed with selective demolition of or alterations to any portion of the existing building only after approval of the HRH Project Manager and Consultant has been obtained, and after weather tight and dustproof partition screens have been erected to provide thorough protection to adjoining areas and rooms.
- .12 When permission has been granted to proceed with alterations in the existing building, carry out the Work expeditiously and continuously to completion.
- .13 Carry out the Work so as to minimize dust migration. Protect items sensitive to and which could be damaged by dust. Where practical, keep selective demolition areas wetted.
- .14 During the performance of the Work of this Contract, adequately protect the Work completed and in progress, and existing works to remain, such as floors, finishes, trim, and similar components, as completely as possible to minimize replacement of damaged works by each Trade Subcontractor. Work damaged or defaced due to failure to provide adequate protection shall be repaired, or removed and replaced as directed by the Consultant.
- .15 Contractor shall properly coordinate the work of various Trade Subcontractors. Take into consideration existing installations to assure best arrangement of pipes, conduits, ducts and mechanical, electrical and other equipment and items, in available space. Under no circumstances shall any extra payment be allowed due to failure by the Contractor to coordinate the Work.
- .16 For critical locations, Contractor shall consult with the Consultant and the Contractor shall prepare interference and installation drawings showing the Work of various trades as well as existing installations for review before commencing the Work in such locations. Contractor shall co-ordinate with the Mechanical and Electrical trades.
- .17 Contractor shall remove, store and reinstall existing fixed equipment, fixtures and components which interfere with the Work.
- .18 Contractor shall provide cutting and patching required for access to execute service alterations. Conceal capped services unless specifically indicated to remain exposed. Patch to conceal altered and capped services. Cutting, patching and "making good" of existing works to accommodate new Work and requirements specified under other Sections shall be done in conjunction with the Work specified herein. Contractor shall co-ordinate all such Work.
- .19 Prior to cutting and drilling through structural and load bearing members, (e.g. slabs, columns, beams and shear walls), Contractor obtain the Consultant review and written acceptance of each cut location and layout.
- .20 Contractor shall provide cutting such as core drilling of existing concrete and masonry walls and slabs to accommodate services through existing assemblies to accommodate the renovations or alterations. Contractor shall obtain radiography (X-ray) imaging and/or high frequency, electro-magnetic penetrating radar imaging as may be required.
- .21 Prior to performing radiography (x-ray) imaging for core drilling, Contractor shall ensure that the Healthcare Facility's Radiography (x-ray) Imaging Safety Procedures are considered and discussed with all construction personnel, HRH Project Manager,

Hospital personnel/staff and Hospital patients and visitors so that they are aware of the radiography (x-ray) imaging safety procedures involved. Radiography (x-ray) Imaging Safety Procedures shall include, but shall not be limited to the following:

- .1 Contractor MUST obtain a Radiography Source Permit from the HRH Project Manager ten (10) working days (minimum of 72 hours may be possible under certain circumstances) prior to performing x-ray imaging procedures. Under NO circumstances shall x-ray imaging procedures be performed by the Contractor without prior written notification and approval from the HRH Project Manager. Contractor shall post the Radiography Source Permit in a conspicuous location outside the space where the x-ray imaging procedures shall be performed. A 2440 mm radius MUST be established around each x-ray imaging location, and ALL x-rays shall be done after regular Healthcare Facility operating hours. For the health and safety of the building occupants NO one is allowed in the building areas during x-ray imaging time periods.
- .2 Where site conditions do not make it feasible to perform x-ray imaging, Contractor MUST exercise reasonable judgement to evaluate whether there is a chance that coring will cause the severing of electrical, low voltage or ANY other service that may be in the structure that is being penetrated. Use of hammer chisels may be necessary in some parts of the building. A through inspection of both sides of the surfaces MUST be performed by the Contractor. Contractor shall use a flux scanner to check for live load alternating current (AC). Where applicable, the opening of drop ceilings on the underside of the floors MUST be done to expose the break through area. Small diameter pilot holes MUST be drilled prior to final coring or chiseling.
- .3 A qualified electrician with access to circuit scanner MUST be present during coring or chiseling procedures should ANY services be severed. HRH Project Manager and Consultant MUST be contacted immediately on such occurrence. Depending on the circumstances, Contractor MAY be asked to begin restoration procedures of the severed services immediately. ANY penetration of structural beams, columns or supports MUST be cleared by the Consultant before proceeding. Patching and making good of coring or chiseling shall be the responsibility of the Contractor.
- .4 Where applicable, and where acceptable to the HRH Project Manager and Consultant, Contractor MAY alternatively use high frequency, electro-magnetic penetrating radar imaging. Procedures for high frequency, electro-magnetic penetrating radar imaging shall be similar to the x-ray imaging procedures. Consultant shall clarify the requirements of electro-magnetic penetrating radar imaging procedures with the Contractor where necessary.
- .22 Contractor shall employ tradesmen qualified in work being cut and patched to perform work correctly and skillfully.
- .23 Contractor shall not undermine, damage or endanger existing structure and structural components, pipe lines, electrical conduit and wiring by digging, cutting or any other operation in performance of the Work of this Contract. Immediately repair and make good existing work so affected, including working after regular working hours, to the Consultant approval, recommendation and satisfaction at no additional cost to the Healthcare Facility (Owner).
- .24 Except where structural requirements are indicated on Drawings, Contractor shall not cut, drill or sleeve load bearing members without first obtaining the Consultant written authorization for each condition.

- .25 Cutting and patching for holes required by Mechanical and Electrical work shall be as follows;
- .1 Include under the work of Mechanical and Electrical Divisions for cutting or provision of holes up to and including 3225 mm² and related patching, except as indicated otherwise.
- .2 Include under the Contractor's Work, holes and other openings larger than 3225 mm² and chases, bulkheads, furring and required patching. Contractor shall be responsible for determination of the Work required for holes in excess of 3225 mm².
- .26 Contractor shall be responsible for all cutting and patching in addition to that specified for mechanical and electrical Work, and shall directly supervise performance of cutting and patching by other Sections.
- .27 Perform drilling of existing work carefully, leaving a clean hole no larger than required.
- .28 Make cuts clean and true with smooth edges. Fit units to tolerances established by existing works and in conformance with best standard practice for applicable class of the Works.
- .29 Cut off, cap, divert or remove existing services in areas being altered which are affected by the changes as required or as directed by municipal authorities and utility company concerned, and the Consultant. Protect and maintain active services to existing building.
- .30 Where new Work connects with existing and where existing work is altered, perform necessary cutting and fitting required to make satisfactory connections with existing work under this Contract, so as to leave entire work in a finished condition. Match new Work exactly with existing works in material, form, construction and finish unless otherwise noted or specified. Make joining works inconspicuous.
- .31 Make good materials, surfaces, and finishes damaged or disturbed due to the Work of this Contract.
- .32 The term "making good" shall mean repairing or filling operations performed on existing floors, walls, ceilings or any other exposed surfaces. Making good also means repairing, restoring, refurbishing, rehabilitating, or performing filling operation on any existing components disturbed due to Work of this Contract, to at least the condition existing at the commencement of the Work, in terms of construction integrity, finishes, alignment with existing adjoining surfaces, compatibility of materials, sound attenuation criteria, exfiltration/infiltration requirements, air/vapour barrier and thermal continuity. It is intended that finished surfaces match existing in every respect, compatible and line with existing adjoining surfaces.
- .33 Fill unused and unfilled sleeves and holes in non-fire rated floors and partitions not otherwise filled, by approved means. If unused sleeve is in fire or sound barrier, fill in manner to restore or maintain fire or sound barrier rating. Filling of openings in fire rated floors and partitions as specified herein.
- .34 If non-designated and unclassified sprayed fire resisting, sound absorbing, or insulation applications are encountered, inform the Consultant for examination and instructions. Restore damaged, non-asbestos type fireproofing to original condition before covering with finishes.

- .35 Work shown on Drawings, Schedules and Specifications may or may not be all Work required to be done in existing building. Make good and perform all necessary Work including incidentals to make a complete job of renovations or alterations Work.
- .36 Provide renovations or alterations indicated on and inferred by the Contract Documents.
- .37 Selectively demolish existing, obsolete construction as part of the renovations or alterations and prepare areas to receive the new Work.
- .38 Refer to the Mechanical and Electrical specifications and Drawings for removal, capping, and alterations to mechanical and electrical Works, e.g., conduit, wiring, fixtures, ducts, piping and other service lines.
- .39 Protect active services which are intended to remain and which pass through spaces involved in alterations and repairs.
- .40 Conceal piping, duct, conduit and other service alterations in ceilings, walls and furred spaces if possible.
- .41 Repair adjacent construction and surfaces which are damaged or disturbed as a result of renovations or alterations.
- .42 Disconnection and sealing off electrical services to area being demolished: Electrical Division.
- .43 Disconnection and sealing off steam, hot and cold water and ductwork to area being demolished: Mechanical Divisions.

1.26 CONSTRUCTION DUST, DEBRIS AND FUMES

- .1 It is imperative that the Healthcare Facility's operational areas remain clean and dust free. It shall be the Contractor's responsibility to insure this. If the Contractor fails to maintain these conditions, the Healthcare Facility (Owner) reserves the right to retain the services of a professional maintenance company to fine clean the areas in question, and the invoiced costs for the cleaning services of the professional maintenance company shall be deducted from the Contractor's next progress payment.
- .2 Contractor shall be responsible to keep operational areas clean and dust free. Contractor shall prevent contamination of and nuisance to adjacent areas and properties near the Work from dust by taking appropriate dust control measures. Contractor shall take measures to prevent dust and dirt rising and migrating to occupied areas including return air systems and/or adjacent properties. Contractor shall respond immediately to complaints of dust received from the Healthcare Facility (Owner), HRH Project Manager, Hospital patients and visitors, Hospital personnel/staff, the Public and the authorities having jurisdiction.
- .3 Adjacent work areas remaining in use by the Healthcare Facility during construction period shall have furnishings, and equipment covered and protected from dust under Work of this Contract. Completely install the dust covers and prior to commencement of each of the Contractor's working periods and shall be also be removed upon the end the Contractor's work period. If required by HRH Project Manager, Contractor shall also provide additional dust covers and keep them in clean and usable conditions.
- .4 Before the Work proceeds, Contractor shall provide temporary, dustproof partitions and

screens, sealed at the floor, walls, ceilings, or intersecting members in a manner to prevent dust and dirt infiltration into adjacent areas of the existing building.

- .5 Each Trade Subcontractor shall be responsible for the periodic removal, disposal and clean-up of debris caused by the work of their trade. This includes as it accumulates during the course of the construction period, and for keeping the construction access route in a clean, neat and orderly manner, free from debris of the work of their trade.
- .6 Contractor shall ensure that periodic removal, disposal and clean-up of debris by Trade Subcontractors is maintained.
- .7 All areas of the Work of the Contract must be left in a clean and safe condition at the end of each work day.
- .8 Take all precautions necessary to ensure that construction dust, debris and fumes resulting from construction operations or originating from within construction enclosures are prevented from entering any portion of the new and existing air supply or exhaust system. Precautions shall, in part, include the sealing off of return air grilles and the sealing off of open ends of supply and exhaust ducts which are left open for any reason whatsoever.
- .9 Special care shall be taken to ensure that dust, debris and fumes not allowed to escape from the containers of demolition waste when they are transported through occupied areas of the healthcare facility in closed top containers.
- .10 All exterior areas to and from and around the disposal containers/bins shall be kept minimum broom clean by the Contractor.
- .11 Contractor shall leave the works areas remaining in use by the healthcare facility clean and ready for use between each work period.

1.27 INFECTION PREVENTION AND CONTROL

- .1 Infection prevent and control required for healthcare facility renovation and alterations shall conform to requirements of CSA Z317.13-17 "Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities" and as specified herein. The most stringent requirements shall govern.
- .2 Infection prevention and control requirement levels and procedures for the project shall comply with CSA Z317.13-17 based on construction activity type categories and population risk group types and shall be established by the HRH Infection Control Officer. Contractor shall comply with infection prevention control construction activity type categories and population risk group types established by the HRH Infection Control Officer. Contractor shall note that the infection prevention control construction activity type categories and population risk group types are subject to change depending on the construction phasing of the project. Infection prevention and control construction activity type categories and population risk group types established by the HRH Infection Control Officer that do not comply with CSA Z317.13-17 or are in question by Contractor, the Contractor shall inform the Owner, HRH Infection Control Officer and Consultant in writing and await direction from the HRH Project Manager.
- .3 Contractor shall establish impervious barriers between patient and construction areas to prevent dissemination of dust and waste construction materials. Extend from floor to slab ceiling if ceiling panels are to be removed. When such impervious barriers cannot be

created without exposing patients to hazardous environment, residents should be temporarily evacuated from the area prior to erection of the barriers. Contractor shall assume that areas where dust has collected is contaminated.

- .4 Contractor shall vacuum clean dust above suspended ceilings including ductwork and piping, etc., prior to construction work with HEPA filtered vacuums.
- .5 Contractor shall establish traffic control patterns which prevent construction dust from being tracked into occupied areas of the healthcare facility. Install adhesive strips on floors to catch dust on shoes.
- .6 Contractor shall ventilate construction areas with negative pressure with respect to adjacent occupied areas and monitor differential pressure at all times by means of sensors wired to an alarm in the Contractor's site office to warn of ventilation system breakdown. Where possible, exhaust air from construction areas directly outside the building. Where not possible, provide and maintain HEPA ventilation filters where construction ventilation enters the long term health care facility.
- .7 Contractor shall routinely remove all filters and replace with new, clean HEPA filters of the required quality to maintain the high air quality standard the healthcare facility requires.
- .8 HEPA filters shall be capable of collecting and retaining airborne fungi and dust particles at 99.97% efficiency. Fungi particles have caused nosocomial fungal pulmonary type infections or similar infections.
- .9 Temporary Way Finding, Directional Signage, Information Signage and Warning Signage and Warning Tapes
- .10 Contractor shall provide all temporary way finding, directional signage, information signage, warning signage and warning tapes as required and as specified herein for the smooth, efficient and continuous operation of the existing building, life safety protection and direction of traffic of the Hospital patients, visitors, Hospital personnel/staff and the Public. In addition to the aforementioned requirements, provide all additional temporary way finding, directional signage, information signage, warning signage and warning tapes as required later by the Consultant to meet the Healthcare Facility's way finding, directional signage and information signage, warning signage and warning tapes requirements.
- .11 Temporary way finding, directional signage, information signage, warning signage and warning tapes shall include, but shall not be limited to the following:
- .12 Floor/Wall Directional Arrows: Colour coded, pressure sensitive, self-adhesive, die cut vinyl type 125 mm wide x 150 mm long floor/wall directional arrows and 75 mm diameter floor/wall dots acceptable to the HRH Project Manager and Consultant. Colours shall be as selected later by Consultant.
- .13 Information Directories: Colour coded, pressure sensitive, self-adhesive, write-on, die cut vinyl information type directories indicating department name(s) and/or room number(s) and having directional arrows acceptable to the HRH Project Manager and Consultant. Colours shall be as selected later by the Consultant.
- .14 Warning, Caution, Danger, Emergency and Miscellaneous Symbol Type Signage: Pressure sensitive, self-adhesive, write-on, die cut vinyl warning, caution, danger,

emergency, and miscellaneous symbol(s) type signage as required by the City of Toronto and the authorities having jurisdiction acceptable to the HRH Project Manager and Consultant. Colours shall be as selected later by the Consultant.

- .15 Safety Aisle and Warning Type Tapes: Colour coded, pressure sensitive, self-adhesive, vinyl aisle marking and warning type tapes as required by the City of Toronto and the authorities having jurisdiction acceptable to the HRH Project Manager and Consultant. Colours shall be as selected later by the Consultant.
- .16 Temporary Illuminated Fire Exit and Life Safety Signage: As approved by the City of Toronto Fire Department and the Consultant. Where so approved by the authorities having jurisdiction, in lieu of aforementioned illuminated fire exit and life safety signage, Contractor may provide photo-luminescent type temporary fire exit and life safety signage conforming to ULC S572 as required by the City of Toronto and the authorities having jurisdiction, acceptable to the HRH Project Manager and Consultant.
- .17 Co-ordinate all temporary way finding, directional signage, information signage, warning signage and warning tapes with construction phasing and dustproof screen requirements.
- .18 When each phase of the Work in the existing building is complete, carefully remove from existing surfaces to remain, relocate and/or provide new temporary way finding, directional signage, information signage, warning signage and warning tapes as required and as directed by the Consultant in accordance with requirements of the authorities having jurisdiction.
- .19 After removal of temporary way finding, directional signage, information signage, warning signage and warning tapes, the Contractor shall patch, repair, make good, repaint and/or replace existing finishes on existing surfaces designated to remain to the satisfaction of the Consultant.

END OF SECTION



**Safety Regulations and
Instructions
for
Contractors**

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Signature of Understanding and Acceptance

Prior to commencing any project on Hospital property, the Contractor and/or Constructor must sign and date this page, in the presence of the Humber River Hospital designate, indicating that he/she has read and understands the contents and accepts the liability and responsibility outlined herein and will comply with the terms and conditions outlined. The Contractor and/or Constructor will also provide the hospital with a letter of good standing from the Workman's Compensation Board and a Certificate of Insurance. The signed copy of this booklet must be kept readily available on site by the Contractor and/or Constructor.

Contractor and/or Constructor (Signature)

Name (Please Print)	Date	Emergency Cell Phone # or Pager # (24 hours/7 days a week)

HRH Designate (Name)	Phone Number

Workman's Compensation Letter Provided
Certificate of Insurance Provided

☐☐

The above named Contractor and/or Constructor agrees that his/her signature is valid.

from _____ to _____

HUMBER RIVER HOSPITAL OCCUPATIONAL HEALTH AND SAFETY POLICY

Policy

Humber River Hospital recognizes that the health and safety of hospital employees, physicians, students and volunteers is directly related to all aspects of the Hospital's operation. Towards this end, Humber River Hospital is committed both financially and philosophically to:

1. Maintaining a safe and healthy working environment;
2. Providing the resources, both physical and human, to support a safe and healthy working environment;
3. Empowering all employees, physicians, students and volunteers to take ownership for their own health and safety;
4. Promoting an open exchange of health and safety information while respecting individual confidentiality;
5. Ensuring that formal and comprehensive health and safety programs with accompanying procedures are implemented and maintained in accordance with this policy;
6. Ensuring that any programs and procedures so implemented are communicated to, supported by and complied with by all levels of management and non-management employees;
7. Ensuring that all legislative requirements serve as the basis of, and the minimum standard of performance deemed acceptable for these programs and procedures.

Section 1

Project, Construction or Maintenance Contractor Safety

DEFINITIONS:

Employer/Contractor

Section 1(1) Occupational Health and Safety Act, 1990 “employer” means a person who employs one or more workers or contracts for the services of one or more workers and includes a Contractor or Subcontractor who performs work or supplies services and a Contractor or Subcontractor who undertakes with an owner, Constructor, Contractor or Subcontractor to perform work or supply services.

Constructor

Section 1(1) Occupational Health and Safety Act, 1990, “Constructor” means a person who undertakes a project for an owner and includes an owner who undertakes all or part of a project by himself or by more than one employer.

Requirements

1. A Project Manager is assigned to every project conducted on hospital property and is responsible for ensuring the safe operation and completion of this project for the Humber River Hospital (If a Project Manager has not been assigned, the person arranging for the Contractor and/or Constructor to perform work on Hospital grounds shall be considered the Project Manager.). Where there is a disagreement as to the meaning of legislated requirements and practices, Humber River Hospital’s interpretation, through the Project Manager shall apply. This document applies to all Contractors and/or Constructors contracted to work on hospital grounds.

All Contractors and/or Constructors accept the liability for ensuring that every reasonable measure is taken to ensure the safety of the worker(s) and the members of Humber River Hospital under the circumstances and the safe operation and completion of the projects.

2. Safety performance and safety records may be a determining factor in awarding various contracts. All Contractors and/or Constructors must indicate if they have any surcharges or outstanding payments to the Workplace Safety and Insurance Coverage prior to commencing any work on a Hospital Project and every forty-five days thereafter (if required by project length). All Contractors and or Constructors

must inform the Project Manager immediately of any status change with the Workplace Safety and Insurance Board.

3. Humber River Hospital requires that all Contractors and/or Constructors and their Subcontractors and their agents adhere to all relevant legislation as well as Humber River Hospital's safety regulations and practices. Safety legislation and practices must be adhered to fully and carried out completely, as would any other specification for any project and contract. The Contractor and/or Constructor is responsible for and assumes all liability for the safety of his/her agents (including Subcontractors) and employees. It is the responsibility of the Contractor and/or Constructor to ensure that his/her employees are fully instructed in the relevant legislation and Humber River Hospital safety regulations and practices prior to commencing any work.

4. Construction Safety Measures

1. Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Occupational Health and Safety Act, Environmental Protection Act, Worker's Compensation Board and municipal statutes and authorities.
2. In event of conflict between any provisions of above authorities the most stringent provision will apply.
3. Submit to Owner copies of all reports and stop work orders issued by local construction safety inspector.

Section 2(A)

Legislative Compliance

1. Prior to being awarded a contract, Contractors and/or Constructors must indicate, in writing, compliance with all legislative requirements including but not limited to:
 - a) a written safety policy posted and circulated to all employees,
 - b) a program to implement this policy,
 - c) a Joint Health and Safety Committee (if required) or a Safety Representative,
 - d) certified Joint Health and Safety Committee members (if required),
 - e) a schedule of regular site inspections with records,
 - f) trained first aid providers (if required),
 - g) all employees trained in WHMIS requirements,
 - h) an equipment maintenance/inspection program implemented, enforced and documented,
 - i) every powered piece of equipment has a copy of the owners manual and a log book, management involvement in an overall safety program (management commitment to health and safety),
 - j) a safety performance must be part of an employees permanent record,
 - k) ensure copy(s) of the Act will be available in the majority language of the workers and posted at the site for easy access,
 - l) employees who require protective equipment must have it provided by the Contractor and/or Constructor and employees must be trained in its proper use and maintenance,
 - m) a documented maintenance schedule (if required),
 - n) eyewash stations, running water and toilets must be provided if required and kept clean and in good repair,

- o) copies of Material Safety Data Sheets must be kept with hazardous substances with every satellite crew, at every location of work for reference,
- p) adequate fire extinguishers/fire blankets must be provided by the Contractor and/or Constructor and kept on site for specific projects to provide proper safety for welding and burning requirements of the project. These precautions to be reviewed and approved by the Project Manager or Hospital Designee.

Section 2(B)

On Site Requirements

1. When on Hospital property, Contractors and/or Constructors and Subcontractors must ensure:
 - a) that a copy of the Occupational Health and Safety Act is posted in the area of work
 - b) First Aid Regulations are posted if required,
 - c) emergency numbers posted (including Project Manager and contact number),
 - d) If on-site for longer than two weeks, regular safety meetings (tailgate/tool box) conducted and recorded (Project Manager, at their discretion and with prior notice, may request or join a tailgate/tool box or other safety meeting with the Contractor and/or Constructor, Subcontractor or their agents),
 - e) All hazardous substances are clearly labeled and properly stored as per WHMIS compliance,
 - f) All accidents or near misses involving Contractors and/or Constructors and Subcontractors, their agents or actions, are fully investigated, recorded with preventative measures identified and implements. A copy of the report must be provided to Humber River Hospital where requested,
 - g) All Contractors and/or Constructors, Subcontractors or their agents do not engage in any activity, process or work that may endanger the health and safety of any workers or members of this community.
 - h) All accidents where Humber River Hospital employees are affected, the Contractor and/or Constructor, Subcontractor or their agents must send a report to Humber River Hospital through the Project Manager.
2. All documented programs and schedules must be reasonably available should Humber River Hospital through the Project Manager require access to them. If the logbooks, WHMIS labels or any others safety requirements are found to be lacking, the Contractor and/or Constructor, Subcontractor or their agents may be asked to leave the Hospital property and this may invalidate any contract(s). It will be up to the Project Manager to determine whether the project shall continue. Contractors and/or Constructors, Subcontractors or their agents will not be permitted to resume work on Hospital property until such time as they have proven compliance with all required safety requirements, legislation and practices.

Section 3

Legislation and Practices

All Contractors and/or Constructors, Subcontractors or their agents must adhere to the relevant legislation and applicable Hospital practices as interpreted by the Hospital through the Project Manager.

This legislation includes but is not limited to:

- a) The Occupational Health and Safety Act - Revised Statutes of Ontario, 1990 and applicable regulations. (See Appendix 1)
- b) Workplace Safety and Insurance Act 1997; Revised Statutes of Ontario 1980 and Chapter 539 and Regulations 1101 and 1102.
- c) Workplace Safety and Insurance Board First Aid Regulations 1101 and 1102.
- d) Ontario Building Code Act and applicable regulations (1997).
- e) Environmental Protection Act, Revised Ontario Regulation 464/85 and associated Regulations.
- f) The Transportation of Dangerous Goods Act, 1981, Statutes of Ontario 1981 and Chapter 69 and associated Regulations.

Section 4

Chemical Safety

1. Under the Occupational Health and Safety Act and related Regulations specific requirements, procedures and training must be carried out to ensure that workers work safely with chemicals. Humber River Hospital expects that these requirements, procedures and training will be carried out by any Contractor.
2. Before any job is started:
 - a) The Project Manager must inform a Contractor in writing of any hazardous or designated substance that may be encountered in the process of work, or may be in the area where the work takes place. The Contractor and/or Constructor must ensure that all necessary precautions are followed when working with or around any hazardous or designated substance including but not limited to personal protective equipment, signing, limiting entry, additional ventilation, etc.
 - b) Appropriate notice must be given to occupants by the Project Manager upon written notice issued by the Contractor and/or Constructor, with as much lead-time as possible to allow for temporary changes in the location of workers.
 - c) Copies of all MSDSs for all chemicals to be used on a project must be forwarded to the Occupational Health and Safety Department, (if a previous copy has been forwarded, send name of chemical). Include chemical and quantity, nature of work and precautions and procedures that will be followed. Contractor and/or Constructor employees must review MSDSs of all chemicals to be used on the project must be kept on site and readily available at all times. The Occupational Health and Safety Department must be notified and new MSDS provided prior to any change in chemicals being implemented.
 - d) Limitations, procedures and precautions outlined by MSDSs and the Project Manager must be adhered to for both workers and occupants of the building (eg. signage, charcoal fan filter, cordon off area, modify airflow where required, personal protective equipment, etc.). Where chemicals are used, spills kit should be readily available.
 - e) If it is warranted, the Occupational Health and Safety Department may forward additional requirement, changes in procedures or other recommendations to improve the safety of the project to the Project Manager by specific directions to be implemented for that project. These will then be forwarded to the Contractor and/or Constructor who must ensure that they are carried out.

- f) All chemical containers must be appropriately labeled in accordance with WHMIS Regulations.
- g) Adequate ventilation must be ensured by the Contractor and/or Constructor for the type and quantity of chemical.
- h) Contractors names and emergency numbers must be submitted to the Engineering and Maintenance Department and Security prior to starting any work.
- i) Chemical spills released into the environment must be reported immediately to appropriate government agencies and must be reported immediately to Humber River Hospital.

Section 5

Work Site Isolation

Barricading, Limiting Access and Hoarding

1. It is the responsibility of the Contractor and/or Constructor to provide appropriate barricading, fencing, hoarding, warning lights and signage on the work site. If road closures or blockages are required, the Project Manager must involve and inform relevant parties including Maintenance, Security and Parking Services. The location and extent of the work site isolation should be discussed with the Project Manager prior to the commencement of the work.
2. Barricades must be placed in such a manner as to prevent unauthorized personnel from entering the work site and potentially placing themselves in danger of injury. No fire prevention equipment or fire exits/egress routes may be blocked without prior written approval from the Hospital Fire Marshal's Office, or Engineering & Maintenance.
3. For construction projects, hoarding will be used in place of fencing to keep pedestrians out of the construction areas.

Section 6

Method Statements

1. The requirement for Method Statements covers all types of hazards such as, but not limited to:
 - a) Asbestos (Asbestos report available)
 - b) Chemicals
 - c) Confined Space
 - d) Designated Substances
 - e) Hot Work
 - f) Welding
 - g) Any other work deemed hazardous by the Project Manager.
 - h) PCB's
2. No hazardous projects shall commence at any time without approval of the Method Statement by Humber River Hospital. Any Special procedures or requirements specified in the Method Statement and any applicable regulations shall be followed at all times.

Before the work starts the Method Statement must be approved by the Project Manager and reviewed by the Occupational Health and Safety Department.

Section 7

1. Fire Safety Requirements

1. Comply with all fire safety regulations and procedures required by Construction Safety Act of Ontario, Ontario Building Code, Insurance Company and municipal statutes and authorities.
2. During the entire construction period, provide ULC approved fire extinguishers and other fire fighting services and equipment, except where more explicit requirements are specified as the responsibility of individual trades.
3. Maintain clear emergency exit paths from each zone for personnel at all times.
4. Use only fire resistant tarpaulins and similar protective covering on site.
5. Ensure that each trade stores its volatile waste in closed containers and removes them from premises daily.

2. Closing of Exits

1. All exits, including stairways and exterior doors to the outside, serving the existing building must be maintained. Where an exit is blocked off or deleted due to construction activities, an acceptable alternative exit must be provided.
2. Where it is absolutely necessary for access to be gained through the construction area to an exit, the access must be clearly defined and protected so that it is separated from the construction area by a reasonable smoke tight fire separation, equivalent to $\frac{3}{4}$ hr. fire resistance rating.

3. Intersecting Corridors – Existing Corridors on Occupied Floor Areas Exposed to New Corridors Under Construction

1. Temporary fire separations of steel studs and gypsum board construction, equivalent to $\frac{3}{4}$ hr. fire resistance rating, must be erected.
2. Where access is desired, the opening must be protected by a door of solid core wood or hollow steel construction, equipped with self-closing and latching hardware.
3. Should such temporary fire separations cut off or eliminate required access to exits, alternative access must be provided.

4. Fire Department Access

1. The location of a building addition and the construction activities must not obstruct the access roadways designated for fire department equipment.
2. If it is necessary that existing access be obstructed or deleted, alternative access, acceptable to the fire department must be pre-planned and provided prior to commencement of construction. Sentence 3.2.5.2.(6) of the Ontario Building Code provides the design criteria for required access routes.

5. Control of Combustible Materials.

1. The stockpiling of construction materials adjacent to the existing building must be carefully controlled.
2. Article 2.4.2.1 of the Fire Code prohibits such storage where the materials create a fire hazard to the existing building or its occupants. Materials stored and equipment used in the portion of the building under construction could create a fire hazard; for instance, the storage of excessive amounts of foam plastic insulation or the placement of open flame portable heating appliances.
3. The control of combustibles on a construction site is also regulated under the Occupational Health and Safety Act.

6. Exposure of Construction in Progress to Existing Occupied Areas

1. Existing exterior walls with windows of plain glazing when exposed to construction in progress must be protected by 15.9 mm thick cement bonded particle board (Pyrok) on suitable framing for the duration of the construction.
2. Other openings in the existing exterior walls such as doors, louvers, etc., must be similarly protected or replaced with doors of solid core wood or hollow steel construction.

7. Openings Created Through Floors or Other Fire Separations

1. Openings in existing floor assemblies and vertical fire separations necessitated by installation of equipment systems or construction in general must be temporarily sealed with fire barrier materials such as mineral wool or other non-combustible insulation and if required, be suitable for pedestrian traffic.

8. Modification and Extension to Existing Fire Alarm Systems

1. Maintaining the fire alarm system in operating condition during the construction of the addition will require careful planning, especially when the extension to the fire alarm system is carried out in phases.
2. A technical representative from the fire alarm manufacturer should be assigned to the project to co-ordinate the different stages of the extension.
3. Whenever a changeover time occurs, which is an outage time of at least a portion of the fire alarm system, the municipal fire department must be notified of the temporary shutdown and alternative measures must be devised.

9. Shutdown of Fire Protection Systems

1. Where temporary shut-down of sprinkler systems, standpipe systems or other fire protection systems is necessary due to alternations, repairs or extensions, the appropriate requirements in Ontario Fire Code, as well as Owner's requirements, must be observed. Refer to Article 1.1.1.2, Clause 2.8.2.1(1)(g), Subsections 6.4.1 and 6.5.2 of the Ontario Fire Code and to Article 24 of Section 01005 of this Specification.
2. Contractors working anywhere in the Hospital are responsible for any costs incurred for the fire alarm false alarms caused by their work. The Hospital is fully protected with smoke detection equipment that will be activated by numerous construction procedures.
3. The Hospital will, with written request a minimum 10 working days in advance, arrange to put any fire alarm zone in bypass to permit construction.
4. Requests shall identify the following information:
 1. Name of Contractor
 2. Where the Contractor will be working
 3. Telephone numbers of persons responsible
 4. Type of work being conducted
 5. Identify if fire/smoke/dust/vibration/floor will occur
 6. Indicate the start and stop times.
5. Shutdown period will only be from 0800 hours until 1430 hours each day, unless special arrangements are made through the Hospital's Project Coordinator in advance of the notice time specified above.
6. To avoid unnecessary alarms during testing, disconnect only those zones being worked on. Zones shall be re-enabled by 1430 hours at the latest.

7. Contractor shall ensure that main control panel is manned at all times during shutdown period.
 8. Any Contractor working in the Hospital will be assessed \$1,000.00 fine per alarm payable to the Hospital by Certified Cheque. Any Contractor causing false alarms and not paying such costs, will not be permitted to continue work until said cheque is received.
10. **Additional Safety to Life Measures**
1. Generally, additional safety to life measures should include the following additional requirements:
 1. Contractors should obtain alternate fire safety plan from the Hospital.
 2. Submit and obtain written approval from the local Fire Department for alternate Fire Safety Plan and Training Procedure.
11. **New Fire Safety System**
1. New Fire Safety System to be installed, tested and verified in accordance with the following most updated versions of the U.L.C. Standards:

CAN/ULC-S524-1991 -	Standard for the Installation of Fire Alarm Systems.
CAN/ULC-S536-1986 -	Standard for the Inspection and Testing of Fire Alarm Systems.
CAN/ULC-S537-1986 -	Standard for the Verification of Fire Alarm Systems.

Section 8

Welding Procedures

1. All work, which requires cutting or welding, must be cleared by the Project Manager to starting the job. A written approved Method Statement and authorization issued by the Engineering & Maintenance Department with all precautions stipulated by the Hospital Fire Marshall, must be followed.
2. A fire watch must be maintained by the Contractor and/or Constructor during and thirty minutes after completion of any welding or cutting operation.
3. Before approving any cutting and welding work, the Project Manager or his appointee shall inspect the work area and confirm that precautions have been taken to prevent fire. In addition, all Sections as outlined in the Occupational health and Safety Act and Regulations for constriction Projects and the Ontario Fire Code Regulation 454 must be followed.
4. The Work authorization must be prominently displayed in the area where the work is to commence.

Section 9

Operation of Vehicles on Hospital Property

1. The Contractor must provide a list of equipment requirements on site. Before entering Hospital Property, the Project Manager must have this list and the appropriate arrangements made for access onto Hospital grounds.
2. Construction/Contractor vehicles used on Hospital property will not be overloaded, and passengers must ride within the cab (loading requirements are those of the Ministry of Transport or the City of Toronto, whichever are more stringent). Riding upon running boards, fenders, hoods, scraper blades and buckets, or in boxes or other attachments is prohibited. Employees must not board or jump off moving vehicles.
3. Construction/Contractor vehicles must be left in designated areas and, when not in use, must not obstruct emergency vehicles or roadways.
4. Construction/Contractor vehicles must obey all traffic signs, speed limits and parking restrictions.
5. Fuel driven equipment, gasoline diesel, natural gas and propane driven equipment will not be permitted for work in the building structure without Project Manager's written approval.
6. Storage of fuel on site is not permitted.

Section 10

Insurance Requirements

The hospital requires that all Contractors/Constructors provide a Certificate of Insurance prior to starting any work. The insurance requirements are based on the type of work and/or size of the project.

The following is an outline of the hospital's liability requirements:

Work Type	Minimum Liability Requirements
Service Work	\$2,000,000.00
Minor Renovations	\$2,000,000.00
Projects Greater than \$100,000.00	\$5,000,000.00

APPENDIX

Contact Numbers:

*Engineering & Maintenance Department----- Local 4125

Occupational Health & Safety Manager

(Church Site) ----- Local 4465

(Finch Site)----- Local 2785

Environmental Services ----- Local 4126

Security

(Church Site) ----- Local 4700

(Finch Site)----- Local 4700

(Keele Site) ----- Local 4700

Communications

(Church Site) ----- Local 4103

(Finch Site)----- Local 3824

(Keele Site) ----- Local 2175

Project Management Office----- Local 4783

Information Systems----- Local 3761

***Note:** 8:00 - 16:00 hours. After hours please contact Communications and ask for the Shift Mechanic to be paged.

EMERGENCY CODES

CODE	INCIDENT
Black	Bomb Threat
Blue	Respiratory/Cardiac Arrest
Brown	Chemical Spill
Green	Evacuation
Grey	Sealed Building "Button Down"
Orange	Community Disaster Reception of Casualties
Pink	Newborn - Respiratory/Cardiac Arrest
Red	Fire
Yellow-Infant	Missing Infant/Possible Abduction
Yellow	Missing Patient(s)
White	Violent Situation Patients/Staff/Visitor(s)

CALL 5555

General Rules and Regulations:

1. The Contractor must provide a work schedule and advise the Project Manager (72) hours before the proposed work starts. In the event of evening or night emergency Call-Out work the Contractor or Tradesman must report to the Shift Mechanic (through Communications).
2. All Contractors and their employees will enter and leave the Hospital through entrances specified by the Project Manager. Access to locked areas will be arranged by the manager of Engineering & Maintenance. ID badges must be worn while on-site and can be obtained through Security/Engineering & Maintenance or the Project Management Office.
3. All Contractors must review the Asbestos reports provided in the scope of work prior to demolition of an area. The management report is maintained in the Occupational Health and Safety Office.
4. All parking regulations are to be observed.
5. Exemption of designated parking will only be allowed for the Contractor's work equipment and must be pre-arranged.
6. The use of cellular phones and smoking are NOT permitted in the Hospital or Professional Building. Smoking is permitted outside in accordance with City by-laws, and for convenience a smoking hut is available at the Finch site.
7. Contractors and their employees must be attired in neat, clean clothing appropriate to the work being performed.
8. Good work practice must be followed to ensure the following:
 - a) That dirt and debris are not tracked through the floors. (Walk-off carpets, matting to be provided by Contractor as necessary).
 - b) That all locked doors are kept locked. (If additional locks are used, Security and the Project Manager will need key.)
 - c) That all extension cords and other tools do not create a tripping hazard.
 - d) That all areas, all tools and materials are left in a safe manner during break periods and at the end of shifts. (The Hospital is not responsible for stolen tools or supplies.). When working in the Mental Health area, all tools must be locked at all times.
 - e) The Patient Care areas are properly protected during construction from dirt and debris, by use of impermeable barriers and the blockage of exhaust vents. See Dust Control section included in Specifications.
9. Accumulation of garbage and rubble will not be permitted beyond (1) day. All debris is to be removed by the Contractor, salvaged material will be removed

through the designated areas. Contractors are to provide their own garbage containers. Location of garbage container/bin must be agreed upon by the Housekeeping Manager. Appropriate Dust Control measures as per Specifications to be implemented for transport and storage of materials.

10. Only Hospital personnel will open breakers, close valves, drain lines, etc. Prior arrangements must be made with the Engineering & Maintenance Department ten working days in advance. Service Interruption Notification Forms will be provided by the Engineering & Maintenance Department.
11. Special precautions must be taken before the drilling of walls, ceilings and floors to ascertain conduits, electrical cables, water lines, or gas lines are not pierced, and that there is no danger of damage or injury on the opposite side of the surface. The Contractor is to review and have approval of methods from the Project Manager.
12. If any of the Hospitals' equipment or services are damaged by the Contractor during the course of their work, no attempt of repair is to be done without approval of the Project Manager/Engineering & Maintenance.
13. Whenever the Contractor is to perform work outside of normal hours, prior arrangements must be made with Engineering & Maintenance and Planning.
14. Use of Hospital tools and equipment is not allowed.
15. For Contractors who perform cost plus work, daily time sheets must be submitted to the Hospital Project Manager in charge of the project.

INFECTION CONTROL

Policy

The hospital's infection control policy is based on Body Substance Precautions. The goal of this policy is to prevent the spread of infection by reducing the risks of cross contamination, from one patient to another or from one area to another.

Procedures

1. If required to work in an active patient room/area, the hospital requires that you check in at the nursing desk prior to or upon entering the work area. The nursing staff will outline any precautions that must be followed when working in the room/area. As part of the hospital policy hand washing is required upon entering and leaving room.
2. When working in ceilings, other than critical care areas (OR, ICU, Recovery Room, Nurseries), ceiling tiles and/or the ceiling may be removed in the immediate work area only. Work is not to continue outside the area until ceiling tiles are replaced or the opening is sealed up.
3. When working in the ceilings in critical care/designated areas, the areas below the intended opening must be tented (fully enclosed) prior to opening up the ceiling. Once the work in the ceiling is completed, the opening must be sealed up and the enclosure vacuumed out with a HEPA filtered vacuum prior to dismantling.
4. When a room or area is to be renovated the area must be closed off. Dust Control procedures (see separate section) are to be implemented as designated conditions in which to carry out the work.

DUST CONTROL

Requirements of Regulatory Agencies

Conform to the requirements of the Occupational Health and Safety Act (OHSA).

Pre-Construction Measures

Prior to the start of construction, take the following preventive measures:

1. Outline methods for dust containment and removal of construction debris.
2. Establish traffic patterns for construction workers to ensure that they do not go near patient care or critical areas.
3. Identify essential services (i.e. water supply, electricity, and ventilation systems) which may be disrupted during construction.
4. Review and assess the Hospital's ventilation system.
5. Provide a methodology statement for Type 2 dust control measures if required.

Categories of Dust Control

Type 1

Provide Type 1 dust control for low risk areas, such as maintenance areas, isolated corridors, central plants, loading docks and other similar areas, as follows:

1. Construct drywall dustproof partitions, or if approved provide heavy duty fire-rated tarpaulins. Duct tape all joints in tarpaulins and where access is required provide a double flapped opening.
2. Weather-strip all doors at perimeter of construction area. Include door sweeps. Also provide doors with closers.
3. Seal windows, doors and other openings of the hospital in areas adjacent to excavation or demolition areas.
4. Install a mat with a sticky surface at both exterior and interior side of entrance to the construction area. As a minimum, change mat daily or as frequently as necessary.
5. Cap/seal open end of supply and return air vents in construction area, with minimum 6-mil polyethylene sheet and duct tape. Review procedures with the

Mechanical Consultants and HRH Engineering and Maintenance and proceed according to their instructions. Modify to suit field conditions.

6. Seal all openings to work.
7. Daily mop the corridor, exterior but adjacent to the construction area, with clean water.
8. Daily, sweep the construction area with dust bane/wet sawdust or clean with vacuum cleaner.
9. Remove debris as follows:
 - a) After visiting hours have ended.
 - b) If construction area is above ground level, an external chute can be used following Owner's authorization. Always use a covered disposal bin.
 - c) As frequently as necessary to prevent accumulation of debris.
 - d) Use covered wheeled containers to transport debris through the Hospital building to the disposal source.
 - e) Use only designated elevator and corridors for transporting debris
10. Work taking place outside of the designated construction area must be isolated by a tarpaulin enclosure.
- 11. Isolate all plumbing fixtures.**

Type 2

Provide Type 2 dust control for medium risk areas, such as administration areas, public areas, lobbies, waiting areas, low risk patient care areas and other similar areas, as follows:

Conform to all the requirements and:

1. Use only drywall dustproof partitions.
2. Where they do not exist provide all doors, including door in dustproof partition, with door closer.
3. Take measures to create a negative air pressure within the construction area. Use a negative air machine(s), connected to the exhaust ducting where available and maintain/replace filters to best standard practice. Provide D.O.P. test results on negative air machines.
4. Where possible, existing ventilation system may be used for the creation of a negative air space. The use of return air ducting is permitted only if the Hospital authorizes the supply of 100% fresh air in the proposed system. Refer to

mechanical notes on drawings.

5. Install HEPA filters at all exhaust/return grills within the construction area, where Hospital authorization has been granted.
6. Where possible, use ducted fans to exhaust air directly to the exterior.

Type 3

Provide Type 3 dust control for high risk areas such as high risk patient care areas, ICU, Oncology, Surgical and other similar areas, as follows:

1. Construct an air lock **anti room (refer to Drawing 1 as an example)** at the entrance to the construction areas.
2. Install an additional mat with sticky surface inside the air lock.
3. Patch/seal all open cracks and joints in existing walls/partitions and temporary dustproof partitions enclosing construction area.
4. Patch and seal all openings and penetrations in floor and ceiling slabs within the construction area.
5. Increase the frequency of cleaning and removal of debris.
6. **Provide HEPA vacuum for personal decontamination and cleaning of items leaving work area.**
7. Implement a dust monitoring system using air pressure alarms to verify negativity of the system. Alarms shall be set at 0.04 H₂O, unless otherwise specified. Contractor must be in attendance during shutdown and start-up procedures.
8. Installation and removal of dustproof partitions must take place within a temporary tarpaulin enclosure.
9. Establishment of baseline reading is a part of the testing and balancing cash allowance specified.

For work outside the construction zone that requires temporary protection as designated by Project Manager, when accessing ceiling space or going work that creates dust, etc. Provide as follows:

1. **A temporary enclosure, either a manufactured unit such as Kontrol Kube or a prefabricated unit.**

2. **Prefabricated unit 6 mil self-supporting structure with frame or supported by ceiling grid.**
3. **Extended enclosure shall have polyethylene sheeting to the underside of the ceiling with double flap entry.**
4. **HEPA vacuum for negative air pressure in enclosure, to clean up inside enclosure upon completion and to vacuum off clothes equipment and flooring.**

Requirements of Regulatory Agencies

1. Conform to the requirements of the Occupational Health and Safety Act (OHSA) and Section 01100 Hospital Project Procedures as applicable.

Post Construction Measures

1. Prior to the start of construction taking the following preventative measures:
 1. Thoroughly clean construction area, including surfaces of all installed materials and equipment, prior to the removal of temporary dustproof partitions, air lock and other measures and again after the dustproof partitions, air lock and other measures have been removed but prior to the admittance of patients to the completed construction area.
 2. Conduct a final walk-through with the consultants to ensure that the ventilation system is functioning properly in the completed construction area.
 3. Outline methods for dust containment and removal of construction debris.
 4. Establish traffic patterns for construction workers to ensure that they do not go near patient care or critical areas.
 5. Identify essential services (ie water supply, electricity, ventilation systems) which may be disrupted during construction.
 6. Review and assess the Hospital's ventilation system.
 7. Provide a methodology statement for Type 2 or Type 3 dust control measures in accordance with similar requirements specified in Section 01300, Submittals.

<u>Manual</u>		<u>PROCEDURE</u>
Section		
Issuing Body	Manager, Security/Parking Services	
<u>Approved by</u>		
References		
Date	O: November 21, 2001	Number:
	R:	[Assigned by P&P Co-ordinator]

CONTRACTOR SECURITY PROCEDURE

Standard of Practice:

Humber River Hospital requires that all staff, contract staff, agency staff, temporary staff and consultants wear hospital issued identification badges at all times while working in the hospital. Visitors accessing the hospital after normal visiting hours are also required to wear identification badges at all times.

Purpose:

The hospital strives to reduce any potential security risks to patients, staff, visitors and the facility as a whole. In order to achieve this goal the following security policy/procedure regarding contractors working on-site must be adhered to accordingly.

Procedure:

1. The hospital delegate must contact the Security Manager to inform s/he of:
 - a) Date
 - b) Time
 - c) Location
 - d) Number of contract staff working in the area
 - e) Type of work being conducted
 - f) Duration of the job.

This must be expressed via mox, email or by phone, 48 hours prior to scheduled working date.
2. All contractors must obtain a hospital contractor's identification badge prior to commencing any work. Badges must be worn above the waist and visible at all times while on hospital property. Failure to do so may result in denied access and/or other inconveniences. Badges can be signed out from the hospital's designated locations:

Finch Site – Security Office
Church Site - Security Office or Maintenance Office

3. All contractors must contact Security via the hospital switchboard to gain access into any locked areas:
Finch Site - ext. 3824
Church Site - ext. 4103
4. All contractors are to refrain from wandering through unauthorized areas of the hospital, which have not been designated as contractor work areas.
5. All contractors must return identification badges to the hospital designated locations at the end of each working day (during off-hours all badges are to be returned to Security). Failure to do so may result in a surcharge being levied against the respected contract company.

HOSPITAL SERVICE INTERRUPTION REQUEST

Note: The Engineering & Maintenance Department requires a minimum of 10 days notice prior to the shutdown of hospital services.
Contractor to confirm with the Engineering and Maintenance Department that the Fire Alarm System is bypassed prior to starting the work in any area.

CONTRACTOR	
Type & Description of Service Interruption:	
Area(s) to be Affected by Interruption:	
Approximate Duration of Interruption:	
Contractor (Company's) Name:	
Contact Name:	Phone: ()
Signature:	Date:
General Contractor's Signature:	Date:
ENGINEERING & MAINTENANCE	
Date Request Received/Reviewed:	
Approved Shutdown Date:	Time: From: to
Date Affected Area(s) Notified:	Signature:
Engineering & Maintenance Director/Manager Signature:	Date:

Aug 1999

HUMBER RIVER HOSPITAL

CONTRACTOR'S GENERAL CONDITIONS FOR MINOR PROJECTS

1. COORDINATION AND COOPERATION

1. The Contractor shall coordinate the work of various trades and Separate Contractors to assure the best arrangement of pipes, conduits, ducts, equipment and other items in the available space. Under no circumstances will any claim for extra cost be allowed due to the failure by the Contractor to coordinate work.
2. The Contractor and all subcontractors shall cooperate with and coordinate their work with each other and with Separate Contractors in proper sequence and as required for the satisfactory and expeditious completion of the work. Take field dimensions relative to this work. Fabricate and erect work to suit field dimensions and field conditions. Provide all forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the work and set in place or instruct the related trades as to their location. Pay the cost of extra work caused by and make up time lost as the result of failure to provide the necessary cooperation, information or items to be fixed to or built in, in adequate time.
3. Co-ordinate sequence of work in areas included in Work of Other Contractors to ensure that the area will not be shared by personnel or equipment necessary for work of another contract.
4. Co-ordinate shutdowns and capping of services with other contractors on the Project and other projects on the Hospital Site.
5. Do not proceed with work in an area where work of another contract is underway without the written authorization of the Owner.

2. EXAMINATION

1. Check all dimensions at the site before commencing fabrication and installation and report all discrepancies, in writing, to Owner. Where dimensions are not available before work is commenced, the dimensions required shall be agreed upon by the various trades concerned and approved by the Owner.
2. The Owner will not entertain any claim for extra work and/or expense incurred by the Contractor or his subcontractors resulting from failure to examine existing surfaces and previous work done either under this

Contract or other separate contracts and conditions upon which any work depends for its satisfactory execution. All unsatisfactory conditions, defects and deficiencies shall be reported, in writing, to the Owner, and shall have been corrected before proceeding with the work.

3. Commencement of work shall imply acceptance of surfaces, previous work and conditions.

3. CONTRACTOR'S USE OF SITE

1. Use of Site: Owner will designate working areas sufficient for the work of this Contract. Confine all operations to designated areas. Cooperate with other separate contractors who may be performing work at the site.
2. Do not unreasonably encumber site with materials or equipment.
3. Move stored products or equipment which interfere with operations of Owner and other separate contractors.
4. General Contractor will control the designated areas. On-site storage space and other space will be allocated by General Contractor. Relocate stored equipment and materials which interfere with construction operations, as directed by General Contractor.
5. The Contractor is identified as the CONSTRUCTOR for the purposes of the Occupational Health and Safety Act.

4. CODES AND STANDARDS

1. Materials and workmanship shall comply with requirements of National Building Code of Canada (NBC), Ontario Building Code (OBC), Construction Safety Act, local building by-laws and applicable standards of Canadian Standards Association (CSA), American Society for Testing Materials (ASTM), Canadian General Standards Board (CGSB), American Standards Association (ASA), Canadian Electrical Manufacturers Association (CEMA) and other relevant codes and standards. In particular, conform to requirements of Ontario Occupational Health and Safety Act and Regulations for Construction Projects, and the Environmental Protection Act.
2. Where Drawings and/or Specifications exceed code or standard requirements, provide such additional requirements.

3. Where codes or standards or this Specification does not provide all information necessary for complete installation of an item, then strictly comply with the manufacturer's instructions for first quality workmanship. In cases of discrepancies consult the Owner for clarification.
4. In the event of conflict between provisions of relevant codes and standards, the requirement of authority having jurisdiction shall apply.
5. Following is a list of abbreviations of some standards writing bodies referred to in the Contract Documents:

<u>Abbreviation</u>	<u>Standard Writing Body</u>
AA	Aluminum Association
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWCI	Association of the Wall and Ceiling Industries – International
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWWA	American Water Works Association
CASA	Canadian Automatic Sprinkler Association
CGA	Canadian Gas Association
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Workers
CITC	Canadian Institute of Timber Construction
CMHC	Central Mortgage and Housing Corporation
CRCA	Canadian Roofing Contractors Association
CRSI	Canadian Reinforcing Steel Institute

5. **AUTHORITIES**

1. Conform to all requirements of all authorities having jurisdiction including the public utilities. The above are referred to in the Contract Documents as the authorities.
2. Apply for, pay for and obtain all permits required by the authorities for the work. Cost of such are included in the Contract Price unless specified otherwise.

3. The Mechanical and Electrical Subcontractors shall obtain and pay for all permits applicable to their respective work unless specified otherwise. Such fees may be registered in Section 01020, Allowances.
4. The "Building Permit Copy" of the drawings and specifications as approved by the local Building Department shall be kept on the job and maintained in good condition, from commencement to completion of the work. On completion of the work, this Building Permit copy shall be delivered in good condition to the Project Manager.

6. CODES AND ACTS

Conform to:

- 6.1 The Ontario Building Code.
- 6.2 The Canadian Electrical Code (CSA C22 Series, latest editions).
- 6.3 The above are referred in the Contract Documents as codes.

7. PROJECT MEETINGS AND MEETINGS WITH CITY OFFICIALS

1. After award of Contract, Contractor shall arrange and hold weekly project meetings at times and locations approved by Owner. Arrange additional project meetings as required.
2. Notify all parties concerned of meetings, to ensure proper coordination of work.
3. Record minutes of meetings, and distribute to all parties within 3 days of meeting.
4. Contractor shall be responsible for scheduling of meetings and communications with City officials for the obtaining of occupancy permits.

8. HANDLING, DELIVERY AND STORAGE

1. Handle and deliver and store materials and equipment in accordance with manufacturers' and suppliers' recommendations and in such a manner that no damage will be done to the materials, equipment, the work and the environment.

2. Owner will designate storage areas at the site. Store materials and equipment so as to ensure the preservation of their quality and fitness for the work. Store materials and equipment on wooden platforms or other hard, clean surfaces raised above the ground or in watertight storage sheds of sufficient size for the storage of all materials and equipment which might be damaged by storage in the open. Locate stored materials and equipment so as to facilitate prompt inspection. Do not use private property for storage purposes without the written permission of the property owner.
3. Deliver and store packaged materials and equipment undamaged, in their original wrappings or containers, with manufacturers' labels and seals intact.
4. Keep materials and equipment free from debris, ice, snow and other foreign matter.
5. Store paints, coatings, thinners, solvents and other volatile materials in ventilated and lockable separate shed containing no other materials.
6. Carefully organize prior delivery of materials to site to permit continual progress of construction without delay.
7. Immediately remove rejected materials and equipment from site.

9. WORKMANSHIP

1. The work of each trade section shall be carried out safely, in accordance with the Apprenticeship and Trades Qualification Act and applicable regulations, by skilled and experienced tradesmen employed by a firm having record of satisfactory completion of similar work.
2. Workmanship shall be of highest quality in accordance with best standard practice for type of work specified, except where specified more precisely.

10. DISPOSAL OF WASTES

1. Burying and burning of rubbish and waste materials on site is not permitted.
2. Disposal of waste or volatile materials, such as mineral spirits, oil, paint or paint thinner into waterways, storm and sanitary drains is prohibited.

3. The Contractor and all subcontractors must comply with all environmental legislation which is applicable.

11. POLLUTION CONTROL

1. Refer also to “Dust Control”.
2. Provide all means necessary to ensure dust control during all demolition work and during any excessive dust producing work during work of this Project.
3. The contractor and all subcontractors must comply with all environmental legislation which is applicable.

12. LOCATION OF EQUIPMENT AND FIXTURES

1. Drawings are, in part, diagrammatic and are intended to convey Scope of Work and indicate general and approximate location, arrangement and sizes of fixtures and equipment. Obtain more accurate information about locations, arrangements and sizes from study and coordination of shop drawings and Contract Drawings, and visits to site, and become familiar with conditions and spaces affecting these matters before proceeding with work.
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. Obtain manufacturer’s literature for roughing-in and hook-up of equipment, fixtures and appliances.
4. Inform Owner of impending installation and obtain his approval for actual location. Where job conditions require reasonable changes in indicated locations and arrangements, consult the Owner to verify the actual locations and arrangements and make changes at no additional cost.

13. CONCEALMENT

1. Conceal pipes, ducts, tubing and wiring in floor, wall and ceiling construction of finished areas wherever possible. If any doubt arises as to means of concealment, or the intention of Contract Documents in this regard, request clarification from Owner before proceeding with the portion of work in questions.

14. PROTECTION – GENERAL

1. Refer also to Article GC9.1 of the General Conditions of the Contract and to Dust Control. Procedures attached.
2. Adequately protect floor slabs and finished flooring from damage. Take special measures when moving heavy loads or equipment on them.
3. Keep floors and walls free of oil, grease and other materials likely to discolour them and/or affect bond of applied finishes.
4. Each trade shall protect the work of other trades from damage during the execution of their work. Damaged work shall be repaired or replaced by appropriate trades, but at the expense of those causing damage.
5. Provide protection required to enable existing building, equipment, services and utilities to remain in continuous and normal operation, and to maintain construction schedule.
6. Indemnify the Owner from and against all claims and losses resulting from the above operations.

15. PROTECTION OF EXISTING UTILITIES AND SERVICES

1. Where work involves breaking into or connecting to existing utilities and services, carry out work at times directed by Owner and relevant governing authorities.
2. Before commencing work, and during work, establish location and extent of existing utilities and service lines in area of work and notify Owner and relevant governing authorities of findings.
3. Remove abandoned utilities and service lines and cap or otherwise seal utilities and lines at cut-off points.
4. Record locations of maintained, re-routed and abandoned utilities and service lines.
5. Indemnify the Owner from and against all claims and losses resulting from the above operations.

16. NOISE PROTECTION

1. Provide full cooperation and protective measures in minimizing all excessive noise due to construction operations.
2. No pneumatic tools and other excessively noisy and disrupting tools, machinery and equipment will be permitted without written approval of the owner.
3. Where required, the Contractor shall ensure that his workers wear noise protection.

17. FASTENINGS

1. Provide all fastenings, anchors and accessories and adhesives required for fabrication and erection of the work.
2. Exposed metal fastenings and accessories shall be of same texture, colour and finish as base metal on which they occur.
3. Metal fastenings shall be of the same material as the metal component they are anchoring or of a metal which will not set up an electrolytic action which could cause damage to the fastening or metal component. In general, anchors occurring on or in concrete and masonry shall be non- corrosive.
4. Unless fasteners and metal components which are being fastened are of the same material, all washers between fasteners and metal components shall be neoprene or nylon.
5. Anchoring and fastening devices or adhesive shall be of appropriate type and shall be used in sufficient quantity and in such a manner as to provide safe, positive and permanent anchorage of the unit to be anchored in position. Install anchors at spacing to provide for required load carrying capacity.
6. Keep exposed fastenings to a minimum, evenly spaced and neatly laid out.
7. Supply adequate instructions and templates and, if necessary, supervise installation where fastenings or accessories are required to be built into work of other trades.
8. Fastenings shall be of permanent type. Wood plugs not permitted.
9. Fastening which cause spalling or cracking of material to which anchorage is being made are not permitted.

10. Except where specified, do not use powder actuated fastening devices on any part of this work without written approval of Owner. Take particularly stringent safety precautions when permitted to use powder actuated fastenings.

18. RENOVATIONS, ALTERATIONS AND REPAIRS TO EXISTING BUILDING

1. Well in advance of work commencement, notify Owner in writing of any work which is to be started within existing Building. At no time interfere with operation of any department without written approval of Owner. It is essential for existing Building to remain functional at all times and for all Hospital operations to proceed normally. Contractor shall, when required on occasion, expedite work outside of Contractor's normal working hours. Owner will cooperate to keep such overtime hours to a minimum.
2. Where new work connects with existing building and where existing work is altered, do all necessary cutting and fitting required to make satisfactory connections with existing work so as to leave entire work in a finished and acceptable condition.
3. Execute work with least possible interference and disturbance to occupants, public and normal use of premises.
4. Make good all existing materials and finishes, which are not to be removed nor altered, but which are damaged or disturbed during the progress of work under this Contract. Also make good to all existing damaged materials and finishes within the areas of work of this Contract.
5. Where existing work is to be made good, match the new work exactly to the old work in material, form, construction and finish, unless otherwise specified or approved.
6. Drill existing work carefully, leaving a clean hole no larger than required.
7. Wherever it becomes necessary to cut or interfere in any manner with existing utilities, services and equipment for short periods of time, do the work at such times as approved by Owner and governing authorities. Provide minimum five (5) normal working days written notice to Owner's Plan Engineer to all impending interruptions.
8. Provide temporary barriers and warning signs in locations where renovation and alteration work is adjacent to areas used by the public, workmen and Owner's personnel. Provide guardrails around an opening in the floor, roof or surface to which a worker has access. Provide, and

ensure that a worker uses, appropriate fall protection devices where this is a hazard of falling more than 3 m. (10 ft.).

9. In all existing rooms which are affected by work of this Contract, Owner will remove existing furniture, equipment and other items which will be retained by Owner. Contractor shall notify Owner minimum 15 working days prior to commencing work in rooms affected.
10. Work within restricted and confined spaces shall be undertaken in strict compliance with Provincial regulations. Refer to the Regulations for Health Care and Residential Facilities.
11. Ensure that the employees of Contractors engaged to do work at Humber River Hospital, Church Site, will not be exposed unnecessarily to environmental, health or safety risks due to their employers' failure to comply with Federal or Provincial Acts and Regulations which specify environmental, health and safety requirements.
12. Ensure that the employees of Contractors engaged to do work at Humber River Hospital, Church Site, will not be exposed unnecessarily to environmental, health or safety risks due to hazards present at Humber River Hospital, Church Site.
13. Ensure that the workers work safely, and wear or use the appropriate protective clothing, equipment and devices.

19. CORE DRILLING AND X-RAY

1. Where x-rays and/or core drilling may be required, provide written notice to Owner minimum ten (10) business days prior to doing such work. Submit core drilling drawings, showing detailed sizes and locations for Structural Engineer's approval. Indicate locations of openings in relation to column grid lines and permanent walls. Prior to drilling, carefully chip concrete to expose reinforcing steel. Proceed with complete core drilling, including cutting and removal of reinforcing steel, upon Engineer's review and approval. X-ray and/or core drilling, as well as the costs associated with the review of the x-rays and core drilling, shall be at Contractor's expense.
2. Where core drilling is required provide temporary water and dustproof barriers to contain dusting. Include dust tight "tenting" at underside of slabs to also contain falling debris.

3. Where core drilled openings and other openings will be left unfilled provide traffic bearing, dust tight protective covering over the openings until the openings are filled.

SPECIAL PROVISIONS

1. SPECIAL SCHEDULING OF WORK

1. Refer to Asbestos Abatement requirements.
2. Contractor shall arrange to execute the work of this Contract during normal working hours between 6:00 a.m. and 6:00 p.m. Operating Rooms will shut down at approximately 4:00 p.m. All demolition work and noisy construction work must be undertaken after 5:00 p.m. and on weekends, subject to the Hospital's approval.
3. Whenever required, give further written particulars concerning the work program. The submission to and approval by the Owner of the Contractor's work program or the furnishing of details and particulars thereon shall not relieve the Contractor of any of his duties and responsibilities under the Contract. Irrespective of Contractor's schedule, the Owner shall have the right to direct the Contractor to carry out work in any section of the Contract in order to expedite the work or comply with the Owner's requirements, including noise requirements.

SUBMITTALS

1. “AS-BUILT” DRAWINGS

1. Owner will supply one set of white prints for “as-built” drawing purposes as work progresses.
2. Regularly maintain project “as-built” drawings on set of white prints and record accurately significant deviations from Contract Document caused by site conditions and changes ordered by the Project Manager.
3. Mark “as-built” changes on white prints in red ink.
4. Record following information:
 1. Location of internal utilities, services and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 2. Field changes of dimension and detail.
 3. Changes made by Change Order or Field Order.

2. SHOP DRAWINGS

1. Submit shop drawings in accordance with requirements specified in the General Conditions and Supplementary Conditions. Conform also to Submission Requirements specified in this Section.

3. SAMPLES AND MOCK-UPS

1. Submit samples in sizes and quantities specified. Confirm also to Submission Requirements specified in this Section.
2. Where colour, pattern or texture is criterion, submit manufacturer’s full range of samples.
3. Where specified in particular Sections, construct field samples and mock-ups at locations acceptable to Architect.
4. Construct each sample or mock-up complete, including work of all trades required to finish work.

5. Reviewed samples or mock-up will become standards of workmanship and material against which installed work will be checked on project for conformity.

4. DATA SHEETS

1. For all materials and products which contain solvents and chemicals of all description, submit material and safety data sheets of such materials and products for Owner's written approval prior to use. Refer to Section 01005 General Instructions, Article 8 Codes and Standards, regarding conformance of materials.

5. MAINTENANCE MANUAL

1. On completion of project submit to Architect three (3) copies of Operations Data and Maintenance Manual in English, made up as follows:
 1. Bind data in vinyl hard covered, 3 ring loose lead binder for 215 x 280 mm size paper.
 2. Enclose title sheet, labeled "Operation Data and Maintenance Manual", project name, date and list of contents.
 3. Organize contents into applicable Sections of work to parallel project specification break-down. Mark each Section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.
2. Include the following information, plus data specified under various Sections:
 1. Maintenance instruction for finished surface and materials.
 2. Warning of detrimental maintenance practices.
 3. Copy of hardware and paint schedules.
 4. Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
 5. Names, addresses and phone numbers of subcontractors and suppliers.

6. Warranties and bonds showing:
 1. Name and address of project.
 2. Warranty commencement date (date of Certificate of Substantial Performance).
 3. Duration of warranty.
 4. Clear indication of what is being warranted and what remedial action will be taken under warranty.
 5. Signature and seal of Contractor.
 7. Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
3. Neatly type lists and notes. Use clear drawings, diagrams or manufacturers literature. Where manufacturers literature is included, clearly indicate only the data with which this project is concerned.
 4. Include on complete set of interference drawings and schematic diagrams for all applicable work, including Mechanical and Electrical work.

6. DEMONSTRATION OF SYSTEMS

1. Instruct Owner's representatives in all aspects of operation of systems and equipment after completion of installation and prior to Substantial Performance. Provide classroom instructions where necessary.
2. Arrange and pay for services of service engineers and manufacturer's representatives required for instruction.
3. Submit to Architect with application for Substantial Performance, complete list of systems and equipment stating the following for each system:
 1. Date instructions were given to Owner's representatives.
 2. Functions performed.
 3. Location and room numbers.
 4. Duration of instruction.
 5. Names of persons instructed.
 6. Other parties present (manufacturer's representative, subcontractor, Project Manager, etc.).
 7. Signature of Owner's representatives stating they understand system and equipment installation, operation and maintenance requirements.
 8. Letters from manufacturers of equipment and systems indicating that their technical representatives have inspected and tested

systems and have approved methods of installation, connections and operation.

4. The only exception to the foregoing requirements for acceptance of equipment and systems will be “fine tuning”, which may be performed after Substantial Performance and prior to Total Performance.
5. In conjunction with the foregoing requirements, Contractor shall arrange necessary inspections and obtain written approval and acceptance of the equipment and systems requiring approval by governing authorities, and correction of unacceptable items to satisfaction of governing authorities.

7. DUST CONTROL PROGRAM

1. Prepare, submit and implement a dust control program, which program shall include details of truck washing and street cleaning to the satisfaction of the Medical Officer of Health for the City of Toronto.
2. Prevent contamination of and nuisance to adjacent areas and buildings near the work from dust by taking appropriate dust control measures at such times as found necessary, and at other times complaints of dust are received from the public, local authorities, Owner or Project Manager.
3. Refer also to Section 01560 Dust Control.

8. CONSTRUCTION METHOD STATEMENT

1. Where work will impact or interfere with existing occupied spaces and building operations, submit a Construction Method Statement, ie. architectural, structural, mechanical and electrical work taking place at the interface of the existing building and the new work, including all service tie-ins, etc.
2. The method statement shall consist of a detailed type written statement on the performance of work that specifically addresses items of work or issues that will potentially interfere with patient care, public safety and normal building operations.
3. The Statement shall address, but not necessarily be limited to, the following:
 1. Hospital notification of intended work.
 2. Detailed Gantt schedule.
 3. Hours of work.

4. Precautions taken to address dust control, asbestos abatement, safety, noise vibration.
 5. Type of equipment to be used.
 6. Shutdown procedures for service tie-ins.
 7. Shutdown requests.
 8. Subcontractors who will be involved in the work.
4. The Construction Method Statement shall be reviewed and approved by the Project Manager and affected hospital staff prior to commencing work on site. Submit the Method Statement minimum two (2) weeks in advance to allow the approvals by the Hospital, the Project Manager and notification requirements.
9. SAFETY POLICY
 1. Contractor must provide his safety policy prior to his first progress payment application.

TEMPORARY FACILITIES

1. MAINTENANCE

1. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.
2. In the event of loss or damage, immediately make all repairs and replacements necessary to Project Manager's approval and at no additional cost to the Owner.

2. CONTRACTOR'S SITE OFFICE

1. Establish within the area of the work, and keep open at all times during the prosecution of the work, an office of size to accommodate site meetings and where all letters, orders, notices and other communications may be received or acknowledged, either by the Contractor or his authorized representative.
2. Make space available in office for use by Project Manager. Include availability of Contract Documents, plan rack, layout table and other such items.
3. Keep in this office one up-to-date copy of all documents listed in General Instructions.
4. If required, relocate the office to another area within the work area as phasing work progresses.
5. If space is available other subcontractors shall provide their own site offices in a location designated by General Contractor.

3. TELEPHONES

1. Arrange and pay for the installation and use of an adequate telephone service at the job site.
2. Telephone service shall be for Contractor's use.
3. Mechanical and electrical subcontractors shall arrange and pay for the installation and use of their own telephone services at the job site.

4. Arrange and pay for installation of pay phone for use by other subcontractors.
5. Under no circumstances will cellular phones and trunking radios be permitted within the Hospital building. Cellular phones may be used exterior to the Hospital building.

4. ACCESS

1. Owner will designate the access routes to the construction work areas and to the disposal bin location.
2. Ensure that Owner's personnel, the public, workmen and officials will have a safe, free and easy access to existing building from entrance route. Keep route free for all vehicular traffic.
3. Where using existing roads for access to project site, maintain such roads for duration of contract and make good damage resulting from Contractor's use of existing roads.
4. Report all existing damaged areas in writing to the Owner, prior to starting work of this Contract.

5. PARKING

1. Parking is free of charge in the designated service vehicle spaces. If there is no parking available on-site, the public lots in the surrounding area can be used.
2. Regulate such parking and restrict parking to authorized vehicles only, by means of identification stickers or cards as directed by the Owner.

6. DUSTPROOF PARTITIONS

1. Refer also to "Dust Control".
2. Provide temporary dustproof partitions where indicated on drawings and where required to isolate construction activity and to separate areas of new work from existing areas. Construct partitions for full height, using 92 mm steel stud framing at 400 mm centres. Provide bracing as required.
3. Secure 4 mil polyethylene sheets to partition framing, on side of new work. Lap joints of polyethylene sheets minimum 100 mm.

4. Install 15.9 mm thick fire-rated gypsum wallboard on each side of steel studs.
5. Tape perimeter of partition and butt joints of gypsum wallboard to provide positive seal.
6. Provide temporary passage door, complete with lockset and dust seal, where directed by Owner.
7. If permitted, provide clear, heavy duty tarpaulins instead of gypsum board partitions to separate areas of work. Include all required passageways. Ensure positive dustproof seals.
8. Where core drilling is required provide temporary water and dustproof barriers to contain dusting. Include dust tight "tenting" at underside of slabs to also contain falling debris.

7. SANITARY FACILITIES

1. The Hospital will assign a designated washroom for use by the Contractor and his forces. The Hospital will clean, maintain and provide supplies for the washroom.

8. SITE ENCLOSURES

1. Submit shop drawings for site enclosures.
2. Each shop drawing submitted shall bear stamp of qualified professional engineer registered in Province of Ontario.
3. Erect temporary site enclosures where indicated and where required using 50 x 100 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA 0121-M1978. Provide cross bracing as required. Ensure enclosure is designed to withstand all loadings, including wind loading.
4. Apply plywood panels vertically, flush and butt jointed.
5. Provide one lockable truck entrance gate and one pedestrian gate, if required. Equip gates with locks and keys.

6. Erect and maintain pedestrian walkways, including roof and side covers, complete with signs and electrical lighting as required by code requirements.

9. TEMPORARY ENCLOSURES AND COVERINGS

1. Other than at exterior windows, where new openings are required in the perimeter walls enclosing the areas of work of this Contract, provide temporary dust tight protection to the openings, constructed of fire rated materials and assembly to provide the rating required to match rating of the existing walls. Seal tight such openings.
2. For opening where portion of existing skylight is temporarily removed, provide temporary watertight covering over the open section of skylight during time when opening will not be required for use until the removed portion of skylight is re-installed.
3. Where door access to the areas of work is required, provide temporary fire rated door with dustproof seals. Ensure doors are lockable.
4. Where core drilled openings and other openings will be left unfilled provide traffic bearing, dust tight protective covering over the openings until the openings are filled.

10. ELECTRICAL SERVICE

1. Temporary electric power supply is available on site and will be provided for construction usage at no cost to the Contractor. Owner will not tolerate nor pay for excessive and wasteful use of power. Connect to existing power supply, in locations designated by Owner, in accordance with Canadian Electrical Code. If required, provide temporary service distribution system, panelboards, grounding branch and receptacle circuits. Contractor shall be responsible for all service lines, disconnects, switches, connections, etc., and removal of same, upon completion of the work.
2. Trades requiring temporary electrical service shall provide and pay for their own extensions for lights, power tools and equipment beyond the receptacle outlets.
3. Permanent electrical power and lighting systems installed under Contract may be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace all light bulbs and

fluorescent tubes which have been used during a minimum period of 3 months.

11. WATER SUPPLY

1. Water supply is available on site and will be provided for construction usage. The Owner will pay the cost of water used. Contractor shall provide all hoses, piping, temporary connections and other necessary work and equipment, and removal of same, upon completion of the work. The Owner will designate the locations from where water supply may be taken.

12. HEATING AND VENTILATING

1. The existing premises are heated. If required, provide additional temporary heating.
2. Ventilating: Where required in existing premises, provide ventilating equipment to:
 1. Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 2. Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 3. Dispose of exhaust materials in manner which will not result in harmful exposure to persons.
 4. Ventilate storage spaces containing hazardous or volatile materials.
 5. Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
 6. Ventilate and maintain humidity levels within acceptable limits for work of finishing trades.
3. Maintain strict supervision of operation of temporary heating and ventilating equipment as follows:
 1. Enforce conformance with applicable codes and standards.
 2. Enforce safe practices.
 3. Prevent abuse of services.
 4. Prevent damage to finishes and floors, taking particular care when re-fueling.

5. Vent direct-fired combustion units to outside.

13. GARBAGE CHUTE AND DISPOSAL BIN

1. Provide Contractor's own disposal bin and locate in where directed by Project Manager.
2. Construct a temporary, fully enclosed and dust tight garbage chute which shall extend from the existing roof where indicated directly into the disposal bin where necessary.
3. Provide a self-closing hinged dust barrier, full size of chute, at bottom of chute.
4. Provide a heavy duty tarpaulin over the disposal bin to contain the dust and debris within the bin.
5. If a garbage chute is not used, waste must be packaged and sealed for transport through non-construction areas to garbage bin.

14. CONVEYING EQUIPMENT

1. If required, provide and maintain all conveying equipment, such as cranes, hoists and other types of conveying equipment, as required, for the proper execution of the work.
2. Assume complete responsibility for construction, strength, placing, anchoring and operation of conveying equipment used for the work under this Contract, to ensure that any load carried thereon will be safely supported and will be free from incidents.
3. If requested, make the use of conveying equipment and their accessories available to all subcontractors.
4. Subcontractors shall be responsible for their own hoisting requirements, and shall be responsible for making their own financial arrangements with the General Contractor.

15. FIRST AID

1. Provide, at the work site, such equipment and medical facilities as required by Worker's Compensation Act, to supply first-aid service to anyone who may be insured on the work site. In case of serious injury or death, report the accident immediately, to the proper authorities and to the Owner.

16. SIGNS

1. Contractor shall supply and post all required directional, warning and construction required and related signs and permits.
2. Unless otherwise approved in writing by Owner, post no other signs or advertisements on site.

17. ROOF PROTECTION AND WALKWAY

1. Where indicated, provide temporary wood walkway for use by Contractor and trades at roof level. Construct duckboard walkway minimum 1.2 m wide.
2. Carefully remove and store where directed, existing gravel topping from areas of walkway. Place 300 mm wide pieces of rigid polystyrene insulation under walkway sleepers. Do not place insulation nor walkway directly over the existing gravel topping. Do not stockpile the gravel in any one location.
3. Design walkway and installation to allow free drainage to roof drains, as well as to withstand against wind uplift.
4. Ensure against all damage to existing roofing system. Make good all damages caused during work of this Contract.
5. Remove temporary walkway when no longer required and replace the stored gravel in bed of hot mix asphalt.

18. SCAFFOLDING STAIR

1. Where indicated provide prefabricated temporary scaffolding stair for construction use. Provide enclosure for the stair.

19. REMOVAL OF TEMPORARY FACILITIES

1. No direct payment will be made for any of the temporary services, offices and connections as specified, nor for any labour, materials, ground rental or other expense in connection therewith, and the costs thereof shall be considered as overhead items and distributed accordingly over all items of the Contract.

2. Remove all temporary facilities from site when directed by Owner.

20. OVERLOADING

1. No part of work shall be loaded with loads which will endanger its safety or will cause permanent deformation.
2. Make every temporary support as strong as permanent support.
3. Contractor shall ensure the enforcing of all the above requirements and he shall be held solely responsible for damages and accidents due to overloading.

SAFETY REQUIREMENTS

1. CONSTRUCTION SAFETY MEASURES

1. Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Occupational Health and Safety Act, Environmental Protection Act, Worker's Compensation Board and municipal statutes and authorities.
2. In event of conflict between any provisions of above authorities the most stringent provision will apply.
3. Submit to Owner copies of all reports and stop work orders issued by local instruction safety inspector.

CLEANING

1. GENERAL

1. Refer also to Article GC3.14 of the General Conditions of the Contract and Supplementary Conditions.
2. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
3. Store volatile wastes in covered metal containers containing water if necessary, and remove from premises daily.
4. Prevent accumulation of wastes which create hazardous conditions.
5. Provide adequate ventilation during use of volatile or noxious substances.
6. Daily, each trade shall adequately clean his work and work areas of all rubbish and debris.
7. Upon completion of work of each trade, each trade shall thoroughly clean his work and leave his work in a suitable condition acceptable to General Contractor and Owner and to other trades requiring the suitable condition.

2. MATERIALS

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer in consultation with Environmental Services Manager.

3. CLEANING DURING CONSTRUCTION

1. Daily maintain project grounds and public roads, walks and properties used by Contractor and his forces free from accumulations of waste materials and rubbish. In particular, maintain roads and walks clean and free of dirt and mud due to work of this Contract.
2. Obtain permit and provide on-site dump containers for collection of waste materials and rubbish.
3. Regularly remove waste materials and rubbish from site.

4. Vacuum clean building interior areas affected by work of this Contract when ready to receive finish painting and coatings and continue vacuum cleaning on an as-needed basis until new work is ready for substantial completion or occupancy.
5. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted and coated surfaces.

4. FINAL CLEANING

1. Where applicable, daily maintain project grounds and public roads, walks and properties used by Contractor and his forces free from accumulations of waste materials and rubbish.
2. In preparation for Total Performance or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed spaces where accessible and only if necessary as determined by Owner.
3. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed interior and exterior finished surfaces including glass and other polished surfaces.
4. Vacuum clean all building interiors in areas affected by work of this Contract. Clean, wax and buff applicable applied floor finishes where applicable.
5. Rake clean surfaces of exterior grounds in areas affected by work of this Contract.
6. Remove debris and foreign materials from roof areas affected by work of this Contract.
7. Replace temporary filters with specified filters on all new heating, ventilating and air conditioning equipment, if such equipment were operated during construction.
8. Leave all new work of this Contract in condition to satisfaction of Owner.

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this section in accordance with requirements of the Contract Documents.
- .2 This section includes but is not limited to administrative and procedural requirements for quality assurance and quality control.
- .3 Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - .1 Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - .2 Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - .3 Requirements for Contractor to provide quality-assurance and quality-control services required by Owner or authorities having jurisdiction are not limited by provisions of this Section.
 - .4 Specific test and inspection requirements are not specified in this Section.

1.2 REFERENCES

- .1 Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- .2 Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- .3 Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- .4 NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
- .5 NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- .6 Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- .7 Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate

that proposed construction shall comply with requirements.

- .8 Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Consultants.
- .9 Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- .10 Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- .11 Use of Subcontractor trade-specific terminology in referring to a Subcontractor or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific Subcontractors.

1.3 DELEGATED DESIGN

- .1 Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
- .2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant.
- .3 Delegated Design Professional: Except as otherwise identified in technical Sections of the Specifications, the Professional Engineer shall have at least five (5) consecutive years' experience providing design services on projects of comparable size and scope, including material, design complexity to this project, that has resulted in applications with a record of successful in-service performance.

1.4 CONFLICTING REQUIREMENTS

- .1 Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Consultant for a decision before proceeding.
- .2 Items indicated on the Drawings but not included in the Specifications or included in the Specifications and not indicated on the Drawings, shall have the same effect as if indicated or included in both. In case of conflict or inconsistency between the Drawings and the Specifications, the Contractor shall request additional information or interpretation as specified. Any adjustment by the Contractor without such determination shall be at its own risk and expense.

1.5 ACTION SUBMITTALS

- .1 Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form

of a recent report on the inspection of the testing agency by a recognized authority.

- .2 Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

- .1 Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- .2 Schedule of Tests and Inspections:
 - .1 Prepare in tabular form and include the following:
 - .1 Specification Section number and title.
 - .2 Entity responsible for performing tests and inspections.
 - .3 Description of test and inspection.
 - .4 Identification of applicable standards.
 - .5 Identification of test and inspection methods.
 - .6 Number of tests and inspections required.
 - .7 Time schedule or time span for tests and inspections.
 - .8 Requirements for obtaining samples.
 - .9 Unique characteristics of each quality-control service.
 - .3 Reports: Prepare and submit certified written reports and documents as specified.
 - .4 Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- .1 Provide and pay for quality control procedures and methods required to ensure compliance with the intent of the Contract Documents including independent inspection and testing specified herein.
- .2 Testing and Inspection:
 - .1 Prepare and submit a comprehensive schedule of Work requiring testing or inspection, including the following:
 - .1 Contractor performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections

- and Contractor elected tests and inspections.
- .2 Special inspections required by authorities having jurisdiction.
- .3 Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.
- .3 Monitoring and Documentation: Contractor shall progressively maintain testing and inspection reports including log of approved and rejected results. Include in this log work of the Contract that the Consultant has indicated as non-conforming or defective. Progressively log, record and document corrective actions taken to bring non-conforming work into compliance with requirements to the approval of the Owner and Consultant. To progressively log, record and document shall mean to update the log as each item is corrected and/or addressed.
- .4 The Owner and Consultant reserves the right to audit the Contractor's quality control plan on a progressive and semi-regular basis as decided by the Owner and Consultant, including the inspection and testing reports and log of accepted and rejected results. Contractor shall cooperate fully with the Owner and Consultant, provide the Owner and Consultant reasonable access and time to audit the Contractor's quality control plan, including the inspection and testing reports and log of accepted and rejected results.

1.8 REPORTS AND DOCUMENTS

- .1 Test and Inspection Reports:
 - .1 Prepare certified written reports specified in other Sections. Include the following:
 - .1 Date of issue.
 - .2 Project title and Consultant's project number.
 - .3 Name, address, and telephone number of testing agency.
 - .4 Name of Consultant.
 - .5 Name of Contractor.
 - .6 Name of Subcontractor responsible for the Work being tested or inspected.
 - .7 Dates and locations of samples and tests or inspections.
 - .8 Names of individuals making tests and inspections.
 - .9 Description of the Work and test and inspection method.
 - .10 Identification of product and Specification Section.
 - .11 Complete test or inspection data.
 - .12 Test and inspection results and an interpretation of test results.
 - .13 Record of material temperature, air temperature and weather conditions at time of sample taking and testing and inspecting.
 - .14 Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - .15 General comments on application and workmanship.

- .16 Notes about any deviations from accepted procedures or the requirements of the Contract Documents.
- .17 Name and signature of laboratory inspector.
- .18 Recommendations on retesting and reinspecting.
- .2 Manufacturer's Technical Representative's Field Reports:
 - .1 Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - .1 Name, address, and telephone number of technical representative making report.
 - .2 Statement on condition of substrates and their acceptability for installation of product.
 - .3 Statement that products at Project site comply with requirements.
 - .4 Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - .5 Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - .6 Statement whether conditions, products, and installation shall affect warranty.
 - .7 Other required items indicated in individual Specification Sections.
- .3 Factory-Authorized Service Representative's Reports:
 - .1 Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
 - .1 Name, address, and telephone number of factory-authorized service representative making report.
 - .2 Statement that equipment complies with requirements.
 - .3 Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - .4 Statement whether conditions, products, and installation shall affect warranty.
 - .5 Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

- .1 General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- .2 Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- .3 Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well

as sufficient production capacity to produce required units.

- .4 Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- .5 Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- .6 Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - .1 Requirements for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local Subcontractor trade association jurisdiction settlements and similar conventions.
- .7 Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- .8 Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- .9 Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- .10 Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - .1 Perform tests and inspections before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
 - .2 Contractor responsibilities include the following:
 - .1 Provide test specimens representative of proposed products and construction.
 - .2 Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - .3 Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - .4 Build site-assembled test assemblies and mockups using installers who

shall perform same tasks for Project.

- .5 When testing is complete, remove test specimens, assemblies, and mockups not being incorporated in the finished Work, and laboratory mockups; do not reuse Products on Project.
- .11 Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Consultant and Commissioning Authority, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- .12 Mockups:
 - .1 Before installing portions of the Work requiring mockups, build full size physical assemblies' mockups for each form of construction and finish required to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances.
 - .2 Mockups are not Samples.
 - .3 Unless otherwise indicated, accepted mockups establish the standard by which the Work shall be judged.
 - .4 Comply with the following requirements, using materials indicated for the completed Work:
 - .1 Build mockups in location and of size indicated or, if not indicated, as directed by Consultant.
 - .2 Notify Consultant minimum seven (7) Working Days in advance of dates and times when mockups shall be constructed.
 - .3 Employ supervisory personnel who shall oversee mockup construction. Employ workers that shall be employed during the construction at Project.
 - .4 Demonstrate the proposed range of aesthetic effects and workmanship.
 - .5 Obtain Consultant's acceptance of mockups before starting work, fabrication, or construction.
 - .6 Allow minimum seven (7) Working Days for initial review and each re-review of each mockup.
 - .7 Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - .8 Demolish and remove mockups when directed unless otherwise indicated.
 - .9 Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

1.10 RELIABILITY OF CALCULATIONS BY DATE SENSITIVE EQUIPMENT, SYSTEMS AND COMPONENTS.

- .1 Date sensitive equipment, systems and components thereof must individually and in conjunction properly function and continue to correctly process, sequence and utilize date

and time related data for all dates and times, which occur during a reasonable life expectancy for said equipment, systems and components thereof.

- .2 Software products that process date or date related data shall recognize, store and transmit date data in a format which explicitly and unambiguously specifies the correct century.
- .3 Each Subcontractor shall include this requirement in all Contracts and equipment orders for this project.
- .4 Submittals: Provide certification from suppliers and Subcontractors providing date sensitive equipment, systems, and software that the proposed equipment, components and systems comply with these requirements.

1.11 QUALITY CONTROL

- .1 Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner shall engage a qualified testing agency to perform these services.
 - .1 Owner shall furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - .2 Payment for these services shall be made from testing and inspecting allowances, as authorized by Change Orders. Unless otherwise indicated, quality control testing required by authorities having jurisdiction shall be included in the Contract Price.
- .2 Costs for re-testing and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents shall be charged to Contractor, and the Contract Sum shall be adjusted by Change Order. Such costs shall include additional consultants' fees applicable to the re-testing and re-inspecting.
- .3 Costs of delays for corrective work, re-testing and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents shall be charged to Contractor, and the Contract Time shall not be adjusted.
- .4 Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - .1 Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - .2 Where services are indicated as Contractor's responsibility, engage qualified independent testing and inspection companies or agents to perform these quality-control services.
 - .3 When requested by Consultant, submit evidence acceptable to the Consultant of the testing and inspection companies' previous experience providing similar testing and inspection services before testing and inspections start.
 - .1 Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - .4 Supply a set of Drawings, Specifications and Schedules including all addenda,

- approved changes to the Work and request for information responses for the use of the testing and inspection companies. Advise Subcontractors of the testing and inspections company appointments.
- .5 Notify Consultant and testing and inspection agencies at least forty-eight (48) hours in advance of time when Work that requires testing or inspecting shall be started.
 - .6 Ensure presence of the authorized inspection and testing agent at the commencement of the part of the Work specified to be inspected or tested.
 - .7 Cooperate with and provide proper facilities for inspection and testing agents to perform their duties.
 - .8 Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - .9 Test and inspections requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - .10 Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 - .11 Provide inspectors full access and cooperation to areas of the Work requiring testing and inspection.
- .5 Subcontractor Responsibilities:
- .1 Advise the Contractor not less than seventy-two (72) hours prior to the commencement of any Work to be tested or inspected.
 - .2 Provide inspectors full access and cooperation to areas of the Work requiring testing and inspection.
- .6 Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures".
- .7 Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- .8 Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including re-testing and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- .9 Testing Agency Responsibilities: Testing and inspection companies, their personnel, employees and inspectors shall be totally independent and have no affiliations with the Contractor, Subcontractors, fabricators, suppliers or others performing the Work of the Contract.
- .10 Cooperate with consultants, Commissioning Authority, and Contractor in performance of duties.
- .11 Provide qualified personnel to perform required testing and inspections.

- .1 Study the requirements and intent of the Drawings, Specifications and Schedules including all addenda, approved changes to the Work and request for information responses.
 - .2 Company representatives shall inform the Contractor and Consultant of each visit to the site, plant or mill at the time of the visit.
 - .3 Determine the location from which test samples shall be taken and in which in-situ tests are conducted.
 - .4 Examine the Work, conduct and interpret tests and inspections, report on conditions, and state in each report whether tested and inspected work complies with or deviates from requirements.
 - .5 Notify Consultant, Commissioning Authority, and Contractor immediately of irregularities in condition or quality, deficiencies, or procedures; which do not comply with the requirements of the Contract Document, observed in the Work during performance of its services.
 - .6 Promptly submit a certified written report, in duplicate, of each test, inspection, and similar quality control service.
 - .7 Do not release, revoke, alter, or increase the Contract Document requirements or approve, accept or reject any portion of the Work.
 - .8 Do not perform any duties of Contractor including but not limited to supervision, instruction in current means and methods.
- .12 Associated Services:
- .1 Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - .1 Access to areas of the Work requiring testing and inspections.
 - .2 Incidental labour and facilities necessary to facilitate tests and inspections.
 - .3 Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - .4 Facilities for storage and field curing of test samples.
 - .5 Delivery of samples to testing agencies.
 - .6 Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - .7 Security and protection for samples and for testing and inspecting equipment at Project site.
- .13 Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
- .1 Schedule times for tests, inspections, obtaining samples, and similar activities.
- .14 Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

- .1 Distribution: Distribute schedule to Owner, Consultant, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 INSPECTION AND TESTING

- .1 Inspection and testing shall be directed by the Contractor.
- .2 Refer to Section Division 01, Section 01 45 23 "Testing and Inspection Services" for specific testing and inspection requirements and technical specification sections.
- .3 Testing and inspection does not relieve Contractor of responsibility to supply specified Products and to properly execute the work, but is a precaution against oversight or error.
- .4 Remove and replace Products indicated in inspection and test reports as failing to comply with specifications in accordance with instructions by the Consultant and without increase to the Contract Price.
- .5 Correct improper installation procedures reported in inspection and test reports as instructed by the Consultant and where necessary replace defective Work without increase to the Contract Price.
- .6 Pay costs for re-inspection and testing of replaced work as directed by the Consultant and for delays due to the corrective part of the Work.
- .7 It is not the responsibility of inspection and testing agents to supervise, instruct in current methods or accept or reject a part of the Work but only to examine and to report conditions.
- .8 Advise the Consultant and the appropriate inspection and testing agent not less than 48 hours prior to the commencement of the part of the Work to be inspected and tested.
- .9 Ensure presence of the authorized inspection and testing agent at the commencement of the part of the work specified to be inspected or tested.
- .10 Ensure that inspection and testing reports are issued promptly within forty-eight (48) hours and that the Consultant is informed immediately if the report indicates improper conditions or procedures.
- .11 Co-operate and provide facilities for inspection and testing agents to perform their duties. Provide proper facilities for storage of concrete specimens at correct temperature, free from vibration or damage in accordance with the instructions of the inspection and testing agent.
- .12 Co-operate and provide facilities for inspection and testing agents to perform their duties. Pay the cost of tests for reinforcing steel unidentified by mill test reports.

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 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes: Definitions, abbreviations, and acronyms, and referenced standards used in Drawings and Specifications.

1.2 DEFINITIONS

- .1 Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Drawings and Specifications, it shall have the meaning here set forth. In the Drawings and Specifications, the neuter gender includes the feminine and masculine, and the singular number includes the plural.
- .2 "Accepted": When used to convey Consultant's action on Contractor's submittals, applications, and requests, "accepted" is limited to Consultant's duties and responsibilities as stated in the Conditions of the Contract. Other terms including "approved" have the same meaning as "accepted".
- .3 "Action Submittals": Written and graphic information and physical samples that require Consultant's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals".
- .4 "Activity": Refer to Division 01, Section 01 32 00 "Construction Progress Documentation".
- .5 "Alteration Work": This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- .6 "Critical Activity": Refer to Division 01, Section 01 32 00 "Construction Progress Documentation".
- .7 "Delegated Design Professional": A Professional Engineer engaged by the Contractor to provide delegated design of materials, components or assemblies defined in technical sections of the Specifications to require delegated design, who has an active license to practice in the jurisdiction of the Project, and who is experienced in providing the design services required.
- .8 "Directed": A command or instruction by Consultant. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- .9 "Dismantle": To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- .10 "Event": Refer to Division 01, Section 01 32 00 "Construction Progress Documentation".
- .11 "Experienced Installer": Entity that has successfully completed a minimum of five previous projects similar in size and scope to this Project; is familiar with the special

- requirements indicated; and has complied with requirements of authorities having jurisdiction.
- .12 "File Transfer Protocol (FTP)": Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- .13 "Furnish": Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- .14 "Hot Work": Hot work includes the use of tools, techniques, or equipment which can constitute a source of ignition including but not limited to cutting or heating torches, grinding tools, soldering equipment (oxy acetylene or acetylene), pipe cutting (flame tools), tar pots, hot tapping operations, open flame.
- .15 "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- .16 "Informational Submittals": Written and graphic information that do not require Consultant's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- .17 "Install": Operations at the project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- .18 "Installer": Entity engaged by the Contractor, either as an employee or Subcontractor, to perform an "Install" construction activity. Installer shall be experienced in the operations they are engaged to perform.
- .19 "Match": To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as accepted by Consultant.
- .20 "Portable Document Format (PDF)": An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- .21 "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- .22 "Refinish": To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- .23 "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- .24 "Repair": To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise

reinforcing or upgrading materials.

- .25 "Replace": To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- .26 "Replicate": To reproduce in exact detail, materials, and finish unless otherwise indicated.
- .27 "Reproduce": To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- .28 "Retain": To keep existing items that are not to be removed or dismantled.
- .29 "RFI" or "Requests for Information / Interpretation:" Request from Owner, or Contractor seeking information required by or clarifications of the Contract Documents.
- .30 "Schedule of Values": A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- .31 "Strip": To remove existing finish down to base material unless otherwise indicated.

1.3 ABBREVIATIONS, AND ACRONYMS

- .1 Abbreviations and Acronyms for Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

- .1 Canadian General Standards Board (CGSB).
- .2 Canadian Standards Association (CSA).
- .3 Underwriters' Laboratories of Canada (ULC).
- .4 Warnock Hersey (WH).
- .5 Building Owners and Manufacturers Association (BOMA).
- .6 American Society for Testing and Materials (ASTM).
- .7 American National Standards Institute (ANSI).
- .8 American National Standards Institute/Door and Hardware Institute (ANSI/DHI).
- .9 Underwriters' Laboratories Inc. (UL, ULI or cUL).
- .10 American Architectural Manufacturers Association (AAMA).
- .11 National Electrical Manufacturers Association (NEMA).
- .12 National Fire Protection Association (NFPA).
- .13 Illuminating Engineering Society of North America (IES).
- .14 Intertek Testing Services ETL SEMKO (ITS).

- .2 Abbreviations and Acronyms for Technical Terms: Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they shall have the following meanings:

Term	Abbreviation / Acronym

Above Finished Floor	AFF
Access Door	AD
Access Panel	AP
Acoustic Ceiling Grid	ACG
Acoustic Ceiling Panel	ACP
Acoustic Plaster	ACPL
Acoustic Tile	ACT
Acoustic Wall Panel	AWP
Adjustable	ADJ
Air Conditioning	AC
Aluminum	AL / ALUM
Anodized	ANOD
At	@
Barrier Free	BF
Basement	BSMT
Beam	BM
Bench Mark	B.M.
Blocking (Wood)	BLKG
Board	BD
Bore Hole	BH
Bottom	BTM
Brick	BRK
Building	BLDG
Built-up Roofing	BUR
Bulkhead	BLKD
By (dimension)	x
Carpet / Carpet Tile	CPT
Cast Iron	CI
Catch Basin	CB
Ceiling	CLG
Cement	CEM
Cement Board	CEMBD
Cement Plaster	CEMPL
Cement Rendering	CEMR
Centre Line	C/L
Centre to Centre	C/C
Ceramic Tile	CT
Chalkboard	CHB
Clean Out	CO
Clear Finish (Wood)	CL
Closet	CLO
Cold-Rolled Steel	CRS
Cold Water	CW
Column	COL
Complete With	C/W
Concrete	CONC
Concrete Block	CBLK
Control Joint	CJT
Control Panel	CP
Convactor	CONV
Corner Guard	CG

Corridor	CORR
Course	CRSE
Crash Rail	CR
Cubic Metre	M3
Cupboard	CUPBD
Dado	DD
Dampproof Course	DPC
Dampproof Membrane	DPM
Double Glazing	DGL
Drinking Fountain	DF
Entrance Floor Grille	EFG
Elevation (Datum)	ELEV
Epoxy Coating	EPC
Epoxy Flooring	EPFL
Expansion Joint	EXP JT
Exterior Expansion Joint Cover	EEJC
Exterior Insulating Finishing System	EIFS
Fabric (cloth, vinyl)	FAB
Fiber Cement Panel	FC
Finished Floor	FIN FL
Fire Extinguisher	FE
Fire Hose Cabinet	FHC
Fire Rated	FR
Fixture	FXTR
Floor	FL
Floor Base	B
Floor Drain	FD
Floor Sump	FS
Footing	FTG
Galvanized	GALV
Galvanized Steel	GALV STL
Galvanized Steel Grating	GSG
Gauge	GA
Glass	GL
Glass Block	GL BLK
Glass Marker Board	WB
Glass Marker Wall	WW
Grade	GR
Ground	GRD
Gypsum	GYP
Gypsum Board	GYP BD
Gypsum Lath	GYP LATH
Hardened Concrete	H.CONC
Hardener	HDNR
Hardware	HDW
Hardware Pull	HPL
Height	HT or HGT
Hold Open	HO

Hollow Metal	HM
Hollow Structural Steel	HSS
Horizontal	HORZ
Hose Bibb	HB
Hot Water	HW
Glass Marker Board	WB
Glass Marker Wall	WW
Hardened Concrete	H.CONC
Hardener	HDNR
Hardware	HDW
Hardware Pull	HPL
Height	HT or HGT
Hot Water Heater	HWH
Hydro Pole	HP
Including	INCL
Information	INFO
Inside Diameter	ID
Insulation	INSUL
Insulation Rendered	INSULR
Interior	INT
Interior Expansion Joint Cover	IEJC
Intumescent Fireproof Coating	IFC
Invert	INV
Janitor=s Closet	JC
Joint	JT
Joist	JST
Laboratory	LAB
Lavatory	LAV
Left-Hand	LH
Left-Hand Reverse	LHR
Level	LEV
Light Standard	LS
Linear Metal	LIN MET
Linoleum	(see RFL)
Long Span Steel Joist	LSSJ
Luxury Vinyl Tile	LVT
Manhole	MH
Masonry Opening	MO
Maximum	MAX
Mechanical	MECH
Medium	MED
Membrane	MEM
Membrane Airseal	MEM AS
Metal	MET
Metal Airseal	MET AS
Metal Panel	MET PAN
Metal Ceiling Tile	(see ACT)
Metre	M
Mezzanine	MEZZ

Millimetre	mm
Minimum	MIN
Mirror	MI
Miscellaneous	MISC
Mounting	MTG
Nominal	NOM
Not in Contract	NIC
Not to Scale	NTS
Number	No.
On Centre	OC
Operable Façade	OF
Open Web Steel Joist	OWSJ
Outside Diameter	OD
Overhead	OH
Paint	PT
Partition	PTN
Paving	PVG
Percent	%
Pedestrian Traffic Coating	PTC
Plaster	PLAS
Plastic Laminate	P.LAM
Plate (Steel)	PL
Plexiglass/ Resin Panel	PLEX
Plumbing Vent	PV
Plywood	PLWD
Polished	POL
Polyvinyl Chloride	PVC
Porcelain Enamel	PE
Power Activated Fastener	PAF
Power Driven Fastener	PDF
Precast Concrete	PCC
Prefabricated	PREFAB
Projection Screen	PS
Protection Board	PROT BD
Public Address	PA
Radius	RAD
Rain Water Leader	RWL
Receptacle	RCPT
Reinforced	REINFD
Reinforcing Steel	RST
Resilient Base	RB
Required	REQD
Resilient Base	RB
Resilient Sheet Flooring (Sheet Linoleum, Sheet Rubber, Sheet Vinyl, Non-Slip Sheet Resilient)	RSF
Resilient Tile Flooring (Vinyl Composite Tile, Rubber Tile, Vinyl Tile)	RTF
Resilient Nosing	RN
Resilient Riser	RR

Resilient Stringer Base	RSB
Resilient Stair Tread	RST
Resinous Flooring	RF
Revision	REV
Right-Hand	RH
Right-Hand Reverse	RHR
Riser	R
Rolling Shutter Door	RSD
Roof Drain	RD
Room	RM
Rubber Tile	(see RTF)
Resilient Nosing	RN
Resilient Riser	RR
Resilient Stringer Base	RSB
Resilient Stair Tread	RST
Resinous Flooring	RF
Revision	REV
Right-Hand	RH
Right-Hand Reverse	RHR
Riser	R
Roller Fabric Shades	WT
Rolling Shutter Door	RSD
Roof Drain	RD
Room	RM
Rubber Tile	(see RTF)
Sanitary	SAN
Sealer	SLR
Sealed Concrete & Hardener	SCH
Sheet Resilient Flooring	(see RSF)
Similar	SIM
Slop Sink	SLS
Soffit	SOFF
Solid Polymer	SP
Solid Surfacing	SOSU
Special Paint	SPT
Square	SQ
Square Iron Bar	SIB
Stainless Steel	SS
Steel	STL
Stone	STO
Structural	STR
Switchboard	SWBD
Tackboard	TB
Telephone	TEL
Telephone Panel	TEL P.
Temperature	TEMP
Terrazzo	TERR
Through Wall Flashing	TWF
Tongue & Groove	T&G
Top of Catch Basin	TCB
Top of Curb	TC

Transition Strip - Flooring	T
Tread	TR
Triple Glazing	TRGL
Typical	TYP
Undercut	U/C
Underwriters' Laboratories Canada	ULC
Underwriters Laboratories Inc. (USA)	UL, ULI or cUL
Underground	U/G
Underpainted	U/P
Underside	U/S
Urinal	UR
Vapour Barrier	VB
Vertical	VERT
Vestibule	VEST
Vinyl Composite Tile	(see RTF)
Vinyl Fabric	(see FAB)
Vinyl Wall Covering	VWC
Vinyl Tile	(see RFL)
Washroom	WR
Water Closet	WC
Waterproof Membrane	WPM
Weatherstrip	WS
Welded Wire Mesh	WWM
Whiteboard	WB
Wide Flange	WF
Window Treatment/	
Washroom	WR
Wood	WD
Wrought Iron	WI

1.4 REFERENCED STANDARDS

- .1 Materials, equipment, and operations specified by reference to published standards and specifications of a technical society, Subcontractor trade association, or other agency standard, shall comply with the requirements of the current edition of the listed document that is in effect on the issue date of the Contract Document or addendum referring thereto, unless otherwise specified.
- .2 No provision of a referenced standard, Specification, manual, or code shall be effective to change the duties and responsibilities of the Owner, the Contractor, the Consultants, their agents and employees from those duties and responsibilities set forth in the Contract Documents.
- .3 Conflicting Requirements: If compliance with two or more referenced standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, refer the question to Consultant for a decision before proceeding.
 - .1 In the event of conflict between the referenced standards and the Specifications,

the Specifications govern.

- .2 In the event of conflict between the referenced standards and applicable law, the applicable law governs.

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 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes but is not limited to requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 INFORMATIONAL SUBMITTALS

- .1 Site Utilization Plan: Submit a site utilization plan indicating locations of construction fencing, temporary facilities, staging and lay-down areas, construction personnel vehicle parking, vehicular circulation, and construction site entrances. Show temporary utility lines and connections. Show use of airspace over adjacent properties.
- .2 Implementation and Termination Schedule: Within fifteen 15 Working Days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.
- .3 Project Identification and Temporary Signs: Show fabrication and installation details for project identification and temporary signs, including plans, elevations, details, layouts, typestyles, graphic elements, message content, and lighting.
- .4 Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- .5 Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - .1 Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - .2 Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - .3 Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, and plastering, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- .6 Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - .1 Locations of dust-control partitions at each phase of work.
 - .2 HVAC system isolation schematic drawing.
 - .3 Location of proposed air-filtration system discharge.
 - .4 Waste handling procedures.

- .5 Other dust-control measures.

1.3 QUALITY ASSURANCE

- .1 Electric Service: Comply with National Electrical Code, NEMA, and ULC standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- .2 Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- .3 Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including, but not limited to, the following:
 - .1 Building Code requirements.
 - .2 Health and safety regulations.
 - .3 Utility company regulations.
 - .4 Police, and Fire Department rules.
 - .5 Regulations for air space over adjacent properties and municipal rights of way.
 - .6 Subcontractor Trade Association Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade associations regulations and union jurisdictions.

1.4 PROJECT CONDITIONS

- .1 Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

1.5 PROTECTION AND SAFETY

- .1 Maintain clear and safe fire exit routes.
- .2 Protect existing services, structures, and other items required to remain and newly installed Work during construction with secure and durable coverings, barricades or guards suitable for the various conditions. Perform the Work in a manner to avoid damage.
- .3 As soon as construction is sufficiently advanced, enclose accessible openings to provide security. Provide temporary doors with security hardware.
- .4 Maintain the Project site in a lockable condition during the period of this work when the construction personnel are not present at the jobsite.
- .5 Life safety & fire protection: Provide all life safety equipment as required by building, fire and labour codes.
- .6 Where construction operations must be executed or traffic routed over finished floors, lay minimum 6.4 mm thick plywood coverings tightly fitted over surface in such areas. Secure plywood to prevent movement in a manner which shall not damage finished surfaces.

- .7 Where construction operations must be executed over finished roofs and waterproofed areas lay minimum 12.7 mm thick exterior grade plywood covering. Secure plywood to prevent damage to and penetration of roof and waterproofed surfaces. Provide means to prevent wind uplift.
- .8 Cover openings in equipment, ducts and pipes until final connections are made.
- .9 Protect exposed live electrical equipment during construction for personal safety. Shield and mark live electrical parts with appropriate warnings.
- .10 Provide temporary doors for rooms containing electrical distribution equipment. Keep doors locked except when under the direct supervision of a qualified electrician.
- .11 Wherever practical lock or barricade finished areas.
- .12 Ensure continuous security of the Work and construction equipment.
- .13 Provide protection against the elements to maintain Products and installations from damage and deterioration.

1.6 FIELD OFFICE

- .1 Provide a temporary field office for construction administration including but not limited to the following:
 - .1 Heat, light, and telephone, table or counter for examining drawings, plan racks and other furnishings required to facilitate administration of the Work of the Contract.
 - .2 Telephone, facsimile machine, wireless internet access, computer, printer and temporary electronic communication service required to facilitate administration of the Work as specified herein. Long distance telephone and facsimile calls shall be paid by the party responsible.
 - .3 Minimum size space of 3,048 mm by 6,096 mm for a meeting room with heat, air conditioning, light, and chairs to accommodate persons required to attend site meetings. Provide a table for recording and for displaying Drawings.
 - .4 Maintain a minimum temperature of 19°C in the field office during meetings.
- .2 Provide in the field office a minimum of four (4) current CSA approved safety helmets and four (4) pair green label safety boots available for the exclusive use of authorized visitors.
- .3 Field office to accommodate three (3) consultant staffing, each with 161 ft² (15 m²) office, storage and area for files and drawing racks, plan table.
- .4 Portable trailers may be used in lieu of framed buildings.
- .5 Submit sketch layout of temporary building or trailer locations if requested by the Consultant.

1.7 STORAGE SHEDS

- .1 Provide auxiliary weatherproof storage sheds similar in appearance to field offices.

1.8 PARKING

- .1 Parking at the Project site is very limited for use by Contractor, Subcontractors, construction personnel and suppliers.
- .2 Parking is available at the Project site on a first come basis for use by Contractor, Subcontractors, construction personnel, suppliers, Owner, Consultant, and subconsultants.
- .3 Contractor, Subcontractors, construction personnel and suppliers shall make use of adjacent Public parking facilities or Public transportation system and pay all associated costs without additional cost to the Owner.
- .4 The Owner and Consultant shall not be responsible for any parking fines and/or towing charges incurred by the Contractor, Subcontractors, construction personnel and suppliers performing the Work of the Contract.
- .5 Refer to Division 01, Section 01 35 13.19 "Special Project Procedures For Health Facilities" for further requirements and restrictions.

1.9 TEMPORARY FACILITIES, GENERAL

- .1 Comply with the requirements of codes, by-laws, regulations governing temporary power, lighting, first-aid, heating, sanitary facilities, hoarding, walkways and the like at the Project site and acceptable to local authorities having jurisdiction.

1.10 TEMPORARY SANITARY FACILITIES

- .1 Provide temporary portable toilets at the location of the Work.
- .2 When water and drain connections within the building are completed, obtain Owner's permission to provide temporary water closets, urinals and flushing devices with temporary partitions and doors. Select locations convenient to labour force and clearly identify for the use of construction workers. Keep location clean. Remove when directed and install permanent equipment.
- .3 Refer to Division 01, Section 01 35 13.19 "Special Project Procedures For Health Facilities" for further requirements and restrictions.

1.11 TEMPORARY WATER

- .1 Water is available for use by the Contractor and Subcontractor's at the Place of the Work. Use water and Owner shall pay bills.

1.12 TEMPORARY HEATING

- .1 Provide for the proper heating and drying out of the building until completion by the use of appropriate heating equipment. Do not use "salamanders". Use forced hot air type heaters operated in well-ventilated locations. Protect the floors, walls and ceilings around the heating units. Ensure that no damage by staining results to finished floors during operation, servicing and refuelling.

- .2 Maintain the heated parts of the buildings at not less than 10°C, or at such temperature specifically stated in Sections of the Specifications, for the proper installation of the various Products.
- .3 Provide at the site and ready for operation between at least October 15th and April 30th, temporary plant and equipment for heating
- .4 Duct carbon dioxide gas (CO²) or other noxious or harmful gases from heaters to the exterior of the building.

1.13 TEMPORARY POWER AND LIGHTING

- .1 Provide and pay for temporary power and lighting.
- .2 Power is available at the site for use by the Subcontractors. Owner shall pay electrical bills.
- .3 Comply with the requirements of codes, by-laws and regulations governing temporary power and lighting at the location of the Work.
- .4 Each Subcontractor shall provide required extension cords from location where power is provided to location where it is needed.
- .5 Contractor will arrange for general temporary lighting throughout work areas. Each Subcontractor shall provide special task lighting required in the execution of the work.
- .6 Provide sufficient lighting to ensure sufficient visibility for the proper execution, safety and inspection of the Work.
- .7 Comply with Construction Safety Association Temporary Wiring Standards on Job Sites the Ontario Electrical Code, and other local authorities having jurisdiction.

1.14 TEMPORARY FIRST-AID FACILITIES

- .1 Provide site equipment and medical facilities necessary to supply first-aid service to injured personnel in accordance with regulations of the Occupational Health and Safety Act and the Workers' Compensation Act and other applicable legislation.

1.15 TEMPORARY VENTILATION

- .1 Inform Consultant prior to commencement of Work where hazardous or volatile adhesives, coatings or substances are used, and arrange to install adequate mechanical ventilation.
- .2 Do not allow excessive build-up of moisture inside building.

1.16 TEMPORARY FIRE PROTECTION

- .1 Provide and maintain in proper order at least one (1) fire extinguisher in each work area, or more if directed by the Owner, prominently placed, until completion of Work.
- .2 Fire extinguishers shall be minimum 9 kg 4A 60BC type.

- .3 Remove fire extinguishers from the Project site upon completion of work.
- .4 Where gas welding or cutting is to be done within 3,048 mm or above combustible material, or above space that may be occupied by persons, interpose shields of non-combustible material. Place tanks supplying gases for welding or cutting at no greater distance from the work than is necessary and securely fasten in an upright position. Such tanks shall be free from exposure to the sun or high temperature.

1.17 TEMPORARY USE OF NEW PERMANENT SERVICE AND EQUIPMENT

- .1 Do not use any permanent service or equipment without Owner's written approval. Comply with Owner's instructions regarding use of permanent services and equipment.
- .2 Permanent services and equipment, including the roof top units, shall be substantially complete and reviewed by Consultant to be in proper operating condition before they may be used as temporary facilities.
- .3 Pay for fuel and operating costs.
- .4 Inspect permanent services and equipment being used as temporary facilities on a regular basis during use.
- .5 Provide competent persons to operate and maintain permanent systems for duration of temporary use period.
- .6 If required, perform repairs and maintenance immediately after each inspection. Upon termination of temporary use period, services and equipment shall be inspected, tested, adjusted, balanced and cleaned. Temporary filters shall be replaced with new filters.
- .7 If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 70 00 "Execution Requirements."
- .8 Permanent services and equipment shall be turned over to Owner in new and perfect operating condition.
- .9 Use of permanent systems and equipment as temporary facilities shall not affect the warranty conditions and warranty period for such systems and equipment. Ensure that Owner shall receive full benefits of equipment manufacturers' warranties after Project takeover.

1.18 CONSTRUCTION MACHINERY AND EQUIPMENT

- .1 Comply with codes, by-laws and regulations governing the erection and use of scaffolding, cranes, hoists, elevators, derricks and other equipment used for preparation, fabrication, conveying and erection of the work.
- .2 Provide fully qualified operators for scaffolding, cranes, hoists, elevators, derricks and other equipment.
- .3 Submit erection drawings if required by the local authority having jurisdiction.

- .4 Erect scaffolding independent of walls and in a manner to avoid interference with the parts of the Work in progress.
- .5 Provide and maintain temporary stairs, ladders and ramps required for movement and placing of Products, equipment and personnel. Remove when Work is completed.
- .6 Provide and maintain required shoring and bracing in accordance with Construction Safety Act and other applicable regulations.
- .7 Prevent sprayed materials from contaminating air beyond application area, by providing temporary enclosures.
- .8 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

1.19 TEMPORARY HOARDINGS, GATES, WALKWAYS AND RAMPS

- .1 Provide temporary hoardings, covered walkways, fences, gates, railings and ramps in accordance with the following:
 - .1 Maintain the existing site hoarding, existing fence enclosures, temporary hoardings, covered walkways, fences, gates, railings and ramps as required for the duration of the project.
 - .2 Protect Work during construction against disfigurement, contamination or damage from physical abuse or harmful materials. Provide protective covering where there is exposure to potential damage. Make good all damage that occurs during construction to match original condition.
 - .3 Provide and maintain for duration of the Contract, or until directed by the Consultant to be removed, substantial wood hoarding enclosures around the work area(s) to the limit of work as indicated on the Drawings conforming to the City of Toronto Department of Public Works standard details, all other by-laws of the City of Toronto and all other authorities having jurisdiction, consisting of approximately 2440 mm high plywood panels supported by wood or metal posts driven into the ground at 2440 mm O.C., complete with lockable gates for access to work area(s) and product deliveries, and safety screened land surveyor openings.
 - .4 Provide enclosures around existing plantings indicated on the Drawings to remain.
 - .5 Paint hoarding exposed to public view with two (2) coats of exterior grade paint in a uniform colour acceptable to the Consultant.
 - .6 Maintain hoarding and fence enclosures in a tidy and secure condition. Remove unauthorized signs and posters if such have been applied.
 - .7 Alter as required to suit construction purposes.

1.20 COINS, FOSSILS, ARTEFACTS, TREASURE AND OTHER ARTICLES

- .1 Coins, fossils, artefacts, treasure and other articles of value, interest or antiquity found in the excavations or elsewhere at the site shall be the absolute property of the Owner.
- .2 Notify the Owner and Consultant immediately upon discovery of coins, fossils, artefacts, treasure and other articles of value, interest or antiquity and await directions from the Owner.

- .3 Carefully abide by the Owner's orders as to their protection or disposal and afford the Owner and authorities having jurisdiction all opportunities to recover the discovered coins, fossils, artefacts, treasure and other articles of value, interest or antiquity.

1.21 DUST, NOISE AND VIBRATION CONTROLS

- .1 Take measures to control dust, noise and vibration generated by the Work.
- .2 Take appropriate dust, noise and vibration control measures at times found necessary and at other times when complaints of dust, noise and vibration are received from the Public, authorities having jurisdiction, Owner, or Consultant.
- .3 Dust, noise and vibration control requirements are for the consideration of the Public and the authorities having jurisdiction. These dust, noise and vibration control requirements shall not be construed as cause for elimination or restriction of the Contractor's construction schedule, claims for delay of the Work, nor additional costs for the Work.

Part 2 Products

2.1 NOT USED.

- .1 Not used.

Part 3 Execution

3.1 INSTALLATION, GENERAL

- .1 Locate facilities where they shall serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - .1 Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- .1 General: Arrange with Owner and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- .2 Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that shall not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - .1 Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- .3 Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - .1 Install electric power service underground unless otherwise indicated.

- .2 Connect temporary service to Owner's existing power source, as per the drawings.
- .4 Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - .1 Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- .1 Temporary and Wayfinding Signs.
 - .1 Except as specified herein, no signs, public announcements or publications concerning any aspect of this Project shall be allowed without the prior approval of the Owner..
 - .2 Provide temporary, directional signs for construction personnel and visitors.
 - .3 Provide signs relating to safety at the Project site, or mandatory regulatory notices.
 - .4 Prior to commencement of Work wherein hazardous or volatile cements, coatings, or substances are used, barricade entire area and post adequate number of "NO SMOKING" signs.
 - .5 Contractor shall be permitted to put his own sign on the hoarding subject to Owner's review and approval.
 - .6 Maintain and touch-up signs so they are legible for the duration of the Project.
- .2 Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- .3 Temporary Use of Permanent Stairs: Use of new stairs for construction traffic shall be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Performance of the Work.

3.4 USE OF ELEVATORS

- .1 New Elevators: Do not load elevators beyond their rated weight capacity.
- .2 Existing Elevators:
 - .1 Under no circumstances shall the existing elevators be overloaded, their governing mechanisms distorted, or be required to perform service unusual to their normal every day operation.
 - .2 Healthcare facility shall allow use of 1 service elevator near the area(s) of the Work of the Contract for the Contractor to transport tools and limited to smaller construction materials which easily fit in the elevator, to and from the areas of Work during restricted hours of 6:00 a.m. to 8:00 a.m. and 4:00 p.m. to 6:00 p.m., from Mondays to Saturdays.
 - .3 Construction personnel shall have use of other elevator s as designated by the Owner for transporting themselves only, to and from the renovation areas during the hours of 9:00 a.m. to 4:00 p.m., Mondays to Saturdays.

- .4 Contractor shall coordinate delivery times of smaller construction materials with restricted hours of service elevator use.
- .5 Contractor shall provide and ensure that service elevator cab interior and landing jamb protection are in place and secure all times. All damages to elevator cab interior, doors, controls and landing jambs caused by Contractor shall be repaired and/or replaced to the satisfaction of the Consultant at no extra costs to the Owner.
- .6 Owner reserves the right at certain times and circumstances not to allow the Contractor use of the elevator, if it interferes with operation of the healthcare facility. If the preceding occurs, Contractor shall make arrangements with the Owner for temporarily extending restricted hours use, or having alternate hours use of elevator.
- .3 Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work to the satisfaction of the Consultant, at no extra cost to the Owner. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- .4 At Substantial Performance of the Work, restore elevators used for construction purposes to new condition, including replacing worn cables, guide shoes, and similar items of limited life.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- .1 Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- .2 Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- .3 Temporary Interior Hoarding Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied during construction from fumes and noise.
 - .1 Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - .2 Construct dustproof partitions with two layers of 6-mil (0.15-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.15-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - .3 Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assembly requirements.
 - .4 Insulate partitions to control noise transmission to occupied areas.
 - .5 Seal joints and perimeter. Equip partitions with gasketed dustproof doors and

- security locks where openings are required.
- .6 Protect air-handling equipment.
- .7 Provide walk-off mats at each entrance through temporary partition.
- .8 Provide lockable steel double doors to each work area.
- .9 Paint hoarding with two (2) coats of paint in a uniform colour acceptable to the Consultant and apply re-usable graphic panels. Owner shall provide graphic files for Construction Manager to create graphic panels.
- .4 Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - .1 Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - .2 Develop and supervise an overall fire-prevention and -protection program for personnel at the Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - .3 Provide temporary standpipes and hoses for fire protection as needed. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
 - .4 Provide fully functioning permanent fire suppression sprinkler system at earliest possible date, including modifications to existing systems where applicable.
- .5 Security:
 - .1 Building security CCTV, alarms and related security monitoring equipment and services shall remain functional and actively monitoring at all times unless otherwise approved in writing by Owner.
 - .2 Relocation or alteration of building security systems shall be approved in writing with Owner so that re-programming of alarms and monitoring to coordinate with contact points that are removed is complete.

3.6 MOISTURE AND MOLD CONTROL

- .1 Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

3.7 OPERATION, TERMINATION, AND REMOVAL

- .1 Supervision: Minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- .2 Maintenance: Maintain facilities in good operating condition until removal.
 - .1 Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

- .3 Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Performance of the Work.
- .4 Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Performance of the Work. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - .1 Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - .2 At Substantial Performance of the Work, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section 01 70 00 "Execution Requirements".

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This section includes but is not limited to administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- .1 Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
- .2 New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
- .3 Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- .4 Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- .5 Date Sensitive Compliance (Date Sensitive Compliant): Systems, equipment and component parts thereof which function in connection with or utilize computer systems and subsystems, hardware, software, firmware, including embedded chip systems and components which process, sequence, calculate or in some fashion are affected by or dependent upon date and date related or time and time related data, including the passage of time, shall properly function and continue to correctly process, sequence and utilize date and time related data for dates and times which occur during a reasonable life expectancy thereof, for all dates on and after date of Substantial Performance of the Work, including leap year calculations.

1.3 ACTION SUBMITTALS

- .1 Comparable Product Requests: Submit a separate request for consideration of each comparable Product using the Request for Substitution form. Identify Product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- .2 Include data to indicate compliance with the requirements specified in "Comparable Products" Article in this Section.
- .3 Consultant's Action: If necessary, Consultant shall request additional information or

documentation for evaluation within five (5) Working Days of receipt. Consultant shall notify Contractor of approval or rejection of proposed comparable Product request within ten (10) Working Days of initial receipt of request, or seven (7) Working Days of receipt of additional information or documentation, whichever is later.

- .4 Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- .1 Compatibility of Options: If Contractor is given option of selecting between two (2) or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - .1 Contractor and each subcontractor is responsible for providing products and construction methods compatible with products and construction methods of others.
 - .2 If a dispute arises between Subcontractors over concurrently selectable but incompatible products, Consultant shall determine which products shall be used.
- .2 Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products or equipment which shall be exposed to view in occupied spaces or on the exterior.
 - .1 Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
 - .2 Instruct manufacturers to eliminate visible trademarks and labels except for labels of CSA, ULC, UL, WH and other similar authorities and where necessary to identify capacities, ratings, and part numbers. Manufacturer's identification may be applied in concealed locations. Ensure CSA, ULC, UL, and WH labels are applied in inconspicuous locations, such as on door hinge edge, inside of access panels or other accessible locations.
 - .3 Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on accessible, but inconspicuous, surface in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - .1 Name of product and manufacturer.
 - .2 Model and serial number.
 - .3 Capacity.
 - .4 Speed.
 - .5 Ratings.
- .3 Reliability of Calculations by Date Sensitive Equipment, Systems and Components:
- .4 Date sensitive equipment, systems and components thereof shall individually and in combination properly function and continue to correctly process, sequence and utilize date and time related data, which occur during a reasonable life expectancy for said equipment, systems, and components thereof.
- .5 Correctly process, sequence, and calculate date and date related data for dates prior to,

through and after date of Substantial Performance of the Work, including leap year calculations.

- .6 Software products that process date or date related data shall recognize, store, and transmit date data in a format which explicitly and unambiguously specifies the correct century.
- .7 include this requirement in all sub-contracts and equipment orders for this Project.
- .8 Submittals: Provide certification from suppliers and subcontractors providing date sensitive equipment, systems, and software that the proposed equipment, components and systems comply with these requirements.

1.5 LABOUR AND PRODUCTS

- .1 Provide and pay for labour, Products, tools, construction machinery and equipment, water, heat, light, power, transportation, and other facilities and services necessary for the performance of the Work in accordance with the Contract.
- .2 Each Subcontractor shall maintain good order and discipline among their employees engaged on the Work and shall not employ on the Work anyone not skilled in the tasks assigned.
- .3 Where metal thicknesses are given in gauges in the specification sections or the Drawings, the gauges referenced shall comply with the requirements of the Gauges and Equivalent Thickness Schedule (GETS) unless specified otherwise. Refer to the Gauges and Equivalent Thickness Schedule (GETS) appended to this Section.

1.6 SUBSTITUTIONS

- .1 Refer to Division 01, Section 01 25 13 "Product Substitution Procedures".

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle products using means and methods that shall prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
 - .1 Delivery and Handling:
 - .1 Order Products and schedule delivery to minimize long-term storage at the Place of the Work, and to prevent overcrowding of construction spaces without causing delays due to late delivery.
 - .2 Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - .2 Advise the Consultant promptly of changes in delivery schedule which adversely affect the progress of the Work and completion date.
 - .1 Deliver Products to the Place of the Work in an undamaged condition in manufacturer's original sealed container or other packaging system, unopened with manufacturers' seals intact, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

- .2 Inspect Products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- .3 The Contractor is responsible for arranging safe off-site storage as needed.
- .4 Storage:
 - .1 Store products to allow for inspection and measurement of quantity or counting of units.
 - .2 Store materials in a manner that shall not endanger Project structure.
 - .3 Store Products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- .5 Store oils, gasoline and other combustible or volatile Products in a locked separate storage shed away from other buildings. Limit quantity at the Place of the Work to minimum requirements for current operations.
 - .1 Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - .2 Comply with Product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage. Store Products in suitable environments.
 - .3 Protect stored Products from damage and liquids from freezing.
 - .4 Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.8 PRODUCT WARRANTIES

- .1 Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - .1 Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - .2 Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- .2 Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - .1 Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - .2 Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - .3 See other Sections for specific content requirements and particular requirements for submitting special warranties.

Part 2 Products`

2.1 PRODUCT SELECTION PROCEDURES

- .1 General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
- .2 Provide Products, materials, and equipment that are of good quality and new, unless otherwise specified, are free from faults and defects not inherent in the quality required, that conform with requirements of Contract Documents, that are suitable for use and function intended, that are corresponding in quality to related materials in the absence of a complete specification, that are of quality appearance where exposed to view, that are of one manufacturer or source for the same specific purpose, with uniform appearance and physical properties, and that are identical and interchangeable when required in quantity
 - .1 Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - .2 Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - .3 Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - .4 Where products are accompanied by the term "as selected," Consultant shall make selection.
 - .5 Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - .6 Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product. The Consultant is solely responsible for evaluation of products and manufacturers submitted as "Or equal" to the specified product or manufacturer.
- .3 Building systems, equipment, and software shall be "Date Sensitive Compliant" as defined by this Section.
- .4 Product Selection Procedures:
 - .1 Product: Where Specifications name a single manufacturer and Product, provide the named Product that complies with requirements. Comparable Products or substitutions for Contractor's convenience shall not be considered.
 - .2 Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a Product by the named manufacturer or source that complies with requirements. Comparable Products or substitutions for Contractor's convenience shall not be considered.
 - .3 Use one manufacturer's Products only, throughout the Work, where the use or purpose is similar, unless specified otherwise.
 - .4 Use specified Products only, or Products listed as acceptable. Where more than one Product is specified any one of the specified Products may be used.
 - .5 Products:
 - .1 Restricted List: Where Specifications include a list of names of both

- manufacturers and Products, provide one of the Products listed that complies with requirements. Comparable Products or substitutions for Contractor's convenience shall not be considered unless otherwise indicated.
- .2 Non-restricted List: Where Specifications include a list of names of both available manufacturers and Products, provide one of the Products listed, or an unnamed Product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed Product.
- .6 Manufacturers:
- .1 Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable Products or substitutions for Contractor's convenience shall not be considered unless otherwise indicated.
- .2 Non-restricted List: Where Specifications include a list of available manufacturers, provide a Product by one of the manufacturers listed, or a Product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's Product.
- .7 Basis-of-Design Product: Where Specifications name a Product, or refer to a Product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated Product or a comparable Product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the Product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- .5 Where specifications are descriptive or performance type without a named manufacturer submit verification of conformance with specification in a form acceptable to the Consultant (e.g. independent test, reports, data sheets and details).
- .6 Follow manufacturer's written instructions for application and installation of products. Request clarification by Consultant if manufacturer's instructions conflict with specifications.
- .7 Products which are not specified shall be of a quality consistent with those specified and their use acceptable to the Consultant.
- .8 Visual Matching Specification: Where Specifications require "match Consultant's sample", provide a product that complies with requirements and matches Consultant's sample. Consultant's decision shall be final on whether a proposed product matches.
- .9 Visual Selection Specification: Where Specifications include the phrase "as selected by Consultant from manufacturer's full range" or similar phrase, select a product that complies with requirements. Consultant shall select colour, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- .1 Conditions for Consideration: Consultant shall consider Contractor's request for

comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Consultant may return requests without action, except to record noncompliance with these requirements:

- .2 Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and shall produce the indicated results, and that it is compatible with other portions of the Work.
- .3 Evidence that the proposed product shall not cause additional cost in adjacent materials, systems, or assemblies; that proposed product is compatible with adjacent materials, systems, and assemblies.
- .4 Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated, warranties and specific features and requirements indicated.
- .5 Evidence that proposed product provides specified warranty.
- .6 List of similar installations for completed projects with project names and addresses and names and addresses of Consultant's and Owners, if requested.
- .7 Samples, where applicable or requested.
- .8 Certificates and qualification data, where applicable or requested.
- .9 Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

Part 3 Execution

3.1 FASTENERS, ANCHORS, BRACES AND SUPPORTS

- .1 Install fasteners, anchors, braces and supports required to maintain installations attached to the basic building structure or to finished floors, walls and ceilings in a secure and rigid manner capable of withstanding the dead weight of the installed item, live loads, superimposed dead loads and vibration.
- .2 Keep exposed fasteners to a minimum. Space evenly and neatly.
- .3 Use fasteners compatible with structural requirements, finishes and types of material to be connected. Do not use materials subject to electrolytic action or corrosion where conditions shall be liable to cause such action.
- .4 Verify that fasteners, anchors, braces, and supports for suspended installations, and the structure to which they are to be secured are designed to support the load requirements including a safety factor.
- .5 Conduct on-site tests of installed anchors and fasteners, employing an independent testing laboratory acceptable to the Consultant using properly engineered and calibrated force measuring meters.
- .6 Where the floor, wall or ceiling construction is not suitable to support the loads, provide additional framing or special fasteners to ensure securement to the structural framing of

the building or other structure which is to support the installation.

- .7 Provide reinforcing or connecting supports where required to distribute loading to the structural components.
- .8 Do not use wood plugs and explosive or hammer impact fasteners. Anchors in floor topping fills are not acceptable. Secure anchors in floors to the structural base.
- .9 Where a performance requirement is specified, submit engineering calculations and written verification, signed by a Professional Structural Engineer registered in the province of Ontario, that the installation has been inspected and is structurally sound and in accordance with design requirements.

3.2 CONDUIT, PIPE AND SLEEVES IN CONCRETE

- .1 Ensure that maximum outside diameter of conduits or pipes in slabs-on-grade is not greater than 1/3 slab thickness with minimum 51 mm concrete cover.
- .2 Depress one conduit or pipe at crossovers and increase the slab-on-grade thickness to suit.
- .3 Maintain minimum spacing of parallel conduits or pipe of three (3) pipe diameters centre to centre.
- .4 For conduits or pipes greater than 1/3 slab thickness for slabs-on-grade increase concrete thickness to maintain minimum 51 mm coverage above and below and extending 152 mm minimum each side.
- .5 Locate sleeves, conduits and pipes passing through suspended slabs, beams, or walls so as not to impair the strength of the construction and at a spacing of not less than four diameters centre to centre.
- .6 Install continuously embedded conduits and pipes in the centre of the slab or wall. Install a maximum of six conduits with a maximum outside diameter of 51 mm and at 152 mm centre to centre in a bay of slab or wall. Crossovers are not permitted in suspended slabs or walls unless the total crossover dimension is within the mid-third of the slab or wall thickness.
- .7 Maximum outside diameter of conduit or pipe placed in 152 mm thick slabs or walls is 25 mm.
- .8 Do not install conduit or pipes in concrete slabs 76 mm or less in thickness. (e.g.- over crests of steel deck or ribbed forms over O.W.S.J.'s).
- .9 Concrete fill predesigned openings around pipes and sleeves in non-fire rated floor, wall, and roof assemblies in exposed locations.
- .10 Refer to Division 01, Section 07 84 00 "Firestopping and Smoke Seals" for filling of predesigned openings around pipes and conduit in fire rated floor, wall, and roof assemblies.

END OF SECTION

GAUGES AND EQUIVALENT THICKNESSES (mm and inches)

Gauge No.	Uncoated Steel Sheet (msg) US Standard (Revised)		Galvanized US Standard Steel Sheet (gsg)		Stainless Steel Sheet (USsg) Gauge No.		Aluminum (Brown & Sharp Wire Gauge) (USS)		
	mm	inches	mm	inches	mm	inches	mm	inches	
	(msg = manufacturer's standard gauge)					.3125		.3249	
1					7.14	.2812	7.34	.2893	1
2					6.74	.2656	6.54	.2576	2
3					6.35	.2500	5.83	.2294	3
4	5.69	.2242			5.95	.2343	5.19	.2043	4
5	5.31	.2092			5.55	.2187	4.62	.1819	5
6	4.93	.1943			5.15	.2031	4.12	.1620	6
7	4.55	.1793			4.76	.1875	3.67	.1443	7
8	4.18	.1644	4.26	.1681	4.36	.1718	3.26	.1285	8
9	3.80	.1495	3.90	.1532	3.97	.1562	2.91	.1144	9
10	3.42	.1345	3.51	.1382	3.57	.1406	2.59	.1019	10
11	3.04	.1196	3.13	.1233	3.18	.1250	2.30	.0907	11
12	2.66	.1046	2.75	.1084	2.78	.1093	2.05	.0808	12
13	2.28	.0897	2.37	.0934	2.38	.0937	1.83	.0720	13
14	1.90	.0747	1.99	.0785	1.86	.0731	1.63	.0641	14
15	1.71	.0673	1.80	.0710	1.78	.0703	1.45	.0571	15
16	1.52	.0598	1.61	.0635	1.59	.0625	1.27	.0508	16
17	1.37	.0538	1.46	.0575	1.43	.0562	1.15	.0453	17
18	1.21	.0478	1.31	.0516	1.27	.0500	1.02	.0403	18
19	1.06	.0418	1.15	.0456	1.11	.0437	.91	.0359	19
20	.91	.0359	1.01	.0396	.95	.0375	.81	.0320	20
21	.83	.0329	.93	.0366	.87	.0343	.72	.0285	21
22	.76	.0299	.85	.0336	.79	.0312	.64	.0253	22
23	.68	.0269	.78	.0306	.71	.0281	.57	.0226	23
24	.61	.0239	.70	.0276	.64	.0250	.51	.0201	24
25	.53	.0209	.63	.0247	.55	.0218	.45	.0179	25
26	.45	.0179	.55	.0217	.47	.0187	.40	.0159	26
27	.42	.0164	.51	.0202	.43	.0171	.36	.0142	27
28	.38	.0149	.48	.0187	.40	.0156	.32	.0125	28
29	.34	.0135	.44	.0172	.36	.0140	.29	.0113	29
30	.30	.0120	.40	.0157	.32	.0125	.25	.0100	30
31	---	-----	.36	.0142	.28	.0109	.23	.0089	31

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Document.
- .2 This Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - .1 Examination.
 - .2 Hours of work.
 - .3 Adjacent existing properties and buildings.
 - .4 Coordination and layout.
 - .5 Installation.
 - .6 Load bearing structure.
 - .7 Completion of installation.
 - .8 Advertising.
 - .9 Progress cleaning.
 - .10 Starting and adjusting.
 - .11 Protection of installed construction.
 - .12 Correction of the Work.
 - .13 Operation and maintenance start-up.

1.2 INFORMATIONAL SUBMITTALS

- .1 Certified Surveys:
 - .1 Submit two (2) printed copies of land survey signed by land surveyor in addition to land survey submitted as PDF and AutoCAD format.
 - .2 Submit certificates, drawings, calculations and photographs, stamped and signed by the Land Surveyor and Subcontractor, certifying that elevations and locations of completed work of the Subcontractors are in conformance with Contract Documents.
- .2 Final Property Survey: Submit two (2) printed copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

- .1 Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

Part 2 Products

2.1 NOT USED

- .1 Not used

Part 3 Execution

3.1 EXAMINATION

- .1 Existing Conditions: Examine existing conditions at the Place of the Work and in the vicinity of the Place of the Work and make provision and allowances for these conditions in the execution of the work.
- .2 Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with installer Subcontractor or applicator Subcontractor present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
- .1 Examine preceding Work and ensure that conditions are satisfactory to receive subsequent Work. Do not proceed with subsequent parts of the work until unsatisfactory conditions are corrected.
- .2 Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
- .3 Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
- .4 Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- .3 Proceed with the Work only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.
- .4 Examine Contract Documents and pay special attention to locations where various parts of the Work require coordination. Advise the Consultant of conflicting requirements and request clarification.
- .5 Examine access and storage conditions at the Place of the Work prior to delivery of products.
- .6 Examine Drawings to ensure that openings, passageways and enclosures scheduled to be constructed prior to delivery and installation of Products are adequate to permit access to the place of installation with correct space dimensions provided. If conditions require, arrange for advanced delivery and protected storage.
- .7 Preparation:
- .1 Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- .2 Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- .3 Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- .4 Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of , submit a request for information to Consultant according to requirements in Section 01 31 13 "Project Management and Coordination".
- .8 Construction Layout:
 - .1 Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Consultant promptly.
 - .2 Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
 - .3 Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Consultants.

3.2 HOURS OF WORK

- .1 Subcontractors shall confine their hours of Work at the Place of Work from 07:00 hours to 18:00 hours, local time, Monday through Friday unless otherwise approved by Owner.
- .2 Arrangements for extended hours to those stated above or for any Work required on Saturdays, Sundays or statutory holidays must be pre arranged in writing with the Owner.
- .3 No additional compensation shall be paid by the Owner for overtime work should scheduling require work to be done on weekends, evenings, or nights.

3.3 ADJACENT EXISTING PROPERTIES AND BUILDINGS

- .1 Retain a professional engineer licenced in the Place of Work for the control of construction vibrations that may affect adjacent existing properties and buildings.
- .2 Obtain written approval from the Owner of adjacent existing properties before proceeding with a part of the Work which necessitates intrusions on such property.
- .3 This applies particularly to underpinning of adjacent existing buildings and where over-swing of cranes occurs. In these cases obtain approval in writing from the owner of each building affected.
- .4 Receipt of such approvals shall not limit responsibility for property damage or personal injury.

3.4 COORDINATION AND LAYOUT

- .1 Coordinate the installation of the Work.
- .2 Structural framing and Mechanical and Electrical Drawings, riser and distribution layouts are generally diagrammatic to indicate the scope of that part of the work. Refer to detail drawings to determine dimensions and to establish exact locations and details. Where necessary, confirm dimensions at the Place of the Work. Do not scale the Drawings.
- .3 Where several systems and Products are concentrated in an area and prior to installation, pre-plan the total installation by preparing full size or scale drawings detailing the location and identifying each system and product. Minimum scale 1:50. Pay all drafting costs apportioned as appropriate to each part of the Work.
- .4 Install systems and Products so as to provide maximum headroom, clearances for access, specified floor to ceiling heights and to minimize offsets in pipes, conduit, ducts and structural framing.
- .5 Run pipes, ducts, tubing and conduit plumb or level (except where specific slope is required for proper function) and in alignment with building grid.
- .6 Unless indicated or specified otherwise install pipes, ducts, tubing and conduit so that they shall be concealed above ceilings, behind furring and in walls as required to conform to finished room dimensions, except in mechanical and electrical equipment rooms.
- .7 Notify the Consultant, and request further instructions if locations of fixtures, fittings, equipment and services to these items interferes with interior finishes and use of building.
- .8 Provide access doors suitable for room finish and locate to avoid interference with room finishes and fitments. Locate access doors to be symmetrical with adjacent installations and architectural features.
- .9 Remove, revise and replace systems and Products installed contrary to these requirements.
- .10 Ensure prompt delivery and placement of items required to be built into concrete and masonry prior to concrete pouring and at appropriate time during erection of masonry.
- .11 Prepare setting drawings showing location and size of all services penetrating structural components, walls, roof and floors of the building, larger than 2 inches (51 mm) outside diameter. Provide drawings showing equipment concrete base requirements.
- .12 Locate wall and ceiling diffusers and grilles in exact accordance with dimensions furnished by the ceiling installer, wall finish installer and masonry installer. Adjust duct branches to allow diffusers and grilles to coincide with ceiling and wall patterns.

3.5 INSTALLATION

- .1 General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - .1 Make vertical work plumb and make horizontal work level.
 - .2 Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - .3 Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

- .4 Maintain minimum headroom clearance of 8 feet (2440 mm).
- .2 Except where more stringent requirements are specified, prepare, install, test, adjust and clean products, materials and equipment in accordance with manufacturer's printed instructions, recommendations and limitations for conditions indicated. Provide recommended accessory materials for a complete installation. If conflict exists between job conditions or specified requirements and with manufacturer's instructions, request written clarification from Consultant before proceeding.
- .3 Install products at the time and under conditions that shall ensure the best possible results. Maintain conditions required for product performance until Substantial Performance of the Work.
- .4 Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- .5 Coordination of Space: Where space is limited, install components and systems to maximize space available for maintenance and ease of removal for replacement.
- .6 Concealed Work: In finished areas, except as otherwise indicated, conceal pipes, ducts, and conduit and wiring in the finished construction. Coordinate locations of fixtures, outlets, annunciation devices, access panels, and similar items with finish elements. Provide escutcheon plates at penetrations through finished walls, ceilings and floors with finish appropriate to adjacent finished surface.
- .7 Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- .8 Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- .9 Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- .10 Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - .1 Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Consultant.
 - .2 Allow for building movement, including thermal expansion and contraction.
 - .3 Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- .11 Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- .12 Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 LOAD BEARING STRUCTURE

- .1 Do not cut, bore, or sleeve load bearing structure without the written permission of the Consultant unless specifically detailed on the Drawings.
- .2 Submit details in writing with each request for permission.

3.7 COMPLETION OF INSTALLATION

- .1 Install systems and Products in a complete and finished condition satisfactory to the Consultant and the Owner.
- .2 Install equipment, devices and controls in a complete and fully operating condition complete with accessories and connections required to fulfil their intended function.

3.8 ADVERTISING

- .1 Advertising is not permitted unless approved by the Owner.

3.9 PROGRESS CLEANING

- .1 General: Clean Project site and work areas daily, including common areas. Enforce requirements. Dispose of materials lawfully.
- .2 Provide all necessary and required means for both the removal and disposal of all rubbish, debris, demolished fixtures and fittings and all other items not scheduled to remain at the Place of the Work or in the tenant's premises, resulting from the operations of this Work.
 - .1 Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - .2 Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 27°C.
 - .3 Containerize unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- .3 Coordinate progress cleaning for joint-use areas where Construction Manager, Subcontractor's and other contractors are working concurrently.
- .4 Site: Maintain Project site free of waste materials and debris.
- .5 Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - .1 Remove liquid spills promptly.
 - .2 Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- .6 Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that shall not

damage exposed surfaces.

- .7 Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- .8 Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Performance of the Work.
- .9 Waste Disposal:
 - .1 Do not wash waste materials down sewers or into waterways.
 - .2 Deposit waste in containers at the end of each Working Day.
 - .3 Remove debris, equipment and excess Products from the Project site.
 - .4 Comply with waste disposal requirements in Division 01, Section 01 74 19 "Construction Waste Management and Disposal".
- .10 During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Performance of the Work.
- .11 Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- .12 Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - .1 Excessive static or dynamic loading.
 - .2 Excessive internal or external pressures.
 - .3 Excessively high or low temperatures.
 - .4 Excessive winds.
 - .5 Thermal shock.
 - .6 Excessively high or low humidity.
 - .7 Pollution and air contamination.
 - .8 Water or ice.
 - .9 Chemicals and solvents.
 - .10 Light.
 - .11 Radiation.
 - .12 Puncture.
 - .13 Abrasion.
 - .14 Heavy traffic.
 - .15 Soiling, staining, and corrosion.
 - .16 Bacteria.
 - .17 Rodent and insect infestation.

- .18 Combustion.
- .19 Electrical current.
- .20 High-speed operation.
- .21 Improper lubrication.
- .22 Unusual wear or other misuse.
- .23 Contact between incompatible materials.
- .24 Destructive testing.
- .25 Misalignment.
- .26 Excessive weathering.
- .27 Unprotected storage.
- .28 Improper shipping or handling.
- .29 Theft or vandalism.
- .13 Floor shall not be overloaded or damaged.
- .14 Keep clean access routes to the Place of the Work.
- .15 Maintain access to exits from Place of the Work.

3.10 STARTING AND ADJUSTING

- .1 Coordinate startup and adjusting of equipment and operating components with requirements in mechanical Specifications and electrical Specifications.
- .2 Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- .3 Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- .4 Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- .5 Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.11 PROTECTION OF INSTALLED CONSTRUCTION

- .1 Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Performance of the Work.
- .2 Comply with manufacturer's written instructions for temperature and relative humidity.
- .3 Owner reserves the right to protect installed Work to prevent damage and deterioration if the Contractor fails to protect the installed Work in a proper manner. The costs incurred by the Owner shall be paid by the Contractor.

3.12 CORRECTION OF THE WORK

- .1 Repair or remove and replace defective construction. Restore damaged substrates and finishes.
- .2 Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- .3 Restore permanent facilities used during construction to their specified condition.
- .4 Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- .5 Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- .6 Remove and replace chipped, scratched, and broken glass or reflective surfaces.

3.13 OPERATION AND MAINTENANCE START UP

- .1 Provide services of skilled persons for a minimum of two (2) consecutive full weeks from the date of Substantial Performance of the Work, or as otherwise required, to start in its proper sequence, and to thoroughly explain the operation and maintenance of each system and item of equipment to the Owner including specialized instructions by the respective manufacturers where appropriate.
- .2 Arrange with the Owner suitable times for instructions to their operating and maintenance personnel.
- .3 Provide the Owner with a record of dates and durations of each instruction period together with the name of persons to whom the instructions were given.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Document.
- .2 This Section includes, but is not limited to general administrative and procedural requirements governing cutting and patching.

1.2 DEFINITIONS

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

1.3 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: For professional engineer.
- .2 Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
- .3 Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
- .4 Consultant's Acceptance: Obtain acceptance of cutting and patching proposal before cutting and patching. Acceptance does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- .1 Subcontractors:
 - .1 Employ skilled workers to perform cutting and patching.
 - .2 Cutting, drilling and sleeving of the work shall be done only by the Subcontractor who has installed it. Subcontractor requiring drilling and sleeving shall inform the Subcontractor performing the work of the location and other requirements for drilling and sleeving.
 - .3 Subcontractor shall be responsible for all cutting and patching in addition to that specified for mechanical and electrical work, and shall directly supervise performance of cutting and patching by other Subcontractors.
 - .4 Patching or replacement of damaged work shall be done by the Subcontractor under whose work it was originally performed, and at the expense of the Subcontractor who caused the damage.

- .2 Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
- .3 Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - .1 Operational elements include the following:
 - .1 Primary operational systems and equipment.
 - .2 Fire separation assemblies.
 - .3 Air or smoke barriers.
 - .4 Fire-suppression systems.
 - .5 Mechanical systems piping and ducts.
 - .6 Control systems.
 - .7 Communication systems.
 - .8 Fire-detection and alarm systems.
 - .9 Electrical wiring systems.
 - .10 Operating systems of special construction.
 - .11 Electronic security systems.
- .4 Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - .1 Other construction elements include but are not limited to the following:
 - .1 Water, moisture, or vapor barriers.
 - .2 Membranes and flashings.
 - .3 Exterior windows, entrances, and storefronts.
 - .4 Exterior curtain-wall construction.
 - .5 Sprayed fire-resistive material.
 - .6 Equipment supports.
 - .7 Piping, ductwork, vessels, and equipment.
 - .8 Noise- and vibration-control elements and systems.
- .5 Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Consultant's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - .1 Visual elements include the following:
 - .1 Ornamental metal.
 - .2 Matched-veneer woodwork.
 - .3 Firestopping.

- .4 Window system.
- .5 Fluid-applied flooring.
- .6 Wall covering.
- .7 HVAC enclosures, cabinets, or covers.

- .6 Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical Subcontractors. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 WARRANTY

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

Part 2 Products

2.1 MATERIALS

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

Part 3 Execution

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Temporary Support: Provide temporary support of Work to be cut.
- .2 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that may be exposed during cutting and patching operations.
- .3 Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free

passage to adjoining areas.

- .4 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 CUTTING AND PATCHING

.1 General:

- .1 Do cutting, patching, coring to the existing building(s) including remedial Work in accordance with the General Conditions.
- .2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- .3 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The Section performing work that penetrates fire, air, vapour, moisture, thermal or acoustic separations of the building shall pack voids appropriately with mineral fibre fire stop material as may be required, seal the air, vapour and moisture barriers and apply sealant to joints as may be required to ensure that no air movement through the penetration is possible.
- .4 Structural Requirements:
 - .1 Before cutting, drilling, coring, or sleeving structural load-bearing elements, obtain approval of location and methods from the existing building Owner's Structural Engineer.
 - .2 Do not endanger any parts of the existing building, the Work or property by cutting, digging, or similar activities. No Subcontractor shall cut or alter the work of another Subcontractor unless such cutting or alteration is approved by the latter Subcontractor and the Contractor.
- .5 Mechanical and Electrical:
 - .1 Include under the work of Mechanical and Electrical Divisions for cutting or provision of holes up to and including 5 square inches (3,225 mm²) and related patching, except as indicated otherwise.
 - .2 Include under the Subcontractor's work, holes and other openings larger than 5 square inches (3,225 mm²) and chases, bulkheads, furring and required patching. Subcontractor shall be responsible for determination of work required for holes in excess of 5 square inches (3,225 mm²).

.2 Cutting:

- .1 Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original installer; comply with original installer's written recommendations.
- .2 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- .3 Finished Surfaces: Cut and drill with true smooth edges and to minimum suitable

- tolerances. Cut or drill from the exposed or finished side into concealed surfaces.
- .4 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
- .5 Mechanical and Electrical Services:
- .1 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- .3 Patching:
- .1 Proceed with patching after construction operations requiring cutting are complete.
- .2 Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable.
- .3 Provide materials and comply with installation requirements specified in other Sections, where applicable.
- .4 Firestopping:
- .1 Refer to Division 07, Section 07 84 00 Firestopping and Smoke Seals for fire stopping and smoke seal requirements.
- .2 Patch and repair fire stopping damaged or removed in the performance of the work. Fire resistance rating to match existing.
- .5 SFRM:
- .1 Refer to Division 07, Section 07 81 16 Applied Fireproofing for SFRM requirements.
- .2 Patch and repair SFRM damaged or removed in the performance of the work. Fire resistance rating to match existing.
- .6 Exposed Finishes:
- .1 Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
- .2 Clean piping, conduit, and similar features before applying paint or other finishing materials.
- .3 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
- .4 Make patches as invisible as possible in final assembly to the approval of the Owner and Consultant. Unacceptable work shall be replaced at no charge to the Owner.
- .5 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- .6 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- .7 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- .7 Mechanical and Electrical Services: Restore damaged pipe covering to its original condition.
- .4 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
- .5 Adjusting: Replace, and otherwise make good, all damaged work, as identified by the Consultant or the Owner.
- .6 Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This section includes but is not limited to administrative and procedural requirements for construction waste management and disposal.

1.2 REFERENCES

- .1 Definitions:
 - .1 Construction Waste Management Plan - inclusive of the Waste Audit (WA), Waste Management Work plan (WMW) and the Materials Source Separation Program (MSSP).
 - .2 Inert Fill: Inert waste, exclusively asphalt and concrete.
 - .3 Materials Source Separation Program (MSSP): A series of on-going activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
 - .4 Recyclable: Ability of product or material to be recovered at the end of its life cycle and re-manufactured into new product.
 - .5 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being re-manufactured into new product.
 - .6 Reuse: Repeated use of product in the same form but not necessarily the same purpose. For example: wood pallets or crushed concrete used as clean fill.
 - .7 Source Separation: Act of keeping different waste types separate for distribution into appropriate recycling/disposal bins.

1.3 CONSTRUCTION WASTE MANAGEMENT PLAN

- .1 Implement a Construction Waste Management Plan to maximize the diversion of demolition and construction waste from landfill disposal. Dispose of unsalvageable and non-recyclable waste.
- .2 All sections of the specifications are affected by the requirements of this Section for effective waste reduction, reuse or recycling.
- .3 Follow the guide requirements and best practices as described in:
 - .1 Canadian Construction Association (CCA) CCA 27-1997, A Guide on Construction Environmental Management Planning and, CCA 81-2001, A Best Practices Guide to Solid Waste Reduction.
 - .2 Comply with local environmental protection regulations, solid waste services and other waste management authorities having jurisdiction at the Place of Work.
 - .3 Requirements of authorities having jurisdiction.
 - .4 Ontario Environmental Protection Act Ontario Regulation 102/94 Waste Audits

- and Waste Reduction Work plans and related Ministry of the Environment guide.
- .5 Ontario Environmental Protection Act. Ontario Regulation 103/94: Industrial, Commercial and Institutional Source Separation Programs and related Ministry of the Environment guide.
 - .6 City of Toronto Solid Waste Management Transfer Station By-Law No. 746-2004 (Prohibited Materials) for Work in the City of Toronto.
 - .4 Comply with Canadian Construction Association's "Code of Practice" outlined in Standard Construction Document CCA 27 to encourage improved waste management practices.
 - .5 Provide requested submittals in accordance with Section 01 30 00. Prepare and submit, prior to project start-up, 2 copies of each of: Waste Audit, Waste Reduction Work plan, and Materials Source Separation Plan.
 - .6 Implement suitable measures to prevent fragile materials such as fluorescent lamps from being damaged prior to recycling or disposal.
 - .7 Do not bury rubbish or waste materials. Hazardous materials to be separated from landfill waste and disposed of according to local regulations.
 - .8 Keep records of construction waste: Number and size of bins, Waste type per bin, Total weight in tonnes of landfill waste, Total weight in tonnes of hazardous waste, Total weight in tonnes of reused materials, Total weight in tonnes of recycled materials and, Destination of all materials.

1.4 SUBMIT A WASTE REDUCTION WORK PLAN (WRW)

- .1 Structure the WRW to follow the hierarchy of the 3Rs: reduce; reuse; recycle, within thirty (30) days of contract signing.
 - .1 WRW to include but not be limited to:
 - .1 Forecast for each applicable waste stream of the percentage of waste expected to be diverted over the course of the Project.
 - .2 Forecast of percentage of materials to be salvaged for reuse or recycling.
 - .3 Provisions to reduce packaging materials entering the Project site to reduce the total waste amount.
 - .4 Destination of materials.
 - .5 Clear labelling of storage areas.
 - .6 Quantities of materials to be salvaged for reuse or recycling.
 - .7 Procedure to monitor the diversion rate throughout the Project duration (i.e. through the collection of waybills or other reports from the waste management company).
 - .2 Submit waste reduction reports containing the information noted when requested by the Consultant.
 - .3 For each waste stream, collect, track and report the following information:
 - .1 Subcontractor Contractor: the name of the Subcontractor completing the recycling activities whether own forces or subcontractor.

- .2 Total Waste Material; for each waste stream the total mass in kilograms of waste produced as part of the Work for the Project.
- .3 Reused Off Site: for each waste stream the total mass in kilograms of waste that was reused by third parties at locations other than the Place of the Work.
- .4 Reused On-Site: for each waste stream the total mass in kilograms of waste that was reused by the Contractor in the execution of the Work.
- .5 Sent to Recycling Facility: for each waste stream the total mass in kilograms of waste sent to a recycling facility.
- .6 Sent to Landfill: for each waste stream the total mass in kilograms of waste sent to a landfill for disposal.
- .7 Contractor Used: for each waste stream the total mass in kilograms of waste sent used by the Contractor (or Subcontractor) for purposes other than the Project.
- .8 Estimated Diverted Material: for each waste stream the total mass in kilograms of waste that at the outset of the Project the Contractor estimates can be diverted from landfill.
- .9 Actual Diverted Material: for each waste stream the total mass in kilograms of waste that based on actual verifiable data can be shown to have been diverted from landfill.
- .10 Type of Verification: for each waste stream, the type of supporting documentation provided to substantiate the claims of waste diversion.
- .11 Notes: any additional information required to be provided with respect to each waste stream.
- .4 Identify opportunities for reduction, reuse and recycling of materials according to information from the waste audit.
- .5 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these obstacles.
- .6 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.5 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

- .1 Implement MSSP for waste generated on site. Provide conveniently-located, on-site facilities for collection, handling and storage of anticipated quantities of reusable, recyclable and waste materials.
- .2 Separate materials for reuse and recycling from general waste stream and stockpile in separate marked piles or containers consistent with applicable fire regulations. Unless otherwise indicated, materials for removal are the property of the Contractor. Prevent contamination of materials for reuse and recycling by handling in accordance with requirements for acceptance by designated facilities.

1.6 WASTE MANAGEMENT PLAN IMPLEMENTATION

- .1 Invite suppliers to retrieve/retain packaging after delivery for reuse.

- .2 Contact local salvaging/recycling facilities and arrange for recycling services.
- .3 Provide on-site bins for the collection, handling, and storage of waste that are properly sized to accommodate expected waste quantities.
- .4 Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods to be used by all parties at the appropriate stages of the Project.
- .5 Be responsible for implementation of programs involving tax credits or rebates or similar incentives related to recycling, if applicable to the Project. Revenues or other savings obtained for recycling or returns shall accrue to the Contractor.
- .6 Compost organic waste materials in accordance with the Composting Council of Canada recommendations.
- .7 The following materials should be able to achieve a minimum 75% diversion:
 - .1 Cardboard.
 - .2 Concrete.
 - .3 Plastic packaging.
 - .4 Rubble.
 - .5 Steel.
 - .6 Wood.

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 Provide the work of this Section in accordance with requirements of the Contract Document.
- .2 This Section includes, but is not limited to general administrative and procedural requirements governing closeout procedures of the Work including, but not limited to, the following:
 - .1 Take over procedures.
 - .2 Final cleaning
 - .3 Warranty inspection.

1.2 TAKE OVER PROCEDURES

- .1 Take Over Procedures: Comply with OAA/OGCA Take-Over Procedures Document No. 100, dated 2018, unless otherwise specified.
- .2 Contractor's Application for Certificate of Substantial Performance of the Work:
 - .1 Prior to submitting an application for a Certificate of Substantial Performance of the Work, Contractor shall make a thorough inspection and list incomplete, deficient, defective, or unsatisfactory parts of the work including items previously reported by the Consultant and issue copies of this list to parties responsible for completion or correction.
 - .1 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
 - .4 Certificates required by Fire Commissioner submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 Commissioning of mechanical systems completed in accordance with 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS and copies of final Commissioning Report submitted to Consultant.
 - .7 Work: Complete and ready for final inspection.
 - .2 Subject to special conditions the Subcontractors shall correct items prior to application for Certificate of Substantial Performance of the Work.
- .3 Contractor's application for Certificate of Substantial Performance:
 - .1 When deficiencies have been corrected and the value of the work to be completed and corrected is within the amount defined in the Construction Lien

- Act for Substantial Performance of the Work, Contractor shall make written application to the Consultant for a Certificate of Substantial Performance of the Work.
- .2 The application to the Consultant for a Certificate of Substantial Performance of the Work shall be issued with and accompany the monthly application for payment.
- .3 In the application state:
- .1 That the Contract is substantially performed in accordance with the conditions of the Construction Lien Act.
- .2 That the completion of the balance of the Work is in process.
- .3 The date that the Work (or parts thereof) is scheduled to be completed and corrected.
- .4 The cost value of parts of the Work to be completed and corrected.
- .5 The cost value of parts of the Work which cannot be completed or corrected for reasons beyond the control of the Contractor.
- .4 Consultant's Certificate of Substantial Performance of the Work: Review shall be conducted by the Consultant, the Contractor, the major Subcontractors and others as the Consultant may request.
- .5 Publication of Substantial Performance of the Work: Where the Contractor publishes the notice of Substantial Performance of the Work, the Contractor is responsible for the cost of publication of Substantial Performance of the Work whether or not it is required by the applicable lien legislation.
- .6 Record Documents: Prior to occupancy by the Owner, in whole or part, submit record documents, specified in Division 01 Section 01 78 39 "Project Record Documents".
- .7 Contractor's Application for Certificate for Payment of Holdback Monies:
- .1 At least ten (10) days prior to the termination of the lien period submit to the Consultant in addition to the normal application for payment documents, accompanied by a Statutory Declaration, CCDC Document 9A, the record documents listed in Division 01, Section 01 78 39 "Project Record Documents". Failure to submit complete and acceptable record documents shall be considered cause for rejecting the application for payment as being premature. If in order, the Consultant shall issue a certificate for the release of holdback monies.
- .8 Final Inspection for Completion of the Contract:
- .1 When the Work is completed, and after making an inspection, Contractor shall make a written request for a final review by the Consultant, who will notify the Owner. Contractor shall arrange suitable dates for review by the Owner, Consultant and the Subcontractors.
- .2 Consultant shall record deficiencies determined by this review with copies to the Owner, and the Contractor.
- .3 Contractor and Subcontractors shall correct deficiencies by a date mutually agreed with the Consultant, unless a specific date is required by the Subcontract.
- .4 Declaration of Substantial Performance: When Consultant considers deficiencies and defects corrected and requirements of Contract substantially performed,

make application for Certificate of Substantial Performance.

- .5 Commencement of Lien and Warranty Periods: Date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

- .9 Contractor's application for statement of completion of the Contract: Submit a statement from the Workplace Safety and Insurance Board verifying that fees are paid up to date of application for statement of completion of the Contract.

- .10 Final Payment:

- .1 When Consultant considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
- .2 Refer to CCDC 2: when Work deemed incomplete by Consultant, complete outstanding items and request re-inspection.

Part 2 Products

2.1 NOT USED

- .1 Not used

Part 3 Execution

3.1 FINAL CLEANING

- .1 Clean-Up:
 - .1 Remove from the Place of the Work all construction tools, unused materials not required to be handed over to the Owner, and debris.
 - .2 Dispose of debris in authorized disposal areas of the municipality or as arranged privately by the Contractor to the approval of local authorities having jurisdiction.
 - .3 Pay costs of loading, cartage and unloading.
- .2 In addition to cleaning specified in specification sections, thoroughly clean and where applicable, polish areas and surfaces of the completed work immediately prior to Contractor's inspection for Substantial Performance of the Work of each subcontract.
- .3 Use soaps, detergents, other special cleaning agents, polishes, equipment and methods recommended in writing by the manufacturer of the product to be cleaned and polished. Provide the Owner with instructions and names of products to be used for cleaning surfaces.
- .4 Remove dust and soil from surfaces by vacuuming, damp mopping, washing or scrubbing, as required.
- .5 Clean and polish glass and polished metal surfaces.
- .6 Clean mechanical and electrical equipment and accessories.
- .7 Remove temporary labels, protective coatings, temporary markings and tags, and

thoroughly clean surfaces of adhesive.

- .8 Avoid contamination of surrounding surfaces with cleaning fluids. Install temporary protection, if required, and remove same immediately upon completion of the cleaning operation involved.
- .9 Use heavy duty type industrial machine for vacuum cleaning.
- .10 Exercise extreme care with abrasive and chemical cleaning agents and verify their compatibility with the finish and material to be cleaned.
- .11 Seal, wax and polish surfaces that are specified as such.
- .12 Repair and touch up damaged surfaces, to finish specified to the acceptance of the Consultant. Replace any surfaces not acceptable to the Consultant.
- .13 Replace HVAC filters if units were operating during construction.
- .14 Vacuum all convector and similar perimeter HVAC enclosures.

3.2 WARRANTY INSPECTION

- .1 Approximately fifteen (15) days prior to the expiration of the one (1) year warranty period of the Contract, the Contractor, Owner and Consultant shall jointly inspect the site and the work of the Contract and identify defects and deficiencies which may be observed at that time and not previously reported and defects and deficiencies previously reported and not corrected.
- .2 Ensure that all Work requiring repair or replacement is carried out by the Subcontractor concerned.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Document.
- .2 This section includes but is not limited to administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - .1 Emergency manuals.
 - .2 Product and finishes maintenance manuals.
 - .3 Systems, subsystems, and equipment operation manuals.
 - .4 Systems and equipment maintenance manuals.

1.2 REFERENCES

- .1 Definitions:
 - .1 System: An organized collection of parts, equipment, or subsystems united by regular interaction.
 - .2 Subsystem: A portion of a system with characteristics similar to a system.

1.3 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

- .1 Prior to occupancy by the Owner submit to the Consultant for review one (1) draft copy of operating and maintenance manuals. Upon final acceptance by the Consultant submit three (3) copies to the Owner for record purposes.
- .2 Operation and maintenance manuals shall consist of the following manual(s):
 - .1 Emergency manual(s).
 - .2 Product and finishes maintenance manual(s).
 - .3 Systems, subsystems, and equipment operation manuals.
 - .4 Systems and equipment maintenance manuals.
- .3 Organization:
 - .1 Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following three (3) parts, in the order listed:
 - .1 Title page.
 - .2 Table of contents.
 - .3 Manual contents.
 - .2 Titlepage; include the following information:
 - .1 Subject matter included in manual.

- .2 Name and address of Project.
 - .3 Name and address of Owner.
 - .4 Date of submittal.
 - .5 Name and contact information for Contractor.
 - .6 Name and contact information for Architect.
 - .7 Name and contact information for Commissioning Authority.
 - .8 Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - .9 Cross-reference to related systems in other operation and maintenance manual
- .3 Project Directory: Directory listing names, addresses, email addresses, telephone and fax numbers of Contractor, Subcontractors, Consultants, Commissioning Authority and major equipment suppliers, including local source of supplies and replacement parts for the systems, materials, items contained in the manuals.
- .4 Table of Contents: List each operation and maintenance manual cross-referenced to volume of the set.
- .1 If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- .5 Manual Contents:
- .1 Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - .2 Arrange contents by specification section number and then alphabetically by product. If possible, assemble instructions into a single binder.
 - .3 When multiple binders are used, correlate data into related consistent groupings. Identify each binder with typed or printed title, ie: "PRODUCT MAINTENANCE MANUAL"; identify title of Project; identify contents of binder. Provide tabbed dividers for each arranged by specification Section number, with typed description of Product and major component parts of equipment.
 - .4 Text to be typewritten. Handwritten information is not acceptable.
 - .5 Prepare data in the form of instructional manuals.
 - .6 Instructions in each manual shall be in simple language so as to guide the Owner in the proper maintenance of manual contents.
 - .7 Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - .8 Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a

tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

- .1 Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 - .9 Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - .1 Do not use original project record documents as part of operation and maintenance manuals.
 - .2 Comply with requirements of newly prepared record Drawings in Section "Project Record Documents."
 - .10 Comply with Division 01, Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.
- .4 Manuals, Paper Copy:
- .1 Submit three (3) hard copies of final manuals as bound and labelled volumes.
 - .2 Binders: Commercial quality, heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, 50 mm maximum ring size, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - .1 If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - .2 Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 - .3 Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - .4 Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 - .5 Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 - .6 Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - .1 If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - .2 If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At

appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

- .5 Electronic File Format:
 - .1 Assemble each final manual into a composite electronically indexed file in PDF format. Submit two (2) USB drives.
 - .2 Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - .3 Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - .4 File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
 - .5 Submit on or via digital media acceptable to Consultant.
- .6 Initial Manual Submittal:
 - .1 Submit electronic draft copy of each manual at least thirty (30) Working Days before commencing demonstration and training. Consultant and Commissioning Authority shall comment on whether general scope and content of manual are acceptable.
 - .2 Enable inserted reviewer comments on draft submittals.
 - .3 Consultant and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
 - .4 Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- .7 Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Performance of the Work and at least fifteen (15) Working Days before commencing demonstration and training. Consultant and Commissioning Authority shall return copy with comments.
 - .1 Correct or revise each manual to comply with Consultant's and Commissioning Authority's comments. Submit copies of each corrected manual within fifteen (15) Working Days of receipt of Consultant's and Commissioning Authority's comments and prior to commencing demonstration and training.
 - .2 The contract shall not be considered complete until all closeout submittals are received, reviewed and accepted by Consultant.

1.4 EMERGENCY MANUAL

- .1 Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

- .2 Manual Content: Organize manual into a separate section for each of the following.
 - .1 Type of emergency.
 - .2 Emergency instructions.
 - .3 Emergency procedures.
- .3 Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - .1 Fire.
 - .2 Flood.
 - .3 Gas leak.
 - .4 Water leak.
 - .5 Power failure.
 - .6 Water outage.
 - .7 System, subsystem, or equipment failure.
 - .8 Chemical release or spill.
- .4 Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- .5 Emergency Procedures: Include the following, as applicable.
 - .1 Instructions on stopping.
 - .2 Shutdown instructions for each type of emergency.
 - .3 Operating instructions for conditions outside normal operating limits.
 - .4 Required sequences for electric or electronic systems.
 - .5 Special operating instructions and procedures.
- .6 Cross-reference to related systems in other operation and maintenance manuals.
- .7 Refer to Divisions 21, 22, and 23 as applicable and Divisions 25, 26, 27, 28 to 49 as applicable for additional requirements.

1.5 PRODUCTS AND FINISHES MAINTENANCE MANUAL

- .1 Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- .2 Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, email address, telephone and fax numbers of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- .3 Product Information: Include the following, as applicable.

- .1 Product name and model number.
- .2 Manufacturer's name address and phone number.
- .3 Colour, pattern, and texture.
- .4 Material and chemical composition.
- .5 Reordering information for specially manufactured products.
- .6 Schedule of finish materials and commodities:
 - .1 Masonry materials, including decorative block, brick, and stone.
 - .2 Finishes for exposed woodwork.
 - .3 Metal fabrications.
 - .4 Plastic laminate.
 - .5 Finish door and cabinet hardware.
 - .6 Glass and glazing.
 - .7 Flooring materials including, stone and ceramic tile, terrazzo, wood flooring, resilient flooring and base, and carpeting.
 - .8 Acoustical ceilings.
 - .9 Acoustical wall treatments.
 - .10 Coatings, paint, and wall coverings.
 - .11 Toilet and janitorial accessories.
 - .12 Roofing.
 - .13 Siding.
 - .14 Waterproofing.
- .7 Schedule of specialties and equipment:
 - .1 Signage and visual display surfaces
 - .2 Toilet compartments.
 - .3 Fire extinguishers and cabinets.
 - .4 Lockers.
 - .5 Fixed auditorium seating.
 - .6 Window treatments including blinds, shades and draperies.
 - .7 Furniture.
 - .8 Landscaping paving and planting.
- .4 Project certificates.
- .5 Shop drawings: Include final corrected shop drawings for materials, commodities, specialties, and equipment.
- .6 As-builts.
- .7 Testing and inspection reports.

- .8 Maintenance and Use Procedures:
 - .1 Include manufacturer's written recommendations and the following:
 - .1 Inspection procedures.
 - .2 Moisture protection and weather exposure protection.
 - .3 Types of cleaning agents to be used and methods of cleaning.
 - .4 List of cleaning agents and methods of cleaning detrimental to product.
 - .5 Recommended schedule for routine cleaning and maintenance.
 - .6 Repair instructions.
- .9 Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- .10 Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - .1 Include procedures to follow and required notifications for warranty claims.

1.6 SYSTEMS, SUBSYSTEMS, AND EQUIPMENT OPERATION MANUALS

- .1 Content: Provide a manual that assembles a complete set of operation data indicating operation of each system, subsystem, and piece of equipment not part of a system. In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - .1 System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - .2 Performance and design criteria if Contractor [Construction Manager] has delegated design responsibility.
 - .3 Operating standards.
 - .4 Operating procedures.
 - .5 Operating logs.
 - .6 Wiring diagrams.
 - .7 Control diagrams and devices.
 - .8 Piped system diagrams including water, sanitary drainage, gas, steam distribution, hot and cold water systems including risers, valves, and the like.
 - .9 Precautions against improper use.
 - .10 License requirements including inspection and renewal dates.
 - .11 Project reports, certificates, and final corrected shop drawings.
 - .12 As-built drawings of mechanical and electrical installations.
 - .13 Air and water balance reports.
 - .14 Include copies of Ministry of Labour certificates.
 - .15 Include copies of inspection certificates as applicable for Electrical Inspection and Plumbing Inspection.

- .2 Descriptions: Include the following:
 - .1 Product name and model number. Use designations for products indicated on Contract Documents and manufacturer's name.
 - .2 Product data for each piece of equipment and system. Mark each sheet to clearly identify specific Product and component parts, and data applicable to installation. Delete inapplicable information. Supplement Product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project record documents as maintenance drawings.
 - .3 Manufacturer's literature, parts list for each component.
 - .4 Equipment identification with serial number of each component.
 - .5 Equipment function.
 - .6 Operating characteristics.
 - .7 Limiting conditions.
 - .8 Performance curves.
 - .9 Engineering data and tests.
 - .10 Complete nomenclature and number of replacement parts.
- .3 Operating Procedures: Include the following, as applicable:
 - .1 Startup procedures.
 - .2 Equipment or system break-in procedures.
 - .3 Routine and normal operating instructions.
 - .4 Regulation and control procedures.
 - .5 Instructions on stopping.
 - .6 Normal shutdown instructions.
 - .7 Seasonal and weekend operating instructions.
 - .8 Special operating instructions and procedures.
- .4 Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- .5 As-Built:
 - .1 As-built drawings of mechanical and electrical installations including but not limited to:
 - .1 Piped Systems: Diagram piping as installed and identify colour-coding where required for identification. Includes water, sanitary drainage, gas, steam distribution, hot and cold water systems including risers, and the like.
 - .2 Wiring diagrams.
 - .3 Control diagrams.
 - .4 Valve charts.
- .6 Shop Drawings: Fold shop drawings larger than 8-1/2" x 11" and place in manila

envelopes, three (3)-hole punched for inclusion in appropriate sections of the binders.

- .7 Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
- .8 Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- .9 Cross-reference to related systems in other operation and maintenance manuals.
- .10 Refer to Divisions 21, 22, and 23 as applicable and Divisions 25, 26, 27, 28 to 49 as applicable for additional requirements.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- .1 Content: Provide a manual that assembles a complete set of maintenance data indicating operation of each system, subsystem, and piece of equipment not part of a system. include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- .2 Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- .3 Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - .1 Manufacturer's literature, parts list for each component, and name and address of closest service organization and spare parts source, for each item of equipment.
 - .2 Standard maintenance instructions and bulletins.
 - .3 Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - .4 Identification and nomenclature of parts and components.
 - .5 List of items recommended to be stocked as spare parts.
- .4 Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - .1 Cleaning and lubrication schedules, filter replacement schedules, overhaul and adjustment
 - .2 schedules, and similar schedules.
 - .3 Test and inspection instructions.
 - .4 Troubleshooting guide.
 - .5 Precautions against improper maintenance.

- .6 Disassembly; component removal, repair, and replacement; and reassembly instructions.
- .7 Aligning, adjusting, and checking instructions.
- .8 Demonstration and training video recording, if available.
- .9 Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- .10 Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
- .11 Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- .5 Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- .6 Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- .7 Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - .1 Include procedures to follow and required notifications for warranty claims.
- .8 Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
- .9 Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's maintenance personnel.
- .10 Refer to Divisions 21, 22, and 23 as applicable and Divisions 25, 26, 27, 28 to 49 as applicable for additional requirements.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This section includes administrative and procedural requirements for Project as-built documents but not limited to:
 - .1 Items provided to the Contractor and Subcontractor by the Consultant.
 - .1 Subject to completion of the "BIM and Electronic Data Transfer Agreement", the Consultant shall provide electronic data to the Contractor for use in preparation of submittals and as-built documents. Sample of "BIM and Electronic Data Transfer Agreement" is included appended to this Section.
 - .2 Items submitted to the Consultant for review prior to distribution to the Owner as specified herein:
 - .1 Marked-up copies of Contract Drawings.
 - .2 Newly prepared drawings.
 - .3 Marked-up copies of specifications, addenda Supplemental Instructions, Change Directives, and Change Orders.
 - .4 Record information on work that is recorded only schematically, when part of as-built documents.
 - .5 Complete set of RFI's and the responses.
 - .3 Items submitted to the Consultant for review prior to distribution to the Owner as specified in Division 01, Section 01 78 23 "Operation and Maintenance Data".
 - .1 Marked-up copies of Shop Drawings.
 - .2 Marked-up Product data submittals.
 - .3 Warranties.
 - .4 Items delivered directly to Owner by the Subcontractor or Contractor:
 - .1 Complete Site Log including but not limited to a complete record of all site transactions, deliveries, meetings, inspections, field reviews, visitors, schedules, issues, and site documentation.
 - .2 One set of permit drawings and specifications approved by the building department.
 - .3 Orders.
 - .4 As-built samples.
 - .5 Field records for variable and concealed conditions.
 - .6 Project photographs.
 - .7 Copies of Change Orders, submittals, substitutions, warranties and other forms that are part of this Project.
 - .8 Refer to individual specification sections for specific requirements that

expand requirements of this Section.

1.2 CLOSEOUT SUBMITTALS

- .1 As-Built Drawings:
 - .1 Initial submittal: Submit one (1) set of PDF electronic files of scanned and colour annotated record drawings to the Consultant for review and acceptance, including but not limited to architectural, interior design, mechanical, electrical and communications as-built drawings. Include all documents, whether changes were made or not.
 - .2 Final submittal: Submit three (3) sets of colour annotated prints, and one (1) PDF electronic files of scanned and colour annotated as-built drawings to the Owner. Include all documents, whether changes were made or not.
- .2 As-Built Specifications
 - .1 Submit colour annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- .3 As-Built Product data:
 - .1 Submit annotated PDF electronic files and directories of each submittal.
 - .2 When Product data is required as part of the Operation and Maintenance Manuals, submit marked-up Product data as an insert in the manual instead of submittal as as-built Product data.
- .4 Miscellaneous As-Built Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of submittals including, but not limited to, the following:
 - .1 As-built information on Work that is recorded only schematically, when part of as-built documents.
 - .2 Complete set of RFI's.
 - .3 Orders delivered directly to the Owner.
 - .4 As-built samples delivered to the Owner.
 - .5 Field as-builts for variable and concealed conditions delivered to the Owner.
 - .6 Project photographs delivered to the Owner.
 - .7 Copies of change orders, submittal substitutions, warranties and other forms delivered to the Owner.
 - .8 Materials log delivered to the Owner.
- .5 Reports: Submit written weekly reports indicating items incorporated into project as-built documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

Part 2 Products

2.1 ELECTRONIC DATA

- .1 Electronic Data: Electronic digital data files of the Contract Drawings and Specifications shall not be provided by Consultant for Contractor's use in preparing project as-built documents without a properly executed "BIM and Electronic Data Transfer Agreement" included at the end of this Section.

2.2 AS-BUILT DRAWINGS

- .1 As-Built Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - .1 Preparation: While Work is in progress, accurately and neatly record deviations caused by conditions at the Place of the Work and changes ordered by the Owner through the Consultant. Mark as-built prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained as-built data, whether individual or entity is installer, Subcontractor, or similar entity, to prepare the marked-up as-built prints.
 - .1 Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - .2 Accurately record information in an acceptable drawing technique.
 - .3 Record data as soon as possible after obtaining it.
 - .4 Record and check the mark-up before enclosing concealed installations.
 - .5 Cross reference as-built prints to corresponding archive photographic documentation.
 - .2 Content:
 - .1 Types of items requiring marking include, but are not limited to, the following:
 - .1 Dimensional changes to the Drawings.
 - .2 Revisions to details on the Drawings.
 - .3 Depths of foundations below first floor.
 - .4 Locations and depths of underground utilities.
 - .5 Revisions to routing of piping and conduits.
 - .6 Revisions to electrical circuitry.
 - .7 Actual equipment locations.
 - .8 Duct size and routing.
 - .9 Locations of concealed internal utilities.
 - .10 Changes made by Supplemental Instruction, Change Order or Change Directive.
 - .11 Changes made following Consultant's written orders.
 - .12 Details not on the original Contract Drawings.
 - .13 Field records for variable and concealed conditions.
 - .14 Record information on the work that is shown only schematically.
 - .3 Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings

are marked, show cross-reference on the Contract Drawings. Use personnel proficient at recording graphic information in production of marked-up as-built prints.

- .4 Erase, redraw, and add details and notations where applicable.
 - .5 Mark as-built sets with erasable, red-coloured pencil. Use other colours to distinguish between changes for different categories of the Work at the same location.
 - .6 Mark important additional information that was either shown schematically or omitted from original drawings.
 - .7 Note Supplemental Instruction numbers, Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 - .8 Immediately before inspection for Substantial Performance of the Work, review marked-up as-built prints with Consultant.
 - .9 As-built drawings shall not be revised to incorporate Shop Drawing variations unless changes to the original design intent or quality are processed via Supplemental Instructions, Change Directives, or Change Orders.
- .2 As-Built Digital Data Files: Immediately before inspection for Certificate of Substantial Performance of the Work, review marked-up as-built prints with Consultant. Prepare a full set of as-built prints as PDF electronic file.

2.3 AS-BUILT SPECIFICATIONS

- .1 Preparation: Mark specifications to indicate the actual product installation where installation varies from that indicated in specifications, addenda, and contract modifications.
- .1 Mark specifications to indicate the actual Product installation where installation varies from that indicated in specifications, addenda, and Contract modifications.
 - .2 Give particular attention to information on concealed Products and installations that cannot be readily identified and recorded later.
 - .3 Mark copy with proprietary name and model number of products and equipment furnished, including substitutions and Product options selected.
 - .4 Record the name of the Subcontractor including the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
 - .5 For each principal Product, indicate whether as-built Product data has been submitted in Operation and Maintenance Manuals instead of submitted as as-built Product data.
 - .6 Note related Change Orders, as-built drawings (and Product data) where applicable.
- .2 Format: Submit as-built specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.4 AS-BUILT PRODUCT DATA

- .1 Preparation: Mark Product data to indicate the actual Product installation where

installation varies substantially from that indicated in as-built Product data submittal.

- .1 Give particular attention to information on concealed Products and installations that cannot be readily identified and recorded later.
- .2 Include significant changes in the Product delivered to the Place of the Work and changes in manufacturer's written instructions for installation.
- .3 Note related Change Orders, as-built specifications, as-built Drawings, (and Product data) where applicable.
- .4 Format: Submit as-built Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.
- .5 Include miscellaneous as-built submittals directory organized by Specification Section number and title.

2.5 MISCELLANEOUS AS-BUILT SUBMITTALS

- .1 Assemble miscellaneous as-built required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous as-builts and identify each, ready for continued use and reference.
- .2 Format: Submit miscellaneous as-built submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous as-built submittals.
 - .1 Include miscellaneous as-built submittals directory organized by Specification Section number and title.

Part 3 Execution

3.1 RECORDING AND MAINTENANCE

- .1 Recording: Maintain one (1) copy of each submittal during the construction period for Project as-built document purposes. Post changes and modifications to Project as-built documents as they occur; do not wait until the end of the Project.
 - .1 Owner and Consultant shall periodically review as-built documents to assure compliance with this requirement.
 - .2 Maintenance of as-built documents and samples: Store as-built documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project as-built documents for construction purposes. Maintain as-built documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project documents for Consultant's reference during normal working hours.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes:
 - .1 Demonstration of operation of systems, subsystems, and equipment.
 - .2 Training in operation and maintenance of systems, subsystems, and equipment.
 - .3 Demonstration and training video recordings.

1.2 SUBMITTALS

- .1 Submit submittals in accordance with Division 01, Section 01 33 00 "Submittal Procedures".
- .2 Instruction program:
 - .1 Submit outline of instructional program for demonstration and training shall include but not limited to; a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - .2 Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- .3 Qualification data: Submit qualification data for facilitator, instructor(s) and videographer(s) in accordance with Division 01, Section 01 40 00 "Quality Requirements".
- .4 Attendance Record(s): Include list of participants and length of instruction time.
- .5 Training Module Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.
- .6 Video Recordings:
 - .1 Submit three (3) copies within seven (7) Working Days of the end of each training module.
 - .2 Identification: On each copy, provide an applied label with the following information:
 - .1 Name of Project.
 - .2 Name and address of videographer.
 - .3 Name of Consultant.
 - .4 Name of Contractor.
 - .5 Name of Subcontractor.
 - .6 Date of video recording.

- .3 Transcript(s): Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
- .4 At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

1.3 QUALITY ASSURANCE

- .1 Facilitator qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- .2 Instructor Qualifications: A factory-authorized service representative, complying with requirements of Division 01, Section 01 40 00 "Quality Requirements", experienced in operation and maintenance procedures and training.
 - .1 Pre-instruction Conference: Conduct conference at Project site to comply with requirements of Division 01, Section 01 31 19 Project Meetings". Review methods and procedures related to demonstration and training including, but not limited to the following:
 - .1 Inspect and discuss locations and other facilities required for instruction.
 - .2 Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - .3 Review required content of instruction.
 - .4 For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.4 COORDINATION

- .1 Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- .2 Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- .3 Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the Consultant.

Part 2 Products

2.1 DEMONSTRATION AND TRAINING INSTRUCTION PROGRAM

- .1 Instruction program structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections including, but not limited to, the following:

- .1 Manual operated fabric roller shades (window treatment).
 - .2 Fire-protection systems, including fire alarm and annunciation, fire pumps, and fire-extinguishing systems.
 - .3 Intrusion detection systems.
 - .4 Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping, and water distribution piping.
 - .5 HVAC systems, including air-handling equipment, air distribution systems, and terminal equipment and devices.
 - .6 HVAC instrumentation and controls.
 - .7 Electrical service and distribution, including transformers, switchboards panelboards, uninterruptible power supplies, and motor controls.
 - .8 Lighting equipment and controls.
 - .9 Communication systems, including intercommunication, surveillance, clocks and programming voice and data and television equipment.
- .2 Training modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
- .1 Basis of system design, operational requirements, and criteria shall include the following:
 - .1 System, subsystem, and equipment descriptions.
 - .2 Performance and design criteria for delegated design responsibility.
 - .3 Operating standards.
 - .4 Regulatory requirements.
 - .5 Equipment function.
 - .6 Operating characteristics.
 - .7 Limiting conditions.
 - .8 Performance curves.
 - .2 Documentation:
 - .1 Review the following items in detail:
 - .1 Emergency manuals.
 - .2 Operations manuals.
 - .3 Maintenance manuals.
 - .4 Project record documents.
 - .5 Identification systems.
 - .6 Warranties and bonds.
 - .7 Maintenance service agreements and similar continuing commitments.
 - .3 Emergencies:

- .1 Include the following, as applicable:
 - .1 Instructions on meaning of warnings, trouble indications, and error messages.
 - .2 Instructions on stopping.
 - .3 Shutdown instructions for each type of emergency.
 - .4 Operating instructions for conditions outside of normal operating limits.
 - .5 Sequences for electric or electronic systems.
 - .6 Special operating instructions and procedures.
- .4 Operations:
 - .1 Include the following, as applicable:
 - .1 Startup procedures.
 - .2 Equipment or system break-in procedures.
 - .3 Routine and normal operating instructions.
 - .4 Regulation and control procedures.
 - .5 Control sequences.
 - .6 Safety procedures.
 - .7 Instructions on stopping.
 - .8 Normal shutdown instructions.
 - .9 Operating procedures for emergencies.
 - .10 Operating procedures for system, subsystem, or equipment failure.
 - .11 Seasonal and weekend operating instructions.
 - .12 Required sequences for electric or electronic systems.
 - .13 Special operating instructions and procedures.
- .5 Adjustments:
 - .1 Include the following:
 - .1 Alignments.
 - .2 Checking adjustments.
 - .3 Noise and vibration adjustments.
 - .4 Economy and efficiency adjustments.
- .6 Troubleshooting:
 - .1 Include the following:
 - .1 Diagnostic instructions.
 - .2 Test and inspection procedures.
- .7 Maintenance:
 - .1 Include the following:

- .1 Inspection procedures.
- .2 Types of cleaning agents to be used and methods of cleaning.
- .3 List of cleaning agents and methods of cleaning detrimental to product.
- .4 Procedures for routine cleaning.
- .5 Procedures for preventive maintenance.
- .6 Procedures for routine maintenance.
- .7 Instruction on use of special tools.
- .8 Repairs:
 - .1 Include the following:
 - .1 Diagnosis instructions.
 - .2 Repair instructions.
 - .3 Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - .4 Instructions for identifying parts and components.
 - .5 Review of spare parts needed for operation and maintenance.

Part 3 Execution

3.1 PREPARATION

- .1 Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01, Section 01 78 23 "Operation and Maintenance Data".
- .2 Set up instructional equipment at instruction location.

3.2 DEMONSTRATION AND TRAINING

- .1 Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
 - .1 Contractor shall furnish instructor(s) to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - .2 Owner shall furnish Contractor with names and positions of participants.
- .2 Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- .3 Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - .1 Schedule training with Owner, through the Consultant, with at least seven (7) working days' advance notice.

- .4 Training location and reference material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- .5 Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a written or demonstration performance-based test.
- .6 Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- .1 General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - .1 At beginning of each training module, record each chart containing learning objective and lesson outline.
- .2 Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
 - .1 Electronic media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
 - .2 File hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
 - .3 File names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
 - .4 Subcontractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Subcontractor involved on the Project, arranged according to Project table of contents:
 - .1 Name of Subcontractor/installer/applicator.
 - .2 Business address.
 - .3 Business phone number.
 - .4 Contact person's full name.
 - .5 E-mail address.
- .3 Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - .1 Film training session(s) in segments not to exceed 15 minutes.
 - .1 Produce segments to present a single significant piece of equipment per segment.
 - .2 Organize segments with multiple pieces of equipment to follow order of Project Specifications table of contents.

- .3 Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

- .4 Light levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - .1 Furnish additional portable lighting as required.

- .5 Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded, or dubbing audio narration off-site after the video recording is recorded depending which narration method provides the best clarity in the opinion of the Consultant. Include description of items being viewed.

- .6 Transcripts: Provide transcripts of video recording narrations. Display images and running time captured from videotape opposite the corresponding narration segment.

- .7 Pre-produced video recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This Section includes but is not limited to:
 - .1 General requirements for coordinating and scheduling integrated fire and safety system testing activities in accordance with CAN/ULC-S1001.
 - .2 Integrated Testing Plan.
 - .3 Integrated System Testing.
 - .4 Integrated Testing Report.
 - .5 Demonstration and training.

1.2 REFERENCES

- .1 Definitions:
 - .1 Fire Protection System: A system designed to detect and/or react to a fire condition and aid in the warning, protection, or evacuation of building occupants, suppress or control the spread of fire and its by-products.
 - .2 Integrated Testing Coordinator: The person, firm, corporation, or organization engaged by Owner, shall be responsible for the development and implementation of the integrated testing plan. Where a firm, corporation or organization is responsible for integrated fire protection and life safety systems testing, a representative of that firm, corporation, or organization shall be designated as the Integrated Testing Coordinator.
 - .3 Integrated Testing Plan: A written specific document, prepared by the integrated testing coordinator, outlining the required tests and necessary functional results to conduct integrated fire protection and life safety systems testing.
 - .4 Integrated Testing Report: A written project specific document, prepared by the integrated testing coordinator, documenting the implementation of the integrated testing plan.
 - .5 Integrated System Testing: A methodology for verifying and documenting that all interconnections between systems provided for fire protection and life safety are installed and operating in conformance with their design criteria.
 - .6 Life Safety System: A system designed to enhance or facilitate the safety of building occupants during an emergency condition.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Conduct a preinstallation meeting in accordance with Section 01 31 19 "Project Meetings" and as follows:
 - .1 Attendees at preinstallation meeting shall include but not limited to the Contractor and Subcontractors whose equipment or systems are part of the integrated fire protection and life safety systems test.
 - .2 Review requirements of AHJ, as well as requirements of, and roles and responsibilities for, each participant in the development of the Integrated Testing

Plan and the execution of the integrated fire protection and life safety systems test.

- .2 The testing requirements under Section 01 91 26 "Integrated Fire Protection and Life Safety System Testing" may be incorporated into the commissioning program specified under Section 01 91 00 "General Commissioning", subject to approval of the Consultant.

1.4 ACTION SUBMITTALS

- .1 Integrated Test Plan:
 - .1 Submit the Integrated Test Plan for review by the Consultant at least thirty (30) days prior to commencement of the first Integrated Systems Test. The Integrated Testing Plan shall comply with the requirements of CAN/ULC-S1001 and as specified herein.
- .2 Integrated Testing Report:
 - .1 A final Integrated Testing Report is completed by the Integrated Testing Coordinator and shall consist of the following:
 - .1 Integrated Testing Plan.
 - .2 Documentation collected during integrated testing implementation phase.
 - .3 Integrated testing forms for initial test
 - .4 Integrated testing forms for re-tests
 - .5 Schedules for life cycle and maintenance testing.
 - .2 Integrated Testing Report shall be intended for use throughout the building's life cycle.

1.5 QUALITY ASSURANCE

- .1 Integrated Testing Coordinator Qualifications:
 - .1 Integrated Testing Coordinator shall be a firm or individual certified under the CAN/ULC-S1001 Certification of Integrated Testing Service Providers program.
 - .2 The UL Certificate shall be valid from the date of project award until completion of Integrated Testing Report.
 - .3 Companies that perform verification of the fire alarm systems in accordance with CAN/ULC-S537 shall not be permitted to conduct Integrated Systems Testing on the same building in accordance with CAN/ULC-S1001 under the ULC listing program.

Part 2 Products

2.1 INTEGRATED FIRE PROTECTION AND LIFE SAFETY SYSTEMS

- .1 The systems applicable include but not limited to:
 - .1 Fire alarm system (including sequence of operations)
 - .2 Fire pumps
 - .3 Fixed fire suppression systems

- .4 Cooking equipment fire suppression systems
- .5 Sprinkler systems
- .6 Standpipe systems
- .7 Water supplies
- .8 Water supply control valves
- .9 Freeze protection systems
- .10 Smoke control pressurization systems
- .11 Smoke control smoke exhaust systems
- .12 Smoke alarms
- .13 Hazardous protection monitoring
- .14 Elevators
- .15 Emergency elevators
- .16 Emergency generators
- .17 Audio/visual
- .18 Lighting controls
- .19 Mass notification system
- .20 Hold-open devices
- .21 Electromagnetic locking devices
- .22 Dust collection systems
- .23 Spark arrest systems

2.2 RESPONSIBILITIES

- .1 Contractor:
 - .1 Coordinate with Integrated Testing Coordinator for schedule and witness testing.
 - .2 Participate in the test protocol and procedures as required by the Integrated Testing Plan.
 - .3 Allow for any cost associated to re-testing due to failures or insufficient work.
 - .4 Allow for any cost associated with phased occupancy and phased Integrated System Testing work.
- .2 Subcontractor:
 - .1 The Subcontractor shall confirm their respective systems are complete and fully operational, prior to the Integrated Testing Coordinator commencing the functional testing.
 - .2 Provide system reports such as, but not limited to; Air balancing reports, NFPA 13 letter, NFPA 20, letter, above ground sprinkler piping letter, below ground sprinkler letter, system designer letter, fire alarm verification, TSSA inspection certificate, ESA inspection certificate, generator start-up report, start-up reports, commissioning report and verification reports.
 - .3 The Subcontractor shall further provide written letter confirming systems are

- installed and operating as intended by the contract documents and sequence of operations.
- .4 Participate in the test protocol and procedures as required by the Integrated Testing Plan.
- .5 Allow for any cost associated to re-testing due to failures or insufficient work.
- .6 Allow for any cost associated with phased occupancy and phased Integrated System Testing work.
- .3 Design Professionals:
 - .1 Shall review the Integrated Testing Plan for implementation.
 - .2 Shall provide design criteria of fire protection and life safety systems to Integrated Testing Coordinator.
 - .3 The design professionals are responsible for design. Upon an unsuccessful test, the failure shall be documented and provided to the respective design professionals for review and action.
 - .4 Participate in the test protocol and procedures as required by the Integrated Testing Plan.

Part 3 Execution

3.1 PLANNING

- .1 Design criteria for the integration of various systems is the responsibility of the design professional(s). The design professional(s) shall document the integration performance of each system for which they hold design responsibility.
- .2 The design professional(s) shall provide documentation detailing each interconnection between the fire protection and life safety systems to the integrated testing coordinator. This documentation shall be sufficient for Integrated Testing Coordinator to prepare the Integrated Testing Plan.
- .3 Integrated Testing Coordinator shall prepare and develop Integrated Testing Plan including but not limited to:
 - .1 Project description.
 - .2 Project contacts.
 - .3 Overview and description of each integrated system
 - .4 System integrations & functional objective of each integrated system
 - .5 Sequence of operations.
 - .6 Integration matrix of all integrated system complete with integration type, normal mode and off-normal mode.
 - .7 Test protocols and procedures of each integrated system.
 - .8 Occupant notifications procedures.
 - .9 Personnel safety.
 - .10 Pre-testing documentation checklist.
 - .11 Testing forms.

- .12 Ongoing Integrated System Testing forms.
- .13 Integrated System Testing completion form.
- .14 Integrated testing notes.
- .4 Final copy of Integrated Testing Plan shall be provided digitally in PDF format to Contractor, Owner, Subcontractors, design professionals and the AHJ. One copy to be maintained at the Place of the Work.

3.2 IMPLEMENTATION

- .1 Integrated Testing Plan, including sequence of operation, shall be reviewed and approved by design professional(s), subject to review by AHJ.
- .2 Subcontractors shall confirm with Integrated Testing Coordinator that the fire protection and life safety systems are complete and fully operational in accordance with design criteria. Provide system reports for applicable integrated systems.
- .3 Subcontractors shall provide ESA inspection certificate and confirm approval of electrical installations.
- .4 Subcontractors shall provide TSSA inspection report and confirm approval of installation(s).
- .5 Contractor and Subcontractors shall provide confirmation of implementation of occupant notification procedures, and alternate measures for ensuring occupant safety.

3.3 TESTING

- .1 Conduct Integrated Systems Testing in accordance with CAN/ULC-S1001 and the accepted Integrated Testing Plan.
 - .1 Provide reviewed Operation and Maintenance Manuals to the Consultant fourteen (14) days prior to scheduled function performance test.
- .2 Integrated Testing Coordinator shall coordinate with the Contractor, Owner, Subcontractors, design professionals and the AHJ to provide a schedule for the implementation of the Integrated Testing Plan.
- .3 Integrated Testing Coordinator shall provide notification to Integrated System Testing participants seven (7) days prior to the date and time for the implementing of the Integrated Testing Plan.
- .4 In the event of building occupants, Integrated Testing Coordinator shall provide at a minimum, fourth-eight (48) hour notice of the implementation of Integrated System Testing. Notification shall be provided via written notices posted at each entrance.
- .5 Implementation of Integrated System Testing shall follow all job site and personnel safety requirements set out in the Contract and Contractor's requirements.
- .6 The respective Subcontractors and manufactures shall be responsible to start-up and function test their respective systems, for observation and witnessing by Integrated Testing Coordinator. Integrated Testing Coordinator shall record the results and the respective Subcontractor and manufacture shall restore the system to a normal condition.

- .7 Upon successful testing the Subcontractor and manufacture shall initial the respective integrated testing from adjacent to their respective test.
- .8 Upon a failure of a test, Integrated Testing Coordinator shall document the failure and continue with the testing of other integrations. The respective Subcontractor and manufacturer shall document the failure, notify they design professional and correct the failure under the direction of the design professional.
 - .1 Integrated Testing Coordinator shall re-test the unsuccessful integration after the correction has been documented and verified.
- .9 Upon a failure of a device (such as a smoke detector), the contractor may immediately replace the device and Integrated Testing Coordinator may continue to test the integration. The device failure shall be documented, but shall not result in a failed Integrated System Testing.
- .10 Upon successful completion of the integrated fire protection and life safety systems tests, Integrated Testing Coordinator shall document as required in Section 7 of the CAN/ULC S1001.
- .11 Integrated Testing Report shall be provided digitally in PDF format to Contractor, Owner, Subcontractors, design professionals and the AHJ. One copy to be maintained at the Place of the Work.

3.4 DEMONSTRATION AND TRAINING

- .1 Conduct demonstration and training in accordance with Section 01 79 00.
 - .1 Demonstrate the operation of, and providing training on, the integration of fire protection and life safety systems.
 - .2 Demonstration and training to include:
 - .1 The function of the integration.
 - .2 The method of integration: hardwired, network communication, operating protocols.
 - .3 The type of information: data, commands, monitoring.
 - .4 Any temporary measures to be taken to retest in the future.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Demolition and removal of selected interior building elements, materials, finishes, equipment, fixtures and the like and removal of redundant service lines.
 - .2 Demolition and removal of selected site elements.
 - .3 Removal of redundant service lines.

1.2 RELATED REQUIREMENTS

- .1 Refer to Mechanical, and Electrical Contract Documents for demolition Work required.

1.3 DEFINITIONS

- .1 Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Remove and Salvage: Items indicated on Drawings for removal and salvage. Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- .3 Remove and Reinstall: Items indicated on Drawings for removal and reinstallation (e.g., fixtures, building elements, etc.). Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall them where indicated.
- .4 Existing to Remain: Leave existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged or removed and reinstalled.
- .5 Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-demolition Conference: Conduct conference at Place of the Work site in the same manner as preinstallation meetings.
 - .1 Inspect and discuss condition of construction to be selectively demolished.
 - .2 Review areas where existing construction is to remain and requires protection.
 - .3 Proposed dates for interruption of utility services. Indicate how long utility services will be interrupted.
 - .4 Coordination for shutoff, capping, and continuation of utility services.

1.5 ACTION SUBMITTALS

- .1 Submit submittals in accordance with requirements of Division 01, Section 01 33 00 "Submittal Procedures".
- .2 Inventory: Submit inventory list of items to be removed and salvaged, and items to be removed by Owner.
- .3 Pre-Demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.6 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for demolition company.
- .2 Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
- .3 Examination Reports: Submit examination report.
- .4 Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection. Indicate proposed locations and construction of barriers.

1.7 QUALITY ASSURANCE

- .1 Demolition Company Qualifications: Engage an experienced company that has successfully completed selective demolition Work similar to that indicated for this Project for a period of not less than 5 years.

Part 2 Products

2.1 MATERIALS

- .1 All materials requiring demolition shall become the Contractor's property and shall be removed and disposed of from the site, as the work progresses, unless indicated otherwise.

2.2 SALVAGE

- .1 Treasure, such as coins, bills, papers of value, and articles of antiquity, discovered during digging and cutting at the site shall remain property of the Owner, and shall be delivered immediately into the Owner's custody.

Part 3 Execution

3.1 EXAMINATION

- .1 Before proceeding with the demolition Work examine existing conditions at the Place of

the Work and make provision and allowances for these conditions in the execution of the demolition Work.

- .2 Verify that utilities have been disconnected and capped before starting selective demolition operations.
- .3 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict and submit a report to the Consultant.
- .5 Perform an 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 selective building demolition operations.
- .6 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.0 PREPARATION

- .1 Arrange for the disconnection, capping and for plugging of gas, water, sewer, electric, telephone and other services to the area to be demolished.

3.1 SELECTIVE DEMOLITION, GENERAL

- .1 Demolish and remove existing construction only to the extent required by new construction and as indicated.
- .2 Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - .1 Coordinate with the Owner to arrange to shut off indicated services/systems.
 - .2 Arrange to shut off utilities with utility companies.
 - .3 If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - .4 Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - .5 Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material to prevent entrance of moisture or other foreign matter after cutting.
 - .6 Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - .7 Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - .8 Equipment to Be Removed and Reinstalled: Disconnect and cap services and

- remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- .9 Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- .10 Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- .11 Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.
- .3 Salvage materials and products as indicated.
 - .1 Removed and Salvaged Items:
 - .1 Clean salvaged items.
 - .2 Pack or crate items after cleaning. Identify contents of containers.
 - .3 Store items in a secure area until delivery to Owner.
 - .4 Transport items to Owner's storage area.
 - .5 Protect items from damage during transport and storage.
 - .2 Removed and Reinstalled Items:
 - .1 Clean and repair items to functional condition adequate for intended reuse.
 - .2 Pack or crate items after cleaning and repairing. Identify contents of containers.
 - .3 Protect items from damage during transport and storage.
 - .4 Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- .4 Comply with CSA S350.
- .5 Demolished materials become the property of the Contractor, unless noted otherwise.
- .6 Where indicated in the Contract Documents that demolished items are the property of the Owner, but to be removed off site, the Contractor shall be responsible to load on Owner's or tenant's carrier. Coordinate with Owner.
- .7 Existing materials that remain the property of the Owner and that are to be reused in the Work shall be removed, protected, and stored by the Contractor until re-installation.
- .8 Demolished materials and debris must be removed on a continuous basis from the Place of the Work.
- .9 Where additional bracing or support is required to ensure the safety of adjoining work, it shall be installed and checked before continuing with demolition work at the affected location.
- .10 Provide all necessary and required means for both the removal and disposal of all rubbish, debris, demolished fixtures and fittings and all other items not scheduled to

- remain at the Place of the Work, resulting from the operations of this Work. Provide all necessary and required garbage bins and garbage chutes.
- .11 Provide garbage bins and garbage chutes for removal of demolition materials.
- .12 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.
- .13 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.
- .14 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
- .15 Torches:
- .1 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 portable fire-suppression devices during flame-cutting operations.
- .2 Maintain fire watch after flame-cutting operations.
- .3 Maintain adequate ventilation when using cutting torches.
- .16 Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- .17 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- .18 Where while units are being removed for replacement (e.g., masonry units, sills, lintels, wall panels, etc.), cut whole units from joint to joint in a manner to permit replacement of full size units, and carefully remove without damaging surrounding construction.
- .19 Remove residual mortar, adhesives, or other matter from material to remain, in preparation for tie-in of new work. (For example, where deficient brick has been removed, remove mortar around perimeter of area in preparation for new brick and mortar.
- .20 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .21 Dispose of demolished items and materials promptly. Comply with requirements in Division 01 "Construction Waste Management and Disposal."
- .22 Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- .23 Workmanship: Perform work as shown with due care. Be responsible for damage caused by the work to parts of the existing structure, finishes or items designated to remain and items designated for reuse. Patch, restore and construct new work in

accordance with Division 01 Section 01 70 00 Execution Requirements and applicable technical sections of the Specifications. Immediately restore utilities inadvertently removed or disconnected.

3.2 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- .1 Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- .2 Concrete: Deconstruct in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- .3 Masonry: Deconstruct in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- .4 Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.3 PROTECTION

- .1 Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - .1 Construct temporary insulated partitions where required to separate areas where noisy or dirt or dust and construction operations are performed.
 - .2 Provide temporary covered passageways where overhead work is required.
 - .3 Provide and maintain temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and installation of new construction, to prevent water leakage and damage to structure and interior areas.
 - .4 Provide and maintain temporary security enclosures to ensure that no unlawful entry is allowed into the existing building
 - .5 Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - .6 Cover and protect equipment and fixtures from damage and soiling during alteration work, including furniture, furnishings, and equipment to remain and other materials to be salvaged and stored.
 - .7 Protection of the Public: The protection of the public during alterations, including but not limited to, requirements for safety of operations, noise control, removal and disposal of waste materials, control of dust, dirt, pollutants, flammable materials, explosive materials, corrosive substances, protection against fire.
 - .8 Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- .2 Temporary Shoring, Bracing and Structural Support: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent

unexpected or uncontrolled movement or collapse of construction being demolished.

- .1 Retain a qualified professional engineer to design temporary shoring, bracing and structural support as needed.
- .2 Strengthen or add new supports when required during progress of selective demolition.
- .3 If safety of structure appears to be endangered, cease operations immediately. notify Owner and Consultant and take precautions to support structure until determination is made for continuing operations.
- .3 Dangerous Nonhazardous Materials: Drain, purge, or otherwise remove, collect, and dispose
- .4 Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- .5 Minimize, to the greatest extent possible, damage to adjacent surfaces and existing buildings and siteworks during demolition.
- .6 Protect own Work, the Work of others, and new, existing and adjacent structures from damage during demolition.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Hydraulic cement underlayment to be used for large area patching and levelling underneath flooring specified in Division 09 to achieve flush and level installation of floor finishes.
 - .2 Hydraulic cement underlayment to be used for levelling underneath stud partitions.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Ensure that concrete supplied for slabs contains no admixtures that would be incompatible with concrete topping.
 - .2 Coordinate application of components to provide optimum adhesion to substrate and between coats.

1.3 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of hydraulic cement underlayment.

1.4 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for installer.
- .2 Product Certificates:
 - .1 For each type of hydraulic cement underlayment stating that the hydraulic cement underlayment is Portland cement, or hydraulic or blended hydraulic cement.
 - .2 For each type of hydraulic cement underlayment stating that the hydraulic cement underlayment is suitable for intended use and with applicable floor substrates.
- .3 Field Quality Control Reports: Submit test moisture vapour transmission test reports.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications: A company with a minimum of 5 year successful experience installing hydraulic cement underlayment on projects of equivalent size and scope and recommended by the hydraulic cement underlayment manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in accordance with hydraulic cement underlayment manufacturers written instructions.

1.7 FIELD CONDITIONS

- .1 Maintain temperature and humidity conditions in installation areas as recommended by the hydraulic cement underlayment manufacturers before, during and after installation.
- .2 In areas that are exposed to intense or direct sunlight, products shall be protected during the conditioning, installation, and curing periods, by covering the light source.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 HYDRAULIC CEMENT UNDERLAYMENTS

- .1 Hydraulic Cement Underlayment:
 - .1 Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/4 inch (6 mm) and that can be feathered at edges and with the following properties:
 - .1 Minimum 80% Portland cement, or hydraulic or blended hydraulic cement tested to ASTM C150/C150M.
 - .2 Compressive Strength: Not less than 3,500 psi (24 MPa) at 28 days when tested according to ASTM C 109/C 109M.
 - .2 Products:
 - .1 K-15 by Ardex.
 - .2 TL-150 High Performance Calcium Aluminate Based Self-Leveling Underlayment by Custom Flooring Installation Systems.
 - .3 "Ultraplan 1" by Mapei Corporation.
 - .4 Sika Level-125 by Sika Canada.
 - .3 Aggregate: Well-graded, washed gravel, 1/8 (3 mm) to 1/4 inch (6 mm); or larger when as recommended by hydraulic underlayment manufacturer based on installation thickness.
 - .1 Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
 - .4 Water: Potable and at a temperature of not more than 70°F (21°C).

- .5 Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Ensure that voids that would allow the mix to run through the substrate are temperately damned or filled.
- .2 Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing through to finished surface of hydraulic cement underlayment.
- .3 Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
- .1 Perform moisture vapour transmission and surface pH testing.
- .2 Proceed with installation of hydraulic cement underlayment after substrate testing shows moisture vapour transmission is within limits specified.
- .4 Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.

3.3 INSTALLATION

- .1 Mix and apply products in accordance with hydraulic cement underlayment manufacturer's written instructions.
- .2 Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- .3 Do not cover or bridge expansion joints or control joints. Provide 1/8" (3 mm) wide sawcut joints over concrete slab control joints.
- .4 Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- .5 Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

3.4 INSTALLATION TOLERANCES

- .1 Feather hydraulic cement underlayment to level with adjacent finished floor heights to within 3 mm (1/8 inch)
- .2 Surface of cured hydraulic cement underlayment shall be true to plane within ± 3 mm (1/8 inch) in 3 m (10 feet) to ACI 117 with straightedge to CAN/CSA A23.1/A23.2.

3.5 FIELD QUALITY CONTROL

- .1 Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- .2 Tests: Field testing shall be performed during the course of the Work.:
 - .1 Verify that concrete floors to receive work of this section are dry, and exhibit negative alkalinity, carbonization, or dusting. Maximum moisture vapour emission rate 1.36 kg of water/100 sq. m (3 lb of water/1000 sq. ft.) in a twenty-four (24) hour period or more stringent requirements in accordance with hydraulic cement underlayment manufacturer's written instructions.
 - .2 Test for moisture vapour transmission in accordance with ASTM F1869.
 - .3 For each test type, perform three (3) tests for flooring applications less than 186 m² (2,000 ft²) in area, and one (1) test per additional 93 m² (1,000 ft²).
 - .4 Prepare test report.

3.6 ADJUSTING

- .1 Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Axial load bearing lightweight steel framing:
 - .1 Wall studs subject to lateral and axial loads
 - .2 Steel bridging
 - .3 Top and bottom track
 - .4 Lintel, sill and jamb members for wall openings
 - .5 Cross bracing for lateral loads
 - .6 Connections
 - .2 Interior non-load-bearing lightweight steel stud framing exceeding height limitations of standard, nonstructural lightweight steel stud framing.

1.2 REFERENCES

- .1 Definitions:
 - .1 Camber: For purposes of this section, camber is defined as deviation from straightness of a member or any portion of a member or any portion of a member with respect to its major axis.

1.3 ACTION SUBMITTALS

- .1 Shop Drawings:
 - .1 Include layout, spacings, sizes, gauges, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - .2 Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - .3 Include technical data indicating the lightweight steel stud framing conforms to applicable standards specified.
- .2 Delegated Design:
 - .1 For cold-formed lightweight steel stud framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- .1 Product Certificates: Submit product certificates for:

- .1 Mill reports covering chemical and mechanical properties, and coating designation for steel used in the work and indicating steel sheet complies with requirements, including base-metal thickness.
- .2 Mechanical fasteners indicating sizes, load capacities, and type of corrosion protection.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications: Erect the lightweight steel stud framing using installers skilled in the installation of cold formed lightweight steel stud assemblies.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials in original, unopened containers or bundles stored in a place providing protection from damage and exposure to exterior elements.
- .2 Transport materials in a manner to prevent damage.
- .3 Store and handle materials in a manner to prevent damage. Store units off ground and protected from mud and rain splashes.
- .4 Products shall be protected from conditions that may cause physical damage or corrosion.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Delegated Design: Design steel framing assemblies, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- .2 Loads and factors shall be in accordance with the building code. For wind load calculations, the reference velocity pressure, q shall be based on a 1 in 50 probability of being exceeded in any one year.
- .3 Resistance and resistance factory shall be determined in accordance with CAN/CSA S136.
- .4 Conform to the requirements of fire rated assemblies which have been tested in accordance with CAN/ULC S101.
- .5 Stud depths are shown on the Drawings. Adjust stud and material thicknesses and spacings, as required by the design criteria. Use greater or lesser stud depths only if accepted by the Consultant.
- .6 For studs and tracks, conform to the minimum design thicknesses as follows which are 95% of the design thickness as limited by CAN/CSA S136:

Stud Track Depth (mm)	Minimum Base Steel Thickness Exclusive of Coating (mm)	Design Thickness Exclusive of Coating (mm)
64	0.836	0.879
92	0.836	0.879
102	0.836	0.879
140	0.836	0.879
152	0.836	0.879
203	1.087	1.146
254	1.367	1.438
305	1.720	1.811
356	1.720	1.811

- .7 For wall studs supporting masonry veneer, the minimum thickness exclusive of coating shall be the greater of the minimum thickness of the table above or 1.087 mm, whichever is more stringent.
- .8 The minimum thickness for bridging channel shall be 1.087 mm for studs. Use greater bridging channel design thickness if required by the design criteria.
- The minimum thickness for clip angles shall be 1.367 mm for studs. Use greater clip angle design thickness if required by the design criteria.

- .9 Maximum flexural deflections under specified live or windloads shall conform to the following:
 - .1 Wall studs supporting masonry veneer shall meet the requirements of CSA S304.1.
 - .2 Wall studs supporting other finishes, L/360.
 - .3 Soffit framing assemblies supporting non-metal material clad soffits, L/720.
- .10 Design connections to accommodate vertical deflection movement of the structure, frame shortening and vertical tolerances without imposing axial loads onto the framing.
- .11 Design light weight steel framing components and assemblies to accommodate specified erection tolerances of the structure.
- .12 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging.
- .13 Design bridging to prevent member rotation and member translation perpendicular to minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on collateral sheathing or sheet metal air/vapour barrier to help restrain member rotation and translation perpendicular to minor axis and resist weak axis buckling. Provide bridging at 1500 mm (5'-0") on centre maximum and stringent requirements to comply with CAN/CSA S136.
- .14 Design anchorage and splice details for bridging.
- .15 Design for local loading due to anchorage of cladding and interior wall mounted fixtures where indicated.
- .16 Connections between light steel framing members shall be by bolts, or sheet metal screws.
- .17 Allow for appropriate end eccentricities in the design of axial loadbearing members.
- .18 Provide head, sill and jamb members and connections to frame openings larger than 100 mm (4") in any dimension.
- .19 Anchor top and bottom track to structure at a maximum spacing of 800 mm (32") on centre. Closer spacings may be required to satisfy structural design requirements.
- .20 Construct work to provide for expansion and contraction of components as will be caused by ambient temperature range without causing buckling, failure of joint seals, undue stress on fasteners or other effects detrimental to appearance or performance.

2.0 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product

Requirements".

- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 LIGHTWEIGHT STEEL FRAMING MEMBERS AND ACCESSORIES

- .1 Steel:
 - .1 CSA S136 and is identified as to specification, grade, mechanical properties and coating type and thickness.
 - .2 Minimum coating of Z275 (G90) galvanizing in accordance with ASTM A653/A653 for steel framing members forming part of the exterior building envelope. Aluminum-zinc alloy to ASTM A792/A792M providing equal or better corrosion protection may be used.
- .2 Steel studs and tracks minimum 150 mm (6") wide minimum with 0.879 mm (0.0346") design thickness exclusive of coating, and 0.836 mm (0.0329") base steel thickness exclusive of coating, Grade A, 33 ksi yield (228 MPa).

2.4 ZINC-RICH PAINT

- .1 For touching up welds and damaged galvanized coatings shall conform to C CAN/CGSB-1.81.

2.5 BITUMINOUS PAINT

- .1 To provide dielectric separation and which will dry to be tack-free and able to withstand high temperatures.

2.6 FASTENERS

- .1 Bolts and nuts shall conform to the requirements of ASTM A307 or ASTM A325. Provide washers. Hot-dip galvanize bolts, nuts, and washers.
- .2 Concrete anchors shall have a minimum coating thickness of 0.008 mm (0.0003") mm of zinc. Other coatings providing equal or better corrosion protection may be used.
- .3 Screws:
 - .1 Sheet metal screws shall have a minimum coating thickness of 0.008 (0.0003") mm of zinc.
 - .2 Steel screws shall be equal to or exceed minimum diameter indicated on Shop Drawings.
 - .3 Penetration beyond joined materials shall be not less than 3 exposed threads.
 - .4 Thread types and drilling capability shall conform to manufacturer's recommendations.
 - .5 Screws covered by sheathing materials shall have low profile heads.
- .4 Powder actuated/low velocity fasteners shall not be permitted for fastening to structural steel or for fastening to concrete.

2.7 FABRICATION

- .1 Do not commence fabrication until Shop Drawings including erection drawings have been reviewed.
- .2 Except as noted herein, fabricated wall framing components shall conform to requirements of CAN/CGSB-7.1-98.
- .3 Insofar as practical, execute fitting and assembly in shop with various parts or assemblies ready for erection at building site.
- .4 Provide cutouts centred in webs of members to accommodate services. Limit dimensions of unreinforced cutouts to suite design requirements and effects on strength and stiffness of members.
- .5 Take field measurements and levels required to verify or supplement those shown on Drawings for proper layout and installation of work. Coordinate dimensional tolerances in adjacent building elements and confirm prior to commencement of work.
- .6 Accurately machine file and fit frames rigidly together at joints, corners and mitres. Match components carefully to produce perfect continuity of line and design.

2.8 FABRICATION TOLERANCES

- .1 Provide cold-formed metal track and framing true and plumb within following tolerances:
 - .1 Member Depth: +/-0.76 mm, (0.03").
 - .2 Flange Width: +/-0.76 mm (0.03") (where exterior glass scrim gypsum sheathing board is attached directly to flange.)
 - .3 Minimum flange width shall be 32 mm (1-1/4")
 - .4 Lip length: +3 mm (1/8").
 - .5 Thickness: -0 mm (0").
 - .6 Corner Angles: +/-3°.
 - .7 Framing Length: +/-3 mm (1/8").

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Install Work fitting to the structure from measurements taken on the Work or verified from Work as it is built. Full responsibility for proper coordination rests with this Subcontractor.

3.3 INSTALLATION

- .1 Install lightweight steel stud framing to extent indicated on Architectural drawings, with load bearing steel stud framing.
- .2 Install lightweight steel stud framing at 400mm (16") on centre in accordance with product manufacturer's installation instructions, as indicated on the reviewed Shop Drawings, and as specified herein.
- .3 Framing indicated shall not be regarded as exact or complete. Location and method of securing framing is left to option of this Subcontractor, but shall be acceptable to the Consultant.
- .4 Build in a deflection allowance of 20mm into the top of the framing to allow for structural steel or slab deflection. Provide this deflection by using a slotted connection in the vertical studs which will be secured to the structural steel or slab as detailed.
- .5 Finished Work shall be rigid, secure, square, level and plumb, framed and erected to maintain the finish dimensions indicated. Make allowance for thermal movement.
- .6 Mechanically fasten connections in the lightweight steel stud framing.
- .7 Temporary bracing shall be employed wherever necessary to withstand loads to which the structure may be subject during erection and subsequent construction.
- .8 Temporary bracing shall be left in place as long as required for integrity of structure.
- .9 Where lateral load-bearing cold-formed lightweight steel stud framing is installed directly against exterior masonry walls or dissimilar metals at exterior walls, install bituminous paint between lateral load-bearing cold-formed lightweight steel stud framing and masonry or exterior walls.
- .10 For studs, reinforce cut-outs where the distance from the centreline of the cut-out to the end of the member is less than 300 mm.
- .11 Unless a closer spacing is shown on the reviewed Shop Drawings, anchor top and bottom tracks securely to structure at maximum 813 mm on centre.. Place one additional anchor within 102 mm of the end of each piece of track and additionally as required by the reviewed Shop Drawings.
- .12 Install additional studs at abutting walls, openings, terminations against other materials and on each side at corners unless explicitly detailed otherwise on the reviewed Shop Drawings.
- .13 Splicing of axial load bearing members is not permitted.
- .14 Insulation equal to that specified shall be placed in all jamb and header assemblies that will be inaccessible after their installation into the wall. Insure that insulation is kept dry and not compressed.

3.4 ERECTION TOLERANCES

- .1 Provide lateral load-bearing cold-formed lightweight steel stud framing true and plumb within following tolerances:

- .1 General:
 - .1 For track, camber shall not exceed 1/400th of member length.
 - .2 Align adjacent or abutting members in the same plane to within plus or minus 0.50 mm.
 - .3 Spacing of studs shall not be more than plus or minus 3.0 mm from the design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.
 - .4 Align adjacent or abutting members in the same plane to within ± 0.5 mm maximum.
 - .5 Spacing of studs shall not be more than ± 3 mm from the design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.
 - .6 Align web cut-outs in studs as required for the installation of through-the-knockout style bridging and services.
- .2 For Axial Load Bearing Lightweight Steel Stud Framing:
 - .1 Out of plumbness and out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
 - .2 Studs shall seat into top and bottom tracks. The gap between the end of the stud and the web of the track shall not exceed 3.2 mm for axial load bearing studs.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Steel framing and supports including but not limited to:
 - .1 Countertops including vanity countertops, Class 2 quality, primed and concealed from view.
 - .2 Steel reinforcement for suspended glass barrier at nursing station, Class 3 quality.
 - .3 Steel tube reinforcement for low partitions, Class 3 quality.
 - .4 Mechanical and electrical equipment, Class 3 quality, field painted in accordance with Section 09 91 00 Painting where exposed to view in the finished work.
 - .5 Mechanical and electrical equipment.
 - .6 Applications where framing and supports are not specified in other Sections.
 - .2 Miscellaneous steel supporting the following
 - .1 Shelf angles.
 - .2 Steel sleeves and link seal closures to accommodate future utility connections.
 - .3 Loose bearing and leveling plates for applications where they are not specified in other Sections.
 - .3 Alternative hanger system for supporting suspended ceilings from metal deck flutes.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Do not install enclosing or concealing construction until after welds have been inspected, and tested and corrections have been made to defective applications.
 - .2 Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
 - .3 Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- .1 Product Data: Submit product data shop applied primers and finish shop applied finish coatings, fasteners.
- .2 Shop Drawings: Submit Shop Drawings detailing fabrication and installation details for each metal fabrication indicated; coordinated with Shop Drawings submitted by related trades. Include dimensioned plans, elevations, sections, and large scale details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- .3 Delegated-Design: Submit engineered Shop Drawings for components of the Work of this Section requiring structural performance including comprehensive engineering analysis.

1.4 QUALITY ASSURANCE

- .1 Quality Standards: Comply with requirements of the following standards except as modified to meet requirements of authorities having jurisdiction.
 - .1 National Association of Architectural Metal Manufacturers:
 - .1 ANSI/NAAMM MBG 532 "Heavy Duty Metal Bar Grating Manual."
 - .2 ANSI/NAAMM-MBG-531 "Metal Bar Grating Manual".
 - .2 Steel Structures Painting Council (SSPC): SSPC "Steel Structures Painting Manual, Volume 2, Systems and Specifications".
 - .3 Industrial Fasteners Institute (IFI): "Fastener Standards Book".
- .2 Welding Qualifications:
 - .1 Welding to conform to requirements of CSA W59 for steel materials.
 - .2 Welders shall be certified and licensed by the Canadian Welding Bureau and CSA W47.1, CSA W47.2, ANSI D1.6/D1.6M for types of welding work.
- .3 Fabricator: Provide glass balustrades and handrails fabricated by a fabricator with 5 years experience in types of balustrades and railings detailed.
- .4 Installer Qualifications: Installers shall have minimum 5 years experience with type of products specified.

1.5 FIELD CONDITIONS

- .1 Field Measurements: Take measurements at the place of the work to ensure that metal fabrications are fabricated to fit surrounding construction, around obstructions and projections in place.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Protect Products from damage during shipment, storage and installation.
- .2 Shop fabricate, finish and assemble Products subject to delivery and handling limitations. Minimize assembly at the Place of the Work.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Delegated-Design: Engage a qualified professional engineer to design metal fabrications, including comprehensive engineering analysis for performance and design criteria specified.
- .2 Design this Work to allow for sufficient tolerances to accommodate building tolerances.
- .3 Design metal fabrications to resist live, dead, lateral, wind, and seismic loads.
- .4 Determine sizes, yield strengths, gauge thicknesses and joint spacing. Metals shall be of sufficient thickness with or without backing, that have straight, flat surfaces without waviness and buckling.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 METALS

- .1 Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- .2 Steel: Unless otherwise indicated on Drawings.
 - .1 Structural Shapes and Plate: CAN/CSA G40.20/G40.21-13, Grade 300W and 350W
 - .2 Flat Hot-Rolled Steel Plates and Bars: CAN/CSA G40.20/G40.21-13, Grade 300W.
 - .3 Sheet: ASTM A1008/A1008M.
 - .4 Hollow Structural Sections: CAN/CSA G40.20/G40.21, Grade 350W, Class H.
 - .5 Steel Pipe: ASTM A53/A53M.
- .3 Galvanized Steel:
 - .1 Galvanized Sheet: A653/A653M, CS Type A, with Z275 (G90) zinc coating designation.

2.4 WELDING MATERIALS

- .1 Steel Welding Materials: Conforming to CSA W59.
- .2 Arc Welding Electrodes and Equipment: Conforming to CSA W48.

2.5 ACCESSORIES

- .1 Common or Ordinary Bolts and Anchor Bolts: Unfinished bolts conforming to ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Supply common bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm (1/4") beyond nut, without the use of washers. Supply anchor bolts of lengths noted, but projecting not less than 13 mm (1/2") beyond nut unless otherwise noted.
- .2 High Strength Bolts:
 - .1 Supply bolts, nuts and washers conforming to ASTM A325M. Supply each type and size of bolt and nut of same manufacture and of same lot.
 - .2 Bolts: Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.
 - .3 Nuts: Heavy hexagon semi-finished nuts.
 - .4 Washers: Flat and smooth hardened washers, quenched and tempered to conform to suit applications and ASTM F844. Provide AISI Type 304 stainless steel washers at exterior locations.
- .3 Stainless Steel Bolts: To suit applications and conforms to ASTM F738M.
- .4 Stainless Steel Nuts: To suit applications and conforms to ASTM F836M.
- .5 Hardened Steel Washers: To suit applications and conforms to ASTM F436M.
- .6 Lock Washers: Helical spring type steel "lock" washers to suit applications and conforms to Federal specification FF-W-84. Provide AISI Type 304 stainless steel lock washers at exterior locations.
- .7 Security Fasteners: Button head "Torx® Plus R" screw tamper resistant #10, 25 mm (1") long 2 per glass stop minimum stainless-steel machine screws.
- .8 Drilled Concrete Anchors:
 - .1 Conforms to CID A-A-1922A, externally threaded stud with full-length expanding sleeve. Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - .2 Products:
 - .1 "Kwik-Bolt" by Hilti (Canada) Ltd.; www.hilti.com.
 - .2 "Wedge Anchor" by Ucan Fastening Products; www.ucanfast.com.
- .9 Drilled Masonry Anchors:
 - .1 Conforms to CID A-A-1922A, externally threaded stud with full-length expanding sleeve. Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - .2 Products:

- .1 "SVA Sleeve Anchor" by Hilti (Canada) Ltd.; www.hilti.com.
 - .2 "SLE Sleeve Anchor" by Ucan Fastening Products; www.ucanfast.com.
- .10 Dielectric Separator: Quick drying non-staining alkali resistant bituminous paint or epoxy resin solution or membrane type.

2.6 FABRICATION QUALITY

- .1 The Consultant has the final word if quality of workmanship meets the intent specified and matches accepted samples and mock-ups.
- .2 "Class 1": Quality of workmanship for metals located in public areas or front of house areas and exposed to view in the finished work and specified as Class 1 quality shall comply with following:
 - .1 Finish exposed surfaces smooth without pits, and mill marks. Fill or grind off nicks and scratches. Defects shall not show when metal is painted.
 - .2 Conceal welds where possible. Where welds are exposed to view in the finished Work, grind welds to small radius with uniform sized cove. Finish welds to comply with NOMMA Guideline 1: Joint Finishes, Finish #1 – No Evidence of a welded joint.
 - .3 Distortions shall not be visible to the eye when viewed from any distance or angle.
 - .4 Fit joints to a hairline finish, inconspicuous as possible to match accepted samples and mock-ups. Where metals are mechanically joined, flush align surfaces between metal faces to maximum tolerance of 0.7 mm.
 - .5 Conceal fastenings unless otherwise indicated on Drawings.
 - .6 Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the work.
- .3 "Class 2": Quality of workmanship for metals specified as Class 2 quality shall comply with following:
 - .1 Exposed surface may retain mill marks and moderate irregularities not visible to the eye when viewed from a distance of 30 feet (9.1 m) at any angle.
 - .2 Concealed welds where possible. Exposed welds are ground with uniform sized cove. Finish welds to comply with NOMMA Guideline 1: Joint Finishes, Finish #2 – Completely sanded joint, some undercutting and pinholes are acceptable.
 - .3 Distortions shall not be visible to the eye when viewed for a distance of 30 feet (9.1 m) any angle.
 - .4 Where metals are mechanically joined, flush align surfaces between metal faces to maximum tolerance of 0.039 inch (1.0 mm) with maximum 1/6 inch (1.6 mm) joint gap.
 - .5 Conceal fastenings unless otherwise indicated on Drawings.
- .4 "Class 3": Quality of workmanship for back of house or service grade metals or specified as Class 3 quality shall comply with following:
 - .1 Exposed surfaces shall be prepared as necessary and specified for galvanizing, priming, or painting.

- .2 Finish welds to comply with NOMMA Guideline 1: Joint Finishes, Finish #4 – Good quality, uniform undressed weld with minimal spatter.
- .3 Bolts, when used, may be exposed to view in the finished Work.

2.7 FABRICATION, GENERAL

- .1 Metal fabrications shall all be fabricated from steel unless otherwise indicate on Drawings.
- .2 Weld connections unless otherwise indicated.
- .3 Countersink exposed fastenings, cut off bolts flush with nuts except as otherwise specified.
- .4 Mitre joints.
- .5 Provide hangers, rods, bars, bolts, anchors, brackets, rivets, bearing plates and bracing, fitting, drilling, stopping, soldering, as required for a complete assembly.
- .6 Remove sharp corners and edges, and burrs.
- .7 Insulate dissimilar metals using dielectric separator to prevent galvanic corrosion.
- .8 Welding:
- .9 Execute welding to avoid damage or distortion to the Work. Should there be, in the opinion of the Consultant, doubt as to adequacy of welds, they shall be tested for efficiency and any work not meeting Standards shall be removed and replaced with new work satisfactory to Consultant. Carry out welding in accordance with following standards:
 - .1 CSA W48 for electrodes (If rods are used, only coated rods are allowed).
 - .2 CSA W59 for design of connections and workmanship.
 - .3 CSA W117.2 for safety.
- .10 Thoroughly clean welded joints and steel exposed for a sufficient space to properly perform welding operation.

2.8 FABRICATION TOLERANCES

- .1 Metal members shall be square, straight, level and plumb to comply with the following maximum tolerances:
 - .1 Plumb and Level: 3.2 mm (1/8") in 3 m (10'-0").
 - .2 Variation From Straight: 3.2 mm (1/8") in 3 m (10'-0") under a 3 m (10'-0") straight edge.
 - .3 Variation Out of Square: 3.2 mm (1/8") difference between diagonal measurements.
 - .4 Out of Plane Joints: Flush with 0 tolerance.

2.9 FINISHES

- .1 Steel Shop Finishing:
- .2 Galvanizing:
 - .1 Hot dip galvanize members exposed to elements when in final location; members embedded on exterior side of exterior walls; members imbedded in concrete; members specified in this Section or indicated on Drawings.
 - .2 Repair damaged galvanized surfaces with zinc rich cold galvanizing coating in accordance with product manufacturer's printed directions.
 - .3 Hot dip galvanize members with minimum 600 g/m2 coating to ASTM A123/A123M.
 - .4 Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - .1 Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - .2 Items Indicated to Receive Primers Specified in Division 09: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - .3 Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 - .4 Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
 - .5 Shop Priming:
 - .1 Interior Metals: CISC/CPMA 2-75.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

- .1 Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- .2 Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- .3 Field Welding:
 - .1 Use materials and methods that minimize distortion and develop strength and

corrosion resistance of base metals.

- .2 Obtain fusion without undercut or overlap.
- .3 Remove welding flux immediately.
- .4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- .4 Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- .5 Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- .6 Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

3.3 INSTALLATION TOLERANCES

- .1 Set posts or vertical members within a tolerance of 2 mm (1/16 inch) in 1.0 mm (3 feet) plumb, level and from indicated position.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Wood blocking, nailers, furring, and grounds.
 - .2 Wood cants.
 - .3 Plywood backing panels for utilities.

1.2 ACTION SUBMITTALS

- .1 Product Data: Submit product data for wood-preservative treatment certifying that treated materials comply with requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Stack lumber flat with spacers beneath and between each bundle to provide air circulation off ground.
- .2 Protect lumber from weather by covering with waterproof sheeting, securely anchored.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 WOOD PRODUCTS, GENERAL

- .1 Lumber shall comply with CSA O86 and National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.
- .2 Factory mark each piece of lumber or panel material with grade stamp of grading agency.
- .3 For exposed lumber to receive a stain or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.

- .4 Moisture Content: Provide lumber and panel products with an average moisture content of maximum 19% at time of installation.
- .5 Dimensional references to lumber on Drawings and in Specifications are to nominal sizes unless actual dimensions are indicated on Drawings. Such actual dimensions shall be dry size.
- .6 Unless otherwise indicated, lumber shall be softwood, S4S.

2.3 WOOD PRESERVATIVE TREATMENT

- .1 Pressure treat with wood preservative. Wood shall be pressure treated with wood preservative treatment to CAN/CSA O80. Treat end cuts with compatible end cut preservative.
- .2 Kiln-dry wood materials after treatment to a maximum moisture content of 15%. Do not use material that is warped or does not comply with requirements for untreated material.
- .3 Identify treated wood with appropriate quality marking of inspection agency.

2.4 FIRE-RETARDANT TREATED MATERIALS

- .1 Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - .1 Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a Flame Spread Value of 25 or less when tested according to CAN/ULC S102.
- .2 Kiln-dry wood materials after treatment to a maximum moisture content of 15%. Do not use material that is warped or does not comply with requirements for untreated material.
- .3 Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

2.5 CONCEALED BLOCKING, FRAMING, FURRING AND STRAPPING

- .1 Use Spruce or Pine conforming to NLGA Standard Grading Rules "Select Merchantable" grade for boards and "Select Structural" grade for framing, straight, dressed four sides, sized and shaped to correct dimensions and profiles.

2.6 PLYWOOD

- .1 CSA 0121, Douglas Fir plywood standard construction, exterior bonded, regular grades as follows:
 - .1 Exposed Plywood: Exterior sheathing to be left unfinished or to receive a clear finish or painted finish, use Sanded Grade, Good Two Sides or Good One Side as required to suit conditions, A Grade face veneer for exposed faces and C Grade face veneer for concealed faces.
 - .2 Concealed Plywood:

- .1 Use minimum 3/4 inch (19 mm) Unsanded Sheathing Grade, C Grade veneer faces for blocking.
- .2 Use minimum 3/4 inch (19 mm) T&G edges exterior grade for decking.
- .3 Fire-Retardant Treated Plywood:
 - .1 Use for mechanical, electrical and communications equipment mounting boards.
 - .2 Use minimum 3/4 inch (19 mm) veneer core plywood.
 - .3 No.2 or Better Grade treatable species (Pine or Fir) free of checks, holes, loose knots, pitch, shakes, splits, wane and pressure treated with fire treated chemicals as specified under paragraph "Fire-Retardant Treated Materials".
 - .4 Plywood mounting panels shall be one-piece plywood sheets where practicable. Do not use waste ends or scrap pieces to form mounting panels.
 - .5 Paint all exposed edges and sides of panels before installation of panels with fire retardant paint in accordance with Section 09 91 00 "Painting".

2.7 INSTALLATION ACCESSORIES

- .1 Metal Fasteners and Connectors:
 - .1 Provide fasteners of size and type indicated, acceptable to Authorities Having Jurisdiction, in sufficient length, to penetrate not less than 38 mm (1-1/2") into wood substrate.
 - .2 Select fasteners of size that do not fully penetrate members where opposite side is exposed to view.
 - .3 Fastener and connector materials; exterior exposed and where exposed in wet service conditions, select from one of the following:
 - .1 Hot-dipped galvanized fasteners to CAN/CSA G164-M92(R2003) with minimum zinc coating of 600 g/m2 or hot-dipped galvanized fasteners complying with ASTM A153/A153M-09, Class A or B1, and connectors complying with ASTM A653/A653M-13, Class G185.
 - .2 Type 304 or Type 316 stainless-steel.
 - .4 Use stainless-steel materials shall for pressure-preservative-treated wood.
 - .5 Use surface fastenings of following types, except where specific type is indicated.
 - .1 To hollow masonry, plaster and panel surfaces use 9 mm expansion bolts or other acceptable anchor.
 - .2 To solid masonry and concrete use expansion bolts.
 - .3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws, or welded stud-bolts.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work

done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Where wood blocking, framing, furring or strapping is used to support furniture items (e.g. wall mounted storage units) location and method of securing wood blocking shall also be acceptable to the furniture installer. Prior to proceeding with installation, review locations, shapes and method of fastening of wood blocking with the furniture installer to ensure that adequate blocking will be installed.

3.3 INSTALLATION, GENERAL

- .1 Fasten framing to structure using fasteners of proper type to support anticipated loads.
- .2 Mitre junctions of wood members with hairline joints.
- .3 Make tight connections between wood members.
- .4 Install fasteners without splitting wood.
- .5 Recess bolts and nuts flush with surfaces.

3.4 INSTALLATION, WOOD BLOCKING

- .1 Supply and install wood blocking for direct attachment of accessories or equipment to framing.
- .2 Attach blocking to the framing to support the load of, and to withstand, the withdrawal and shear forces imposed by the items installed upon the work of this section.
- .3 Fasten blocking to structure using fasteners of proper type to support anticipated loads.
- .4 Fill voids between wood blocking at exterior assemblies with mineral wool insulation unless otherwise indicated.

3.5 WOOD PRESERVATIVE TREATED WOOD

- .1 Seal surfaces of cut ends of wood preservative treated wood.

3.6 FIRE-RETARDANT TREATED PLYWOOD

- .1 Securely install wood strapping on walls to suit size(s) of plywood mounting panels at minimum 450 mm on centre with fasteners suitable for wall substrate at 300 mm on centre.
- .2 Provide wood strapping at minimum of two (2) edges of plywood mounting panels for edge support.

- .3 Over wood strapping install plywood mounting panel(s) with nails or screws fastened into wood strapping at 300 mm on centre.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 This Section includes the following, but is not limited to:
 - .1 Plastic-laminate faced cabinets.
 - .2 Plastic laminate countertops
 - .3 Solid surfacing countertops.
 - .4 Shelving.
 - .5 Shop finishing interior woodwork.
 - .6 Cabinet hardware and accessories.
 - .7 Furring, blocking, shims, hanging strips, unless concealed within other construction before woodwork installation.
 - .8 Finishing of flush wood doors supplied by Section 08 14 16 "Flush Wood Doors.

1.2 DEFINITIONS

- .1 Architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, that are not concealed within other construction before woodwork installation.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with partition accessories, electrical, communications, and finish components to ensure that proper provisions are made for the installation of the work of this section and for work by others.
 - .2 Coordinate Work of this Section with Work of Gypsum Board Subcontractor relative to location of backing support members to be built into metal stud partitions. Inspect partitioning as built prior to installation of gypsum board and ensure support is provided as required.
 - .3 Cooperate with Mechanical and Electrical Subcontractors for connection of services to casework fitments from rough-in points in rooms to final termination point, including locating service fittings and outlet boxes.
- .2 Preinstallation Conference: Conduct conference at Project site.
 - .1 Verify project requirements, including mockup requirements.
 - .2 Review installation conditions under which work is to be performed including substrate conditions and possible site concerns.
 - .3 Coordination of products, installation methods and techniques and with other building Subcontractors.

1.4 ACTION SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Prepare and submit material list in accordance with AWMAC NAAWS, cross-referenced to specifications.
 - .2 Include manufacturer's instructions, printed product literature, data sheets and catalogue pages for all materials and products to be incorporated into architectural wood casework and include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
- .3 Hardware List:
 - .1 Submit hardware list cross-referenced to specifications.
 - .2 Include manufacturer's specification sheets indicating name, model, material, function, finish, BHMA designations and other pertinent information.
- .4 Shop Drawings:
 - .1 Prepare and submit shop drawings in accordance with AWMAC NAAWS and as follows.
 - .2 Submit shop drawings for initial review in accordance with requirements of Division 01. Revise as directed, submit for final acceptance and distribution.
 - .3 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .1 Scales: profiles full size, details half full size.
 - .4 Indicate materials, thicknesses, finishes and hardware.
 - .5 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
 - .6 Show location on casework elevations of backing required in supporting structure for attachment of casework.
 - .7 Indicate AWMAC AWS quality grade where different from predominant grade specified.
 - .8 Include color schedule of all casework items, including all countertop, exposed, and semi-exposed cabinet finishes, finish material manufacturer, pattern, and color.
- .5 Samples:
 - .1 Prepare and submit samples in accordance with AWMAC NAAWS and as follows.
 - .2 Apply sample finishes to specified substrate or core material minimum 300 x 300 mm. For veneers with transparent finish submit three samples to illustrate range and colour of grain expected.
 - .3 Submit duplicate samples of laminated plastic for each specified colour selection.
 - .4 Submit duplicate samples of laminated plastic joints, edging, cutouts and post-formed profiles.

- .5 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Submit statement of experience and qualifications of architectural wood casework fabricator.

1.5 CLOSEOUT SUBMITTALS

- .1 Maintenance Data:
 - .1 Submit maintenance instructions for any cleaning or use practices or materials which may damage or disfigure woodwork finishes.
 - .2 Submit woodwork manufacturer's advice for optimum temperature and humidity conditions for woodwork during service life.

1.6 QUALITY ASSURANCE

- .1 Perform Work of this Section by single architectural wood casework fabricator with minimum 5 years of current architectural casework production experience and having completed minimum one project in the past 5 years with value within 20% of the cost of the work of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00 Product Requirements and with manufacturer's written instructions.
- .2 Deliver wood casework only when area of work is enclosed, plaster and concrete work is dry, and area is broom clean and site environmental conditions are acceptable for installation.
- .3 Protect millwork against dampness and damage during and after delivery.
- .4 Store millwork in ventilated areas, protected from extreme changes of temperature and humidity, and within range recommended by AWMAC NAAWS 4.0 for location of project.
- .5 Store materials indoors in clean, dry, well-ventilated area.
- .6 Protect architectural woodwork and hardware from nicks, scratches, and blemishes.
- .7 Replace defective or damaged materials with new.
- .8 Waste Management: for packaging and materials, in accordance with Section 01 74 19 Construction Waste Management and Disposal.

1.8 FIELD CONDITIONS

- .1 Environmental Conditions:
 - .1 Obtain and comply with woodwork manufacturer's advice for optimum temperature and humidity conditions for storage and installation of work of this section.
 - .2 Do not install woodwork until these conditions have been attained.

- .3 Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed 5% to 10%.
- .2 Where woodwork is indicated to be fitted to other construction, check actual dimension of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Provide wood blocking in partitions and other support required to carry weight of woodwork.

2.2 QUALITY GRADE

- .1 Provide all materials and perform all fabrication in accordance with AWMAC NAAWS 4.0 Custom Grade and as follows, except where specified otherwise:
 - .1 Economy Grade: Mechanical rooms and utility areas, storage areas, and janitor's closets.
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.

2.3 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.4 LUMBER

- .1 Softwood and Hardwood Lumber: Sound lumber to specified AWMAC NAAWS quality grade requirements, kiln-dried to moisture content recommended by AWMAC NAAWS for location of the Work
- .2 Machine stress-rated lumber is acceptable for all purposes.

2.5 WOOD MATERIALS

- .1 Quality Standard: Unless otherwise indicated, provide materials and fabrications, and install architectural woodwork to comply with the North American Architectural Woodwork Standards NAAWS for each type of woodwork quality grade specified, and required for construction, finishes, installation and other requirements.

- .2 Lumber, General:
 - .1 Surfaces and Patterns: Provide lumber surfaced 4 sides (S4S) and worked to profiles shown.
 - .2 Moisture Content: Provide kiln-dried lumber with an average moisture content range of 6% to 11%.
- .3 Painted Solid Wood:
 - .1 Paint Grade Maple or Paint Grade Poplar.

2.6 PANEL MATERIALS

- .1 Interior mat-formed wood particleboard: To ANSI/NPA A208.1, industrial grade M-2 or M-3, medium density (640-800 kg/m³), thickness 19 mm unless indicated otherwise.
 - .1 Use moisture resistant grade 2-M-2 or 2-M-3 for countertops and splash-backs to receive plumbing fixtures.
- .2 MDF (medium density fibreboard) core: To ANSI A208.2, density 769 kg/m³, Grade 130, 19 mm thick unless indicated otherwise.
 - .1 Use moisture resistant MR grade for countertops and splash-backs to receive plumbing fixtures.
 - .2 No added urea-formaldehyde used in composition.
- .3 Douglas fir plywood (DFP): To CSA O121, minimum 7 plys for 12 mm thickness.
- .4 Hardwood plywood: To ANSI/HPVA HP-1, minimum 7 plys for 12 mm thickness and minimum 9 plys for 19 mm thickness.
- .5 Canadian softwood plywood (CSP): To CSA O151, standard construction
- .6 Poplar plywood (PP): To CSA O153, minimum 7 plys for 12 mm thickness and minimum 9 plys for 19 mm thickness.
- .7 Hardboard: To CAN/CGSB-11.3

2.7 DECORATIVE OVERLAID COMPOSITE PANELS

- .1 Thermally Fused Laminate (TFL): To NEMA LD3 Grade VGL, High wear resistant thermofused melamine: Equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
 - .1 Laminate: Decorated paper with melamine or polyester resin, from based on woodgrain or printed pattern, colour range with finish selected by Consultant from manufacturer's full range.
 - .2 Core: Medium density fibreboard (MDF).
- .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.

2.8 LAMINATED PLASTIC MATERIALS

- .1 Laminated plastic for flatwork: to NEMA LD3
 - .1 High pressure decorative laminated (HPDL) plastic.
 - .1 Type: GP (general purpose).
 - .2 Horizontal Surfaces: HGS to suit application, minimum 1.0 mm thick.
 - .3 Vertical Surfaces: VDS to suit application, minimum 0.5 mm thick.
 - .4 Solid color core high pressure plastic laminate grade shall be (HCS).
 - .2 Colours:
 - .1 **PL-01:** Fusion Maple 7909-60 Matte Finish by Wilsonart.
 - .2 **PL-02:** Monticello Maple 7925-38 Fine Velvet Finish by Wilsonart.
 - .3 **PL-03:** Paloma Polar 06698-58 Matte Finish by Wilsonart.
- .2 Edge finishing for doors, drawer fronts, shelves and false fronts:
 - .1 HPDL to match face.

2.9 CASEWORK FABRICATION - GENERAL

- .1 Fabricate casework of specified core and surface finish materials to specified AWMAC NAAWS 4.0 quality grade
 - .1 Construction type: Frameless.
 - .2 Door-cabinet interface: Flush overlay.
- .2 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .3 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .4 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .5 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .6 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .7 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

2.10 LAMINATED PLASTIC CASEWORK FABRICATION

- .1 Do laminated plastic fabrication in compliance with NEMA LD3, Annex A and specified AWMAC NAAWS 4.0 quality grade.
- .2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .3 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600

mm from sink cutouts.

- .4 Form shaped profiles and bends as indicated, using post-forming grade laminate to laminate manufacturer's instructions.
- .5 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .6 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .7 Apply laminated plastic liner sheet to interior of cabinetry.

2.11 HARDWARE

- .1 Whether hardware is specified, indicated on drawings, scheduled or not, casework hardware shall comply with ANSI/BHMA Standards, latest edition, minimum grades, loading and other basic rules per the NAAWS 4.0.
- .2 Hardware Manufacturers:
 - .1 Blum
 - .2 Grass Canada
 - .3 Hafele.
 - .4 Hettich Canada Ltd.
 - .5 Knappe & Vogt Manufacturing Company
- .3 Drawer Pulls and Door Pulls:
 - .1 Type, size, model number and manufacturer as indicated on Drawings, or equivalent product and manufacturer acceptable to Consultant.
 - .2 Mount pulls in direction indicated in Drawings.
- .4 Interior Cabinet Adjustable Shelving Pin Supports
 - .1 6 mm Heavy-Duty Pin Supports.
- .5 Interior Cabinet Adjustable Pilasters and Clips:
 - .1 Products: "2332G72" and "25622G" by Richelieu.
- .6 Rubber Silencers (Door Bumpers):
 - .1 Product: "9998CLS" by Richelieu.
- .7 Magnetic Door Catch:
 - .1 Product: "8755XV" by Richelieu.
- .8 Full Overlay Concealed Hinges:
 - .1 Frameless European style, fully concealed in flush overlay cabinet construction.
 - .2 Minimum 110° hinge opening with soft close.

- .3 ANSI/BHMA A156.9, Grade 2.
- .4 Products:
 - .1 Art. no. 329.17.117 by Hafele Canada.
 - .2 Art. no. 329.17.552 by Hafele Canada.
 - .3 CLIP top by Blum Hinges.
- .9 Hinge Mounting Plates:
 - .1 Art. no. 329.71.512 by Hafele Canada.
- .10 Standard Cabinet Door Hinges:
 - .1 110 degree opening compete with hinge arm and cup cover caps.
 - .2 Fully concealed in flush overlay cabinet construction.
 - .3 Silent, soft-closing.
 - .4 Products:
 - .1 Clip Top Blumotion by Blum.
 - .2 "71B358180 by Richelieu.
- .11 Standard Cabinet Door and Drawer Locks:
 - .1 Camlocks complete with cylinder housing, rosette and nuts with nickel finish for exposed components and snap in lock core.
 - .2 Keying:
 - .1 Keying in administration areas keyed alike and different than RHA's. Keying in RHA's to be keyed alike.
 - .2 Provide number of keys as requested and confirmed by Owner.
 - .3 Product: 235.08.303 by Hafele.
- .12 Grommets at Plastic Laminate Surfaces:
 - .1 Sizes to suit services/cables, minimum 2 inches (51 mm) in diameter.
 - .2 Finish to match plastic laminate finish.
 - .3 Allow for five (5) for full extent of work counter surfaces final locations to be coordinate at the Place of the Work with equipment installed on site.
- .13 Wire Management Trough:
 - .1 Dimension: 90 mm (3.6") diameter, 610 mm (24") length.
 - .2 Product: Humanscale NeatLinks,
 - .3 Finish: Grey.
 - .4 Provide one (1) per worksurface bay.
- .14 Rubber Silencers:
 - .1 Self-adhering, round, clear vinyl type door silencers.
 - .2 Provide two (2) per door. For doors over 39.37 inches (1000 mm) height provide an additional door silencer for every 12 inches (304 mm) in height.

.15 Drawer Slides:

.1 Tested and graded to comply with ANSI/BHMA A156.9 which shall be as follows:

Product Grade	Initial Load – kg (lbs)	Static Load – kg (lbs)
1	22.2 (50)	33.4 (75)
2	13.3 (30)	22.2 (50)
3	8.9 (20)	22.2 (50)
1HD-100	44.5 (100)	44.5 (100)
1HD-200	90 (200)	44.5 (100)

.2 Side mounted, full extension zinc plated steel slides for Product Grades 1HD-100 and 1HD-200.

.3 Shall conform to NAAWS 4.0 loading capacities, Section 10 Casework "Basic General Rules".

.4 Products:

.1 Product Grade 1HD-100: #3832EC2G20 by Richelieu.

.16 Cabinet Legs:

.1 Product:

.1 "637.45.326" by Hafele.

.17 Hardware Finish:

.1 Unless otherwise specified, hardware finish shall comply with the following:

.1 Exposed hardware finishes comply with ANSI/BHMA A156.18-2016.

.1 Stainless steel: ANSI/BHMA Code 630.

2.12 INSTALLATION ACCESSORIES

.1 Fasteners shall comply with NAAWS 4.0.

.1 Nails and staples to CSA B111-1974(R2003), type, size material and finish as required for the condition of use.

.2 Anchor type, size material and finish as required for the condition of use.

.3 No exposed fasteners permitted. Where exposed fasteners are accepted by Consultant, exposed fasteners shall be flat head hex socket cap screws and matching joint connector hex bolts and fastening devices shall be set or countersunk flush with finished surface or framing member; finish as selected by Consultant, bronze finish unless otherwise indicated on drawings.

.2 Adhesives: Shall be used for intended purpose and manufacturer materials applications and installation, applied in accordance with adhesive manufacturer's written requirements and shall comply with the "adhesive usage guidelines" recommendations of NAAWS 4.0

2.13 FABRICATION

.1 Complete fabrication, assembly, finishing, hardware application, and other work before shipment to maximum extent possible. Trial fit in shop and disassemble components only as necessary for shipment and installation. Where necessary, provide ample allowance for scribing, trimming, and fitting. Reassemble with concealed fasteners.

- .2 Balancing Sheets: Complying with NAAWS 4.0.
- .3 Provide cut-outs for electrical, plumbing, HVAC, raceways, sleeves, grommets and other manufactured accessories. Smooth edges of cut-outs and, where located in countertops, seal edges of cut-outs with a water-resistant coating.
- .4 Reinforcing shown is minimum. Supply and install additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects. Accurately fit all joints, corners and mitres.

2.14 FINISHING

- .1 The entire finish of interior architectural woodwork is specified in this section, regardless of whether factory applied or applied after installation. Factory finish architectural woodwork except where otherwise specified or indicated on drawings.
- .2 Prior to finishing, exposed portions of woodwork shall have handling marks or effects of exposure to moisture removed with a thorough final sanding over surfaces of the exposed portions, using appropriate grit sandpaper, and shall be cleaned prior to applying sealer or finish. Sanding shall be completed just prior to stain or finishing application.
- .3 Any panel board, solid wood or wood veneer surface that is concealed from view and will not be finished with a topcoat finish or finish material such as plastic laminate, shall be at minimum, sealed or primed to minimize moisture damage and to promote stability of the finished materials.
- .4 Comply with referenced quality standard in Part 1 for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.
- .5 Painted Solid Wood: Finish with paint systems specified in Section 09 91 00 "Painting" in the shop. Field painting of touch-ups is permitted.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work.
- .2 Ensure that wall and ceiling variations are not in excess of 6.4 mm (1/4") in 3658 mm (144") and that floors are not in excess of 12.7 mm (1/2") in 3658 mm (144") of being plumb and level.
- .3 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Provide all blocking and nailers which are to be built in for installations of other Work not included in this Section.

3.3 INSTALLATION

- .1 Comply with installation requirements established by quality standard.
- .2 Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- .3 Anchor woodwork to built in blocking or directly attached to substrates as applicable. Secure to blocking with countersunk fasteners concealed from final finished view.
- .4 Complete the finishing work specified in this section to whatever extent not completed at the shop.

3.4 INSTALLATION TOLERANCES

- .1 Install woodwork to a tolerance of 3 mm (1/8 inch) in 2,400 mm (95 inches) for plumb and level including countertops and with no variations in flushness of adjoining surfaces unless otherwise acceptable in accordance with NAAWS 4.0.

3.5 ADJUSTING

- .1 Repair damaged woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork.
- .2 Clean, lubricate, and adjust hardware.
- .3 Touch up factory-applied finishes to restore damaged areas.

3.6 PROTECTION

- .1 Protect architectural woodwork during construction to ensure that work will be without damage or deterioration until substantial performance of the work.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Mineral fibre batt insulation:
 - .1 Fire batt insulation; **INS-02B**
 - .2 Acoustic batt insulation; **INS-02C**.
 - .2 Spray polyurethane foam gap filler insulation; **INS-05**.

1.2 REFERENCES

- .1 Definitions:
 - .1 Mineral-fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.3 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of insulation and insulation fastener.

1.4 INFORMATIONAL SUBMITTALS

- .1 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.5 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each type of building insulation through one source.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 FIELD CONDITIONS

- .1 Do not install insulation during inclement weather or when surfaces are moist.
 - .1 Insulation that is exposed to moisture due to inadequate or compromised environmental protections, or that becomes wet or moist by other means subsequent to installation, shall be completely removed and discarded, and replaced with new materials.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MINERAL FIBRE BATT INSULATION

- .1 Fire batt insulation; **INS-02B**:
 - .1 Unfaced mineral fibre basalt rock and steel slag or glass mineral-fibre acoustic batt insulation Type 1 to CAN/ULC S702 and non-combustible to CAN/ULC S114.
 - .2 Products:
 - .1 "MinWool Sound Attenuation Fire Batt (SAFB)" by Johns Manville.
 - .2 "Thermafiber SAFB FF" by Owen's Corning.
 - .3 "AFB" by Rockwool.
- .2 Acoustic batt insulation; **INS-02C**:
 - .1 Unfaced mineral-fibre basalt rock and steel slag or glass mineral-fibre acoustic batt insulation Type 1 to CAN/ULC S702 and non-combustible to CAN/ULC S114.
 - .2 Products:
 - .1 "Sound-SHIELD" by Johns Manville.
 - .1 "QuietZone" by Owen's Corning.
 - .2 "Thermafiber SAFB FF" by Owen's Corning.
 - .3 "AFB" by Rockwool.

2.1 SPRAY POLYURETHANE FOAM GAP FILLER INSULATION

- .1 Spray foam polyurethane foam gap filler insulation; **INS-05**:
 - .1 Single-component, gun-grade polyurethane flexible foam that performs as a thermal barrier and air barrier and purpose designed to fill tight cavities and gaps in exterior walls.
 - .1 "Pro Window & Door Polyurethane Foam Sealant" by Great Stuff.
 - .2 "Titefoam Gaps & Cracks" by Loctite.
 - .3 "ExoAir Flex Foam" by Tremco.

2.2 INSULATION FASTENERS

- .1 Adhesive for Impale Type Perforated Fasteners: Type as recommended by impale fastener manufacturer.
- .2 Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
- .3 Insulation-Retaining Washers: Self-locking washers formed from 0.41 mm(0.016-inch) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
- .4 Impale Type Anchor: Perforated approximately 50 mm (2") x 50 mm (2") cold rolled carbon steel or galvanized steel, minimum 0.8 mm thickness, spindle of 2.5 mm diameter annealed steel, length to suit insulation.
- .5 Insulation-Retaining Washer: High density polyolefin or polyethylene washer minimum 50 mm (2") holding diameter with direct fasten pin type. Pin shall be purpose made to suit substrate material with pin depth length to suit insulation thickness, with zinc plated carbon steel or other finish acceptable to Consultant suitable for fastening to concrete and steel.
 - .1 Product: InsulFast by ITW Construction Products Ramset.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates and conditions, with installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation, or that interfere with insulation attachment.

3.3 INSTALLATION, GENERAL

- .1 Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- .2 Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- .3 Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- .4 Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- .5 Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- .1 Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- .2 Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - .1 Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - .2 Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - .3 Maintain 76 mm (3") clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - .4 For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- .3 Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - .1 Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.
 - .2 Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

- .1 Where acoustical blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 610 mm (24") on both sides of partition heads.

3.6 INSTALLATION OF SPRAY POLYURETHANE FOAM GAP FILLER INSULATION

- .1 Install spray polyurethane foam gap filler insulation where indicated on Drawings and to fill gaps at openings, between door frames or window frames and adjacent framing, or to fill tight cavity gaps according to spray polyurethane foam gap filler manufacturer's written instructions.

3.7 CLEANING

- .1 Remove over-spray of spray applied polyurethane insulation and masking material immediately after sprayed applied polyurethane foam insulation has cured to hard surface film.
- .2 Clean and make good surfaces soiled or damaged by work of this section. Consult with section of work soiled before cleaning to ensure methods used will not damage their work.

3.8 PROTECTION

- .1 Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.9 INSULATION SCHEDULE

- .1 General: The following list identifies where each type of insulation is generally used. Except as otherwise shown on drawings, provide the following types of insulation in locations listed below and where indicated on Drawings:
 - .1 Insulation Type **INS-02B**: For use in fire rated acoustic assemblies.
 - .2 Insulation Type **INS-02C**: For use in interior spaces and above suspended partitions as acoustic insulation.
 - .3 Insulation Type **INS-05**: For use in tight cavities, in exterior wall cavities, to fill gaps and elsewhere as necessary to maintain the continuity of insulation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the Work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Sprayed fire-resistive materials **FP-01**, both concealed and exposed to view.
 - .2 Cutting and patching of existing SFRM.

1.2 REFERENCES

- .1 Definitions:
 - .1 SFRM: Spray-Applied Fire-Resistive Materials
 - .2 Cementitious: Sprayed fire-resistive material using cementitious binders and adhesive materials complying with ASTM E1513.
 - .3 Concealed: Fire-resistive materials applied to surfaces that are concealed from view behind other construction when the Work is completed and have not been defined as exposed. Concealed fire resistive materials may be accessible through suspended ceilings, which may be in elevator shafts and machine rooms, mechanical rooms, air-handling plenums, and structural steel encapsulated by wall construction.
 - .4 Exposed: Fire-resistive materials applied to surfaces that are exposed to view when the Work is completed. It also includes applied fire resistive materials that are in exterior installations, or are in interior mechanical bulkheads, loading docks, garages, that exposed to abuse, and must withstand damage from equipment, or that are identified as exposed on Drawings.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Sequence and coordinate application of fireproofing with other related work specified in other Sections to comply with the following requirements:
 - .1 Provide temporary enclosure as required to confine spraying operations and protect the environment.
 - .2 Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
 - .3 Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - .4 Do not apply fire-resistive material to metal roof deck substrates until concrete topping, if any, has been completed. For metal roof decks without concrete topping, do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic

- during application and drying of fire-resistive material.
- .5 Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.
- .6 Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
- .7 Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
- .8 Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and tested and corrections have been made to defective applications.
- .9 Apply fireproofing after field touch up of shop primed steel and field priming of connections prior to application of fireproofing for steel that is located below the flood elevation.
- .2 Coordinate applied fireproofing products with firestopping and smoke seals specified in Division 07, Section 07 84 00 "Firestopping and Smoke Seals". Applied fireproofing used in firestop details shall comply with firestop system rating and certification.
- .2 Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to fireproofing including, but not limited to, the following:
 - .1 Coordination of products, installation methods and techniques and with other building Subcontractors.
 - .2 Review products, exposure conditions, design ratings, restrained and unrestrained conditions, calculations, densities, thicknesses, bond strengths, and other performance requirements.
 - .3 Review and finalize construction schedule and verify sequencing and coordination requirements.
 - .4 Review weather predictions, ambient conditions, and proposed temporary protections for fireproofing during and after installation.
 - .5 Review surface conditions and preparations on bare steel and steel with shop primers. Determine what repairs and preparations are required to ensure adequate bond.
 - .6 Review installation conditions under which work is to be performed including substrate conditions and possible site concerns
 - .7 Review product manufacturer's installation instructions.
 - .8 Review field quality-control testing procedures including special inspections, which are different than quality control testing.
- .3 Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
 - .1 Do not cut and patch SFRM in a manner that results in a reduction of the capacity of structural members to perform as intended, or that results in increased maintenance or decreased operational life or safety.

- .2 Outline the methods of removal planned and safeguards for structural members during the procedures.

1.4 ACTION SUBMITTALS

- .1 Product Data: Submit manufacturer's product data showing compliance with performance requirements specified. Include manufacturer's technical data sheets, printed instructions, and specifications for handling, mixing, protection of adjacent surfaces, heating requirements, and cleanup:
 - .1 Sprayed fire-resistive material.
 - .2 Substrate primers.
 - .3 Bonding agent.
 - .4 Metal lath.
 - .5 Reinforcing fabric.
 - .6 Reinforcing mesh.
 - .7 Sealer.
 - .8 Topcoat.
- .2 Applied Fireproofing Schedule: Provide a schedule for structural elements proposed to receive spray-on fireproofing noting the following:
 - .1 Locations and types of surface preparations required before applying applied fireproofing material.
 - .2 Extent of sprayed fire resistive material for each construction and fire resistive rating including the following:
 - .1 Minimum thicknesses needed to achieve required fire resistance ratings of structural components and assemblies based on manufacturer's ULC testing for each size and shape of structural framing required.
 - .2 Hourly ratings and corresponding ULC Standard No.
 - .3 Designation of restrained and unrestrained conditions based on definitions in ASTM E119, Appendix X3 as determined by a qualified Professional Engineer.
 - .4 Treatment of sprayed fire resistive material after application
- .3 Shop Drawings:
 - .1 Structural framing plans or schedules, or both, indicating the following:
 - .1 Locations and types of surface preparations required before applying SFRM.
 - .2 Extent of fire protection for each construction and fire-resistance rating, including the following:
 - .1 Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - .2 Minimum sprayed fire-resistive material thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.

- .3 Treatment of sprayed fire-resistive material after application.
- .3 Base all design designations on unrestrained members or submit designation of restrained and unrestrained conditions based on definitions in ASTM E119, Appendix X3 as determined by a Structural Professional Engineer licensed in the Province of Ontario.
- .4 Treatment of sprayed fire resistive material after application

1.5 INFORMATIONAL SUBMITTALS

- .1 Product Test Reports:
 - .1 Submit certified copies of test reports verifying applied fireproofing applied to substrate will meet or exceed design and performance requirements and products meet ULC Designs.
 - .2 Submit fire test design results for fire endurance and for surface burning characteristics.
 - .3 Submit certified copies of test reports or letter from the manufacturer indicating that substrate primers, bonding agents, and sealers and adjacent intumescent fireproofing are compatible.
 - .4 Submit test reports showing compliance with ASTM E1513 for cementitious content of fireproofing.
- .2 Engineering Judgment: Copies of engineering judgment review, signed by the applied fireproofing manufacturer's fire safety professional engineer, licensed to practice in the Province of Ontario and approval by local authorities having jurisdiction for fireproofing applications for which no ULC tested design is available.
- .3 Preconstruction Test and Field Review Reports:
 - .1 Submit report of the examination of existing SFRM, indicating locations collected, average thickness, tested compressive strength, bond strength, and estimated fire resistance.

1.6 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each type of applied fireproofing from one source and by a single manufacturer.
- .2 Installer Qualifications:
 - .1 A firm or individual with at least five (5) years successful experience in application of type of fireproofing specified and certified, licensed, or otherwise qualified by sprayed fire-resistive material manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
 - .1 Submit detailed listing of five most current projects with location, names, and telephone numbers of Owner, Consultant, and Subcontractor.
 - .2 A manufacturer's willingness to sell its fireproofing to Subcontractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.

- .3 Mockups: Build mockups to set quality standards for materials and execution.
 - .1 Build mockups of each applied fireproofing type 10 m² (107 ft²).
 - .2 If Consultant determines mockups do not comply with requirements, reconstruct mockups until mockups are accepted.
 - .3 Acceptance of mockups does not constitute acceptance of deviations from the Contract Documents contained in mockups unless Consultant specifically approves such deviations in writing.
 - .4 Subject to compliance with requirements, accepted mockups may become part of the completed Work if undisturbed at time of Substantial Completion of the Work.

1.7 PRECONSTRUCTION TESTING AND FIELD REVIEW

- .1 Preconstruction Adhesion and Compatibility Testing: Engage a qualified testing and inspection agency to test for compliance with requirements for specified performance and test methods.
 - .1 Bond Strength: Test for cohesive and adhesive strength according to ASTM E736 and requirements in UL's "Fire Resistance Directory" for coating materials. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - .2 Density: Test for density according to ASTM E605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - .3 Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with sprayed fire-resistive material.
 - .4 Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - .5 For materials failing tests, obtain sprayed fire-resistive material manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.
- .2 Preconstruction Survey of Existing SFRM:
 - .1 Submit report documenting examination of existing SFRM, indicating locations collected, average thickness, tested compressive strength, bond strength, and estimated fire resistance which require cutting and patching.
 - .2 If available, submit documentation of existing SFRM materials:
 - .1 Original drawings or specifications from construction or previous renovations.
 - .2 Existing product data from previous modifications or repairs.

1.8 FIELD CONDITIONS

- .1 Ambient Conditions:
 - .1 Do not apply fireproofing when ambient or substrates temperatures in installation areas are less than 5°C (41°F) or lower unless temporary protection and heat are provided to maintain temperature at or above this level for twenty-four (24) hours before application, during application and twenty-four (24) hours after

applications.

- .2 Relative humidity in installation areas shall be between 40-60%.

.2 Ventilation:

- .1 Ventilate building spaces during and after application of fire protection, providing complete air exchanges according to manufacturer's written instructions; introducing fresh air and exhausting air continuously during and twenty-four (24) hours after application to maintain nontoxic, unpolluted, safe working area. Use natural means or, if they are inadequate, forced-air circulation until fire protection dries thoroughly. Provide temporary enclosures to prevent spray from contaminating air.
- .2 Protect adjacent surfaces and equipment from damage by overspray, fall out and dusting off of sprayed materials.
- .3 Provide fire extinguisher and post caution signs warning against smoking and open flame when working with flammable materials.

1.9 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver products to the Place of the Work in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.
- .2 Use materials with limited shelf life within period indicated. Remove from Place of the Work and discard materials whose shelf life has expired.
- .3 Store materials inside, under cover, aboveground, and kept dry until ready for use. Remove from Project site and discard wet or deteriorated materials.

1.10 WARRANTY

- .1 Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace fire-resistive materials that fail in materials or workmanship within specified warranty period.
 - .1 Failures include, but are not limited to cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of fireproofing from substrates.
 - .2 Warranty Period: Five (5) years.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Regulatory Requirements:
 - .1 Sprayed fireproofing shall be ULC certified, qualified for use in ULC Designs specified or indicated on drawings.
 - .2 Fire endurance testing designs to CAN/ULC S101.
 - .3 Surface burning characteristics tested to CAN/ULC-S102, Maximum Flame Spread Value of 25.

- .4 Non-combustible to CAN/ULC S114.
- .5 Engineering Judgment: For those fireproofing applications shown for which no ULC tested design is available through a manufacturer, an engineering judgment signed and sealed by the applied fireproofing manufacturer's Professional Engineer, derived from similar UL system designs or other tests is to be obtained and submitted to local authorities having jurisdiction for their review and approval prior to installation. Submit documentation to substantiate such review and approval.
- .2 Assemblies: Provide applied fire protection, including auxiliary materials, identical to those tested according to requirements of each fire-resistance design, inspecting organizations acceptable to authorities having jurisdiction and manufacturer's written instructions.
- .3 Products that when applied shall maintain the original fire rating of the steel member.
- .4 Dry mix sprayed fire resistive materials containing mineral fibers are not allowed.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 AD Fire Protection Systems / Carboline Company.
- .2 GCP Applied Technologies.
- .3 Isolatek International.

2.4 APPLIED FIREPROOFING

- .1 Standard Density or Medium Density Applied SFRM **FP-01**:
 - .1 Portland cement based or gypsum based, factory-mixed, dry formulation, mixed with water at Project site to form a slurry or mortar before conveyance and application.
 - .2 Dry Density: Minimum 15 lbs/ft (240 kgs/m³) tested to ASTM E605.
 - .3 Cohesion/Adhesion (Bond Strength): Minimum 150 lbs/ft² (7.2 kPa).
 - .4 Deflection: Applied fireproofing shall not crack, spall or delaminate under downward deflection conditions over 10'-0" (3 m) clear span tested to ASTM E759.
 - .5 Compressive Strength of minimum 1440 lbs/ft² (68.9 kPa) tested to ASTM

E761/E761M.

- .6 Corrosion: Applied fireproofing material shall not contribute to corrosion of test panels to ASTM E937/E937M.
- .7 Fire Performance: Non-combustible when tested to CAN/ULC S114 or when tested to CAN/ULC S102 has maximum 0 FSV and maximum 0 SDV.
- .8 Product:
 - .1 "CAFCO Blaze-Shield II" by Isolatek International
 - .2 "Southwest Fireproofing Type 7GP" by Carbolite Company
- .2 Cutting and Patching of Existing SFRM:
 - .1 Subject to compliance with requirements, acceptable products may include the following:
 - .1 Pyrocrete 239 by Carbolite Company.
 - .2 Monokote Z106/HY by GCP Applied Technologies Inc.
 - .3 Cafco® 400: Isolatek® Type 400 by Isolatek International.
 - .4 Type 7GP by Southwest Fireproofing Products Co.

2.5 AUXILIARY MATERIALS

- .1 General: Provide auxiliary materials that are compatible with applied fireproofing and substrates and are approved by ULC and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- .2 Bonding Agent: Type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.
- .3 Substrate Primers: Type recommended by fireproofing manufacturer, compatible with materials.
- .4 Sealer:
 - .1 Type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.
 - .2 Fire Performance: Tested to CAN/ULC S102, maximum 5 Flame Spread Rating and maximum 5 Smoke Developed Rating.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work.
- .2 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

- .3 Ensure that items required to penetrate applied fireproofing are placed before installation of applied fireproofing or ensure that ducts, piping, equipment, or other items which would interfere with application of applied fireproofing are not positioned until applied fireproofing work is completed.

3.2 PREPARATION

- .1 Substrate shall be free of material which may impair bond or act as a bond breaker to comply with applied fireproofing manufacturer's written requirements.
- .2 Remove incompatible materials.
- .3 Prime substrates where included in fire-resistance design and where recommended in writing by applied fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive applied fireproofing.

3.3 INSTALLATION

- .1 Comply with applied fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply applied fireproofing, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- .2 Apply fireproofing to uniform density and texture.
- .3 Tamp smooth, surfaces visible in finished work.
- .4 Where sprayed fireproofing meets intumescent fireproofing provide 100 mm (4 inch) to 150 mm (6 inch) overlap.
- .5 Do not install enclosing or concealing construction until after applied fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

3.4 FIELD QUALITY CONTROL

- .1 Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - .1 Inspections: Perform field inspection of applied fireproofing for compliance with requirements. Inspection may include the following:
 - .1 When preparatory work of this Section is complete, but before installation begins.
 - .2 Once during progress of work at 60% complete.
 - .3 Upon completion of work.
 - .2 Tests: Field testing shall be performed during the course of the Work. Testing requirements shall be determined by qualified testing agency from among the following tests. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense:
 - .1 Density: Test two specimens to ASTM E 605/E605M.

- .2 Bond strength: Adhesion bond strength tested to ASTM E736.
 - .3 Thickness: Measured with a calibrated thickness gauge to ASTM E 605/E605M.
 - .4 Remove and replace deficient materials for retesting as specified above.
- .2 Manufacturer's Field Service: Manufacturer's representative shall be present at preinstallation meeting, first installation, and periodically during installation.
 - .3 Prepare test and inspection reports.

3.5 ADJUSTING

- .1 Repair applied fireproofing damaged by other work before concealing it with other construction.
- .2 Repair applied fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

3.6 CLEANING

- .1 Immediately after completing application operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

3.7 PROTECTION

- .1 Provide temporary enclosures to prevent spray from contaminating air beyond application area.
- .2 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 This section includes firestopping for through-penetrations and joints in or between the following fire-resistance rated assemblies, including both blank openings, linear openings, and openings containing penetrating items:
 - .1 Floor-ceiling assemblies.
 - .2 Roof-ceiling assemblies.
 - .3 Walls and partitions.
 - .4 Smoke barriers.
 - .5 Construction enclosing compartmentalized areas.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems are installed according to specified requirements.
 - .2 Coordinate application of firestopping with other related work specified in other Sections to comply with the following requirements:
 - .3 Do not cover up penetration firestopping system installations that will become concealed behind other construction until each installation has been examined by inspecting agency and building inspector, if required by authorities having jurisdiction.
- .2 Preinstallation Conference: Conduct conference at Project site.
 - .1 Verify project requirements,
 - .2 Procedures to be adopted.
 - .3 Verify substrate conditions.
 - .4 Review manufacturer's installation instructions.

1.3 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for each product including manufacturer's written installation instructions.
 - .2 Submit ULC design references and test reports indicating conformance of firestopping and smoke seal materials to requirements of CAN/ULC S115.

- .2 Shop Drawings: Submit shop drawings showing applicable project specific conditions.
 - .1 Identify construction condition in which firestopping and smoke seals are installed and relationships to adjoining construction.
 - .2 Identify listings applicable to each configuration, including illustrations, from a qualified testing and inspecting agency acceptable to authorities having jurisdiction, demonstrating compliance with specified requirements.
- .3 Delegated Design: Submit engineered shop drawings for engineering judgements.
 - .1 Where project conditions require modification to an accredited third-party testing agency's listed system design to address a firestopping condition that is not covered by a listed system, submit engineered shop drawings detailing the modifications to the listed system design as an engineering judgment or equivalent fire-resistance-rated assembly, for each Project location and condition.
 - .2 Submit the manufacturer's engineering judgment identification number and shop drawing details prepared by a Professional Engineer.

1.4 INFORMATIONAL SUBMITTALS

- .1 Field Quality Control Reports: Submit inspection and testing reports.

1.5 QUALITY ASSURANCE

- .1 Source Limitations: Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from a single manufacturer.
- .2 Installer Qualifications:
 - .1 Perform work of this Section only by a Subcontractor of recognized standing who has adequate plant, equipment, and skilled workers to perform it expeditiously, and have full knowledge of the specified systems, and the requirements of applicable underwriter test designs and jurisdictional authorities.
 - .2 Engage an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991, Certified by ULC as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer's willingness to sell its firestopping products to Contractor or to an installer engaged by Contractor does not in itself confer qualifications on buyer.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver penetration firestop system products and materials to the Project site in manufacturer's original, unopened containers or packaging with intact and legible manufacturers' labels identifying product and manufacturer, brand, type, and grade, date of manufacture, lot number, shelf life if applicable, qualified testing and inspection agency's classification marking applicable to the Project, curing time, and mixing instructions for multi-component materials.
- .2 Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes. Store in protected dry location off ground in accordance with manufacturer's instructions. Do not open packaging nor

remove labels until time for installation.

1.7 FIELD CONDITIONS

- .1 Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- .2 Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 WARRANTY

- .1 Special Warranty: Submit five (5) year written warranty signed by the manufacturer and Installer, agreeing to repair or replace Work which has shown any evidence of deterioration, failed to provide an airtight seal, failed to provide a watertight seal where required, failed in adhesion or cohesion, or otherwise failed as a result of defects in materials or workmanship. Upon notification of such defects, within the warranty period, make necessary repairs or replacement at the convenience of the Owner. Other warranties may not be substituted by the Contractor for the terms of this special warranty

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 The design of firestopping is the responsibility of Contractor. Individual through-penetration systems, construction-gap firestopping, through-penetration smoke-stopping, and construction-gap smoke-stopping will be selected by the Contractor to meet the requirements of the Contract Documents and governing codes.
- .2 Firestopping and smoke seal systems capable of maintaining an effective barrier against flame, smoke, gases and water in compliance with the requirements of CAN/ULC-S115 and not to exceed the opening sizes for which they are intended.
- .3 Provide penetration firestop systems, fire-resistive joint systems, or perimeter fire barrier systems subjected to an air leakage test conducted in accordance with Standard, CAN/ULC-S115 with published L-Ratings for ambient and elevated temperatures as evidence of the ability of firestop system to restrict the movement of smoke.
- .4 Provide T-Rating Collar Devices tested in accordance with CAN/ULC-S115 for metallic pipe penetrations requiring T-Ratings per the building code.
- .5 Provide firestopping with STC rating equal or better to STC rating of fire rated assembly. Comply with NRC Best Practice Guide on Fire Stops and Fire Blocks and their Impact on Sound Transmission including;
 - .1 Best Practice for Fire Stops for Pipe Penetrations.
 - .2 Best Practice for Fire Stops for Electrical Service Penetrations.
 - .3 Best Practice for Fire Stops for Mechanical Service Penetrations.
 - .4 Best Practice for Fire Blocks.

- .6 In all fire separations provide tested fire stop systems at all penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways and similar items through fire- rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- .7 Fire-resistive joint systems for floor-to-wall, head-of-wall, wall-to-wall joints. Joints capable of 50% movement.
- .8 Provide through penetration firestops which have been tested and listed to meet every condition in the Work. Do not provide materials or systems that are not part of a tested system, suitable for the condition; or not certified by manufacturer as an engineered modification.
- .9 Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
- .10 Provide moisture-curing products where inclement weather or greater than transient water exposure is expected.
- .11 Provide a fire-rated grommet for all individual or small grouped cable applications up to 0.53 inch (14 mm).

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Firestopping and Smoke Seals List: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 3M Canada Inc.
 - .2 Hilti Canada Corp.
 - .3 NUCO Inc.
 - .4 Specified Technologies Inc.
 - .5 Tremco Commercial Sealants & Waterproofing.

2.4 MATERIALS

- .1 General:
 - .1 Firestopping materials shall include materials and systems capable of

- maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN/ULC S115 and not to exceed opening sizes for which they are intended and listed in ULC Listings for Firestop Systems and Components or UL Listing Mark for Canada and United States (cULs) or UL Listing Mark for Canada (cUL).
- .2 Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
 - .3 Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
 - .4 Colours: Red is not acceptable at locations exposed to view in public areas unless otherwise required by Authorities having Jurisdiction.
- .2 Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
- .3 Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve made of polypropylene materials lined with an intumescent strips within device and fire rated cloth closures that allow for future reconfiguration of cables and addition of future cabling without the need to demolish, remove or replace firestop, and a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- .1 Product: Specified Technologies, Inc. SpecSeal CD Cast-In Firestop Device
- .4 Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- .5 Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:
- .1 Product:
 - .1 Specified Technologies, Inc. SpecSeal Series LC Endothermic Sealant
- .6 Elastomeric Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture and accommodate minimum ± 25 percent movement, the following products are acceptable:
- .1 Products:
 - .1 Specified Technologies, Inc. SpecSeal Series AS Elastomeric Spray
 - .2 Specified Technologies, Inc. SpecSeal Series ES Elastomeric Sealant
- .7 Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- .1 Products:
 - .1 Specified Technologies, Inc. SpecSeal Series SSC Firestop Collars
 - .2 Specified Technologies, Inc. SpecSeal Series LCC Firestop Collars

- .8 Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating on all six sides contained in a flame retardant poly bag, the following products are acceptable:
 - .1 Product: Specified Technologies, Inc. SpecSeal Series SSB Firestop Pillows
- .9 Fire Rated Cable Management Devices/Pathways:
 - .1 Factory assembled devices that can be opened and closed for re-penetration and capable of being retrofitted around existing cables to achieve fire and leakage ratings, the following products are acceptable:
 - .2 Locate firestop locations where frequent cable moves, add-ons and changes will occur. Such devices shall be:
 - .1 Capable of retrofit around existing cables
 - .2 Designed such that two or more devices can be ganged together
 - .3 Maintenance free such that no action is required to activate the smoke and fire sealing mechanism.
 - .3 When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
 - .4 Product:
 - .1 Specified Technologies Inc. EZ-Path Fire Rated Pathway
- .10 Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts, the following products are acceptable:
 - .1 Product: Specified Technologies, Inc. SpecSeal FyreFlange Firestop Angles
- .11 Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material capable of expanding minimum 10 times with expansion beginning at 350°F (177°C) for use in blank openings and cable sleeves, the following products are acceptable:
 - .1 Product: Specified Technologies, Inc. SpecSeal Series FP Firestop Plug
- .12 Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing cable penetrations up to 0.53 in. (14 mm) diameter, the following products are acceptable:
 - .1 Product: Specified Technologies, Inc. EZ-Firestop Grommet (RFG1 or RFG2)
- .13 Fire-Rated Closet Flange Gasket: Molded, single-component, intumescent gasket for use beneath a closet flange in floor applications, the following products are acceptable:
 - .1 Product: Specified Technologies, Inc. SpecSeal Series CF34 Closet Flange Firestop Gasket
- .14 Intumescent Composite Sheets:
 - .1 Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
 - .2 Capable of sustaining a minimum 2,500 lbs (1,134 kg) when subjected to load testing.
 - .3 Product: Specified Technologies, Inc. SpecSeal CS Composite Sheet

- .15 Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
 - .1 Product:
 - .1 Specified Technologies, Inc. SpecSeal Series SSP Firestop Putty
- .16 Intumescent Putty Pads: Moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering, for molding around electric boxes and other equipment items embedded in fire rated construction.
 - .1 Products:
 - .1 Specified Technologies, Inc. SpecSeal Series SSP Firestop Putty Pads
 - .2 Specified Technologies, Inc. SpecSeal Series EP PowerShield Insert Pads
- .17 Intumescent Sealants: Single component intumescent latex formulations containing no water soluble intumescent ingredients capable of expanding a minimum 8 times, the following products are acceptable:
 - .1 Products:
 - .1 Specified Technologies, Inc. SpecSeal Series SSS Intumescent Sealant
 - .2 Specified Technologies, Inc. SpecSeal Series LCI Intumescent Sealant
- .18 Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- .19 Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
 - .1 Product: Specified Technologies, Inc. SpecSeal Series SSM Firestop Mortar
- .20 Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- .21 Protective Wrap: Endothermic wrap incorporating foil scrim evaluated for protection of cable pathways, liquid fuel lines, as well as in through-penetration and membrane-penetration firestopping.
 - .1 Product: Specified Technologies, Inc. E-Wrap™ Endothermic Wrap
- .22 Sealant Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of non-sag grade for both opening conditions.
- .23 Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
 - .1 Product: Specified Technologies, Inc. Pensil 200 Silicone Foam.
- .24 Silicone Sealants: Single-component, silicone-based, neutral-curing or moisture curing silicone sealants for horizontal surfaces (pourable or non-sag) or vertical surface (non-

sag).

.1 Products:

- .1 Specified Technologies, Inc. SpecSeal SIL300 Silicone Firestop Sealant
- .2 Specified Technologies, Inc. SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant'

.25 Smoke and Acoustic Sealant: high performance acrylic based sealant for sealing construction joints and through penetrations in non-fire-rated assemblies to reducing the transmission of sound through wall openings.

.1 Product: CP506 Smoke and Acoustic Sealant.

.26 Weather Resistant Coatings: Moisture curing, single component silicone copolymer elastomeric spray coatings for horizontal surfaces where greater water resistance is required or inclement weather is anticipated, the following products are acceptable:

.1 Product: Specified Technologies, Inc. SpecSeal FT305 Firestop Spray

.27 Wrap Strips:

.1 Single component intumescent elastomeric strips faced on both sides with a plastic film and capable of expanding a minimum 30 times, the following products are acceptable:

.2 Products:

- .3 Specified Technologies, Inc. SpecSeal Series RED2 Wrap Strip
- .4 Specified Technologies, Inc. SpecSeal Series BLU2 Wrap Strip

2.5 MIXING

.1 Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions with will adversely affect the performance of this Work.

.2 Examine sizes and conditions of voids to be filled and establish correct thicknesses and installation of materials.

.3 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Prepare surfaces in contact with smoke seals materials to manufacturer's instructions.
- .2 Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - .1 Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - .2 Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - .3 Remove laitance and form-release agents from concrete.
- .3 Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- .4 Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- .1 Install firestopping and fire rated sealant Products in accordance with product manufacturer's installation instructions and as specified herein.
- .2 Firestop system installation shall meet requirements of CAN/ULC S115 and ASTM E1966 tested assemblies that achieve a fire rating equal to that of construction being penetrated.
- .3 In all unrated fire separations provide tested smoke seal systems at all gaps between the top of walls and ceilings, floors or roof assemblies.
- .4 Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - .1 After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- .5 Install fill materials by proven techniques to produce the following results:
 - .1 Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - .2 Apply materials so they contact and adhere to substrates formed.
- .6 Seal all openings or voids made by penetrations to ensure an air and water resistant seal.
- .7 Consult with mechanical engineer, project manager, and damper manufacturer prior to

installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

- .8 Apply a suitable bond-breaker to prevent three-sided adhesion in applications where this condition might occur such as the intersection of a gypsum wallboard/steel stud wall to floor or roof assembly where the joint is backed by a steel ceiling runner or track.
- .9 Where joint application is exposed to the elements, fire-resistive joint sealant shall be approved by manufacturer for use in exterior applications.
- .10 All non-rated fire separations and fire separations required to have a fire resistance rating in vertical and horizontal locations shall incorporate a smoke seal.
- .11 All zero-rated fire separations shall be constructed as a smoke barrier to smoke. All service penetrations and wall intersections shall be caulked with sealant.
- .12 Notify Consultant immediately upon discovery of any missing smoke seals discovered in the course of this Work.
- .13 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- .14 Keep areas of work accessible until inspection by applicable Authorities Having Jurisdiction.

3.4 INSTALLATION - FIRESTOPPING AND SMOKE SEAL AT TOP OF FIRE RATED CONCRETE BLOCK WALLS AND GYPSUM BOARD PARTITIONS ABUTTING UNDERSIDE OF STRUCTURE

- .1 Fill space with properly sized firestopping.
- .2 Pack firestopping from both sides of partition.
- .3 Butt each firestop section tightly against preceding section. Leave no voids.
- .4 Apply fire rated sealant in accordance with manufacturer=s recommendations.

3.5 INSTALLATION - FIRESTOPPING AND SMOKE SEAL OF JOINTS AT INTERSECTION OF FIRE RATED CONCRETE BLOCK WALLS AND GYPSUM BOARD PARTITIONS

- .1 Fill space with properly sized firestopping.
- .2 Pack firestopping from both sides of wall.
- .3 Butt each firestop section tightly against preceding section. Leave no voids.
- .4 Apply fire rated sealant in accordance with manufacturer=s recommendations.

3.6 INSTALLATION - MECHANICAL AND ELECTRICAL PENETRATION FIRESTOPPING AND SMOKE SEAL

- .1 Apply firestopping and smoke seal to mechanical and electrical through penetrations.
- .2 Apply 13 mm bead of fire rated sealant at interface of retaining angles around fire dampers where retaining angles meet fire rated walls, floors, or ceilings.
- .3 Apply fire rated sealant to unpenetrated openings and sleeves installed for future use through fire rated assemblies.
- .4 Where necessary, remove insulation from insulated pipes and ducts where pipes or ducts penetrate a fire separation, unless ULC certified assembly permits such insulation to remain within the fire rated assembly.

3.7 **INSTALLATION - CABLE MANAGEMENT PENETRATION FIRESTOPPING AND SMOKE SEALS**

- .1 Apply firestopping and smoke seal to cable management through penetrations and at the vertical ladder tray assemblies in accordance with ULI certified assemblies and as follows:
 - .1 Through floor firestopping cap devices.
 - .2 Smoke seal gaskets.
 - .3 Firestopping.
 - .4 Stay plates.
 - .5 Wedge assemblies.
 - .6 Insert modules.
 - .7 Intumescent wraps/strips.
- .2 Apply fire rated, non-toxic, smoke and gas tight, synthetic elastomer type putty at zone cable pass-throughs at the vertical ladder tray assemblies.
- .3 Apply fire rated, non-toxic, smoke and gas tight, synthetic elastomer type putty at metal sleeves through fire rated assemblies.
- .4 Apply fire rated, non-toxic, re-useable, intumescent type firestop pillows at metal sleeves for future use through fire rated assemblies.

3.8 **IDENTIFICATION**

- .1 Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
 - .1 Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).
- .2 Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces

on which labels are placed. Include the following information on labels:

- .1 The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
- .2 Subcontractor's name, address, and phone number.
- .3 Designation of applicable testing and inspecting agency.
- .4 Date of installation.
- .5 Manufacturer's name.
- .6 Installer's name.

3.9 FIELD QUALITY CONTROL

- .1 Testing Agency: Owner shall engage a qualified testing agency to perform tests and inspections.
- .2 Manufacturer's Field Service: Manufacturer's representative shall be present at preinstallation meeting, first installation, and periodically during installation. As a minimum, furnish representative's attendance during the first day of installation for each major type of firestop material, and furnish technical assistance to the Installer as may be required.
- .3 Inspections: Perform field inspection of firestopping and smoke seals for compliance with requirements in accordance with ASTM E2174 and ASTM E2393 or other recognized standards. Inspection shall include the following:
 - .1 Verify that firestopping systems have been constructed in compliance with the submitted designs for fire rating required by the Contract Documents and are acceptable to authorities having jurisdiction.
 - .2 Do not proceed with installation of joint systems for the next area unit inspecting agency determines work shows compliance with requirements.
 - .3 Inspections shall include:
 - .1 Visual inspection of substrates before installation of firestopping to ascertain that preparation has been performed in accordance with the Contract Documents.
 - .2 Inspect visually for gaps or voids in the smoke seals.
 - .3 Visual inspection of completed work including removal of damming materials if used to ensure an adequate and complete fire and smoke seal.
 - .4 Inspect each type of smoke seal per floor level. Where high numbers of defective smoke seals found during inspection, increase number of each type smoke seal inspections as required to locate the defective installation and application procedures.
 - .5 Final inspection after other trades have completed Work in contact with firestopping material, but before firestopping material is covered.
- .4 Tests: Field testing shall be performed during the course of the Work. Testing requirements shall be determined by qualified testing agency from among the following tests. Retesting of materials that fail to comply with specified requirements shall be done at Subcontractor's expense:

- .1 Using a smoke pencil, check for any air movement through the smoke seals.
- .2 Test for lack of adhesion of smoke seal to adjacent material and lack of cohesion within the smoke seal material.
- .3 Test each type of smoke seal per floor level. Where high numbers of defective smoke seals found during testing, increase number of each type smoke seal tests as required to locate the defective installation and application procedures.
- .5 Where smoke seals are removed, replaced and/or repaired, all additional testing required to determine compliance with the specified performance requirements shall be paid by the Subcontractor at no additional cost to the Owner.
- .6 Perform under this Section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades
- .7 Prepare test and inspection reports.
- .8 Inspect and test each type of firestopping and smoke seals per floor level. Where high numbers of defective firestopping and smoke seals found during testing and inspection, increase number of each type of firestopping and smoke seal inspections and tests as required to locate the defective installation and application procedures.
- .9 Contractor shall not proceed with firestopping and smoke seals of the next area unless test results of previously completed firestopping and smoke seals work show compliance with the specified performance requirements.
- .10 Additional testing: Where firestopping and smoke seals are removed, replaced and/or repaired, all additional testing required to determine compliance with the specified performance requirements shall be paid by the Contractor.

3.10 CLEANING

- .1 Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

3.11 PROTECTION

- .1 Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Performance of the Work.
- .2 Protect materials from damage on surfaces subjected to traffic.
- .3 If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Latex Joint Sealant **SE-06**
 - .2 Mildew-Resistant Silicone Sealant **SE-09**
 - .3 Acoustical Joint Sealant **SE-10**
 - .4 Joint Sealant Backing

1.2 REFERENCES

- .1 Definitions:
 - .1 Non-staining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with the other Subcontractors responsible for the adjacent building envelope to ensure a continuous air barrier is installed to building envelope, in particular pay close attention to continuity with precast concrete cladding panels.
- .2 Preinstallation Conference: Conduct conference at Project site.
 - .1 Verify project requirements, including mockup requirements.
 - .2 Review foreseeable methods and procedures related to sealing joints between substrates, including but not limited to, the following:
 - .1 Review joint substrates requiring sealant and the condition of each surface, sealant application, flashing details, and other preparatory work.
 - .2 Review joint sealant requirements as indicated on the drawings and in the specifications and other contract documents.
 - .3 Review required submittals.
 - .4 Review potential weather conditions and procedures for addressing unfavorable conditions.
 - .5 Review backing materials, shapes of joint sealants, sizes of joint sealants.

1.4 ACTION SUBMITTALS

- .1 Product Data: Submit manufacturer's technical data for each type of joint sealant product specified including related accessories.
- .2 Samples for Initial Section: Submit Sealant manufacturer's colour charts showing the full

range of colours available for each type of sealant required for the work.

- .3 Samples for Verification: Submit 100 mm (4 inch) length of sealant bead colour.
- .4 Joint Sealant Schedule: Submit joint sealant schedule including the following information:
 - .1 Joint-sealant application, joint location, and designation.
 - .2 Joint-sealant manufacturer and product name.
 - .3 Joint-sealant formulation.
 - .4 Joint sealant colour.

1.5 INFORMATIONAL SUBMITTALS

- .1 Pre-Construction Testing: Submit testing reports.

1.6 QUALITY ASSURANCE

- .1 Source Limitations: Use one type of sealant throughout the Work for each type of sealant.
- .2 Installer/Applicator Qualifications: Sealant work shall be performed by a firm having 5 years successful experience installing specified materials on projects of comparable size and scope.

1.7 PRECONSTRUCTION TESTING

- .1 Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants. Where joint sealant manufacturers have completed independent inspection and testing for adhesion, compatibility, and stain testing within twenty-four (24) months of issuance of bid such testing preconstruction laboratory testing is not required and such testing reports can be submitted instead.
 - .1 Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - .2 Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - .3 Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with stone and masonry substrates.
 - .4 Submit manufacturer's recommended number of pieces of each type of material, but not less than 8 pieces of each kind of material, including joint substrates, joint-sealant backings, shims, secondary seals and miscellaneous materials.
 - .5 Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - .6 For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
 - .7 Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other

materials matching those submitted.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Comply with product manufacturer's written requirements.
- .2 Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- .3 Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.9 FIELD CONDITIONS

- .1 Weather Conditions:
 - .1 Comply with product manufacturer's written requirements.
 - .2 Do not apply silicone joint sealants in snow, rain, fog or mist, or when such conditions are expected.
 - .3 Allow joint surfaces to attain dry conditions as recommended by product manufacturer before joint sealant application.
- .2 Keep organic joint sealant materials heated to at least 16°C when working at temperatures below 10°C.

1.10 WARRANTY

- .1 Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - .1 Warranty Period: Two years from date of Substantial Completion.
- .2 Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - .1 Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - .2 Disintegration of joint substrates from natural causes exceeding design specifications.
 - .3 Mechanical damage caused by individuals, tools, or other outside agents.
 - .4 Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MANUFACTURERS

- .1 Joint Sealant manufacture list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 Dow.
 - .2 Master Builders Solutions.
 - .3 Momentive
 - .4 Nuco Inc.
 - .5 Pecora.
 - .6 Sika Canada Inc.
 - .7 Tremco Canada.

2.3 MATERIALS, GENERAL

- .1 Liquid-Applied Joint Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- .2 Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.
- .3 Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- .4 Colours of Exposed Joint Sealants: Colour to be later selected by Consultant from manufacturer's full colour range where not specified.

2.4 LATEX JOINT SEALANTS

- .1 Latex Joint Sealant **SE-06**: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - .1 Products:
 - .1 MasterSeal NP 520 by Master Builders Solutions.
 - .2 AC-20+ by Pecora Corporation.
 - .3 Tremflex 834 by Tremco.

2.5 NON-STAINING SILICONE JOINT SEALANTS

- .1 Mildew-Resistant Silicone Sealant **SE-09**: ASTM C920, Type S, Grade NS, Class 25 or 50, for Use NT.
 - .1 For joints in restrooms, janitor's closets, and other areas subject to continued moisture exposure or high humidity, including door frames and all static joints.
 - .2 Products:
 - .1 786 Mildew Resistant by Dow Corning Corporation.
 - .2 SCS 1700 by GE Silicones.
 - .3 898 by Pecora Corporation.
 - .4 Sikasil GP by Sika.
 - .5 Tremsil 200 Sanitary by Tremco.

2.6 ACOUSTICAL JOINT SEALANT

- .1 Acoustical Joint Sealant **SE-09**:
 - .1 Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834.
 - .2 Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
 - .3 Products: Subject to compliance with requirements, provide one of the following:
 - .1 RCS20 by GE Silicones.
 - .2 Acoustical Sealant by USG Sheetrock.
 - .3 AC20 FTR by Pecora Corporation.
 - .4 CP 506 by Hilti Canada Corp.

2.7 JOINT SEALANT BACKING

- .1 General: Provide sealant backings of materials that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- .2 Cylindrical Sealant Backings Filler Type **JF-01**: ASTM C1330, type indicated below, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - .1 Bi-cellular Flexible Polyethylene or Polyolefin Foam Rod: Type B, Cylindrical, flexible sealant backings composed of bi-cellular material, for use as gasket or sealing material.
 - .1 Provide one of the following:
 - .1 SOF Rod by Nomaco.
 - .2 Titan Foam by Backer Rod Mfg. Inc.
 - .3 FillPro Soft Type Backer Rod by Armacell LLC.

- .4 MasterSeal 921 by Master Builders Solutions.
- .2 Closed Cell Backer Flexible Polyethylene Rod (for horizontal joints susceptible to moisture prior to joint sealing): Type C (closed-cell material with a surface skin for use with cold applied sealants, as a gasket or sealing material).
 - .1 Provide one of the following:
 - .1 HBR by Nomaco.
 - .2 MasterSeal 920 by Master Builders Solutions.
 - .3 Mile High Foam by Backer Rod Manufacturing, Inc.
 - .4 FilPro Standard Closed Cell Backer Rod by Armacell LLC)
 - .5 Backer Rod Cross-Linked by Tremco.
 - .3 Open Cell Backer Rod (for use with moisture curing low modulus, slow curing, high performance silicone sealants): Type C, Type C (closed-cell material with a surface skin for use with cold applied silicone sealants, as a gasket or sealing material).
 - .1 Provide one of the following:
 - .1 FillPro Standard Closed Cell Polyethylene Foam Backer Rod by Armacell LLC
 - .2 Denver Foam by Backer Rod Manufacturing.
 - .3 FilPro Open Cell Backer Rod by Armacell LLC.
- .3 Closed Cell Polyethylene Filler Type: Not less than 3 psi (21 kPa) for 25% compression resistance, highly resistant to petroleum oils and solvents.
- .4 Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.
- .5 Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- .6 Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- .7 Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Comply with product manufacturer's written recommendations.
- .2 Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
 - .1 Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
 - .2 Remove laitance and form-release agents from concrete.
 - .3 Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- .3 Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- .4 Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

- .1 Install products in accordance with product manufacturers written recommendations and ASTM C1193.
- .2 Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability. Where joints are 1/2" (12 mm) or deeper, insert continuous joint sealant backing material with setback from finished face of adjoining materials half the width of the joint.
 - .1 Do not leave gaps between ends of sealant backings.
 - .2 Do not stretch, twist, puncture, or tear sealant backings.
 - .3 Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- .3 Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- .4 Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
 - .1 Place sealants so they directly contact and fully wet joint substrates.
 - .2 Completely fill recesses in each joint configuration.
 - .3 Produce uniform, cross-sectional shapes and depths relative to joint widths that

- allow optimum sealant movement capability.
- .4 Install joint sealants at building envelope and openings to make cladding installation watertight where cladding types meet one another or meets opening framing such as doors, windows, curtain wall, and penetrations or openings of mechanical and electrical services.
- .5 Do not apply joint sealants to areas where installation of paints, coatings or flooring is in progress. Apply sealants after such work is complete and fully cured.
- .6 Apply exterior joint sealants to form waterproof joint. Lap vertical joints over horizontal joints.
- .7 Joint sealant face surfaces shall be smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities.
- .8 Install sealant with exterior face of sealant set back 3/8" (10 mm) from face of adjacent materials at building movement joints, unless otherwise indicated.
- .5 Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - .1 Remove excess sealant from surfaces adjacent to joints.
 - .2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - .3 Provide concave joint as indicated in Figure 5-A in ASTM C1193 unless otherwise indicated on drawings or specified.
- .6 Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

- .1 Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- .2 Manufacturer's Field Service: Manufacturer's representative shall be present at preinstallation meeting, first installation, and periodically during installation. Manufacturer's rep shall provide on-site training of installers for the initial installation crew.
- .3 Inspections: Perform field inspection of joint sealant work for compliance with requirements. Inspection may include the following:
 - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of work at 25% and 60% complete.
 - .3 Upon completion of work, after cleaning is carried out.
- .4 Tests: Before installing sealants, field test their adhesion to Project joint substrates. Notify Consultant seven days in advance of dates and times when test joints will be erected.
 - .1 Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C

1521.

- .2 Perform minimum five (5) field adhesion tests for the first 300 m (1,000 lineal feet) for each type of sealant and substrate.
- .3 Perform minimum one (1) test for each 300 m (1000 lineal feet) of sealant joint length thereafter or (1) test for each floor height per elevation.
- .4 Keep a daily log which records adhesion testing.
- .5 Remove and replace deficient materials for retesting as specified above.
- .5 Prepare test and inspection reports.

3.5 CLEANING

- .1 Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 JOINT SEALANT SCHEDULE

- .1 Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces Latex Joint Sealant **SE-06**.
 - .1 Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - .2 Field-painted vertical and overhead gypsum board surfaces.
 - .3 Other interior locations not indicated otherwise.
 - .4 Other joints as indicated.
- .2 Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces Mildew-Resistant Silicone Sealant **SE-09**
 - .1 Joints between plumbing fixtures and adjoining walls, floors, and millwork counters, between backsplash and walls.
 - .2 Joints between toilet accessories and adjoining walls, floors and counters.
 - .3 Control and expansion joints in or around surfaces of solid surfacing materials, and plastic laminate in toilet rooms, showers, and kitchens, and other wet areas subject to moisture and mildew.
 - .4 Other joints as indicated.
- .3 Joint-Sealant Application: Interior joints in vertical and horizontal nontraffic surfaces; Acoustical Joint Sealant **SE-10**:
 - .1 Joints which form parts of acoustical details.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Uninsulated steel frames including transom frames, sidelights, and window assemblies.
 - .2 Uninsulated steel doors and panels.

1.2 REFERENCES

- .1 Definitions:
 - .1 Defining Opening Sizes:
 - .1 Width: Widths of openings shall be measured from inside to inside of frame jamb rabbets (frame rabbet width or nominal door width).
 - .2 Height: Heights of openings shall be measured from the finished floor, exclusive of floor coverings, to the head rabbet of the frame (frame rabbet width or nominal door width).

1.0 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Cooperate with door hardware distributor's representative during preparation of shop drawings and execution of shop fabrication. Be responsible to provide adequate reinforcing, clearances, for door hardware specified and for accurate installation of door and door hardware on site.

1.1 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of steel door and steel frame or material.
- .2 Shop Drawings:
 - .1 Indicate each type of door, frame, steel, construction and core.
 - .2 Indicate material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, panelled or louvered) and arrangement of standard hardware.
 - .3 Include schedule identifying each unit, with door marks and numbers relating to numbering Door Schedule on drawings.
 - .4 Indicate fire ratings for fire rated doors and frames.
 - .5 Indicated sound rating doors and frames.
 - .6 Indicate electrified door hardware requirements and preparations.
 - .7 Provide details of door hardware locations, anchorage and fastening methods.

1.2 QUALITY ASSURANCE

- .1 Quality Standard: Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- .2 Manufacturer Qualifications:
 - .1 Provide doors and frames manufactured by a firm specializing in the design and production of hollow metal steel doors and frames.
 - .2 Manufacturer of doors and frames shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Comply with CSDMA, Guide Specification For Installation and Storage of Hollow Metal Doors and Frames.
- .2 Doors and frame product shall be removed from their wrappings or coverings upon receipt on site, be stored in a vertical position, and be spaced with blocking to permit air circulation between them.
- .3 Materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported, in writing, to the supplier.
- .4 Damages incurred during shipment shall be noted on the carrier's Bill of Lading and immediately reported, in writing, to the supplier.
- .5 Scratches or disfigurement of doors or frame product caused by shipping or handling shall be promptly cleaned and touched-up with a zinc-rich primer.
- .6 Materials shall be stored on planks or dunnage, out of water and covered to protect from damage from any cause.

1.4 FIELD CONDITIONS

- .1 Verify steel door and frame products actual opening sizes and field conditions by field measurement before fabrication.

Part 2 Products

2.1 DESIGN/PERFORMANCE REQUIREMENTS

- .1 Regulatory Requirements:
 - .1 Fire-rated frame products shall be provided for those openings requiring fire protection as scheduled.
 - .2 Frames, transom and sidelight assemblies shall be listed for conformance with CAN/ULC S104.
 - .3 Window assemblies shall be listed for conformance with CAN/ULC S106.
 - .4 Fire-rated products shall bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be

- in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer.
- .5 Fire-rated products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.
- .6 Fire rated doors shall be installed so that clearances comply with NFPA 80:
- .1 Clearances dimension between doors and frames and meeting stiles of paired door shall be measured on the pull side of the assemblies.
- .2 The clearances between the top and vertical edges of hollow metal doors and the frames, and the meeting stiles of doors swinging in pairs, shall be 3.18 mm (1/8 inch) plus or minus 1.59 mm (1/16 inch).
- .3 Clearances under the bottom of the door shall be measured vertically from the bottom of the door to the top of the finished floor or threshold.
- .4 Where latching hardware devices project from the bottom of the door, the maximum clearance dimension under the door shall be in accordance with the hardware manufacturer's installation instructions and shall not exceed 19 mm (3/4 inch).
- .5 Clearance under the bottom of a door shall be maximum 19 mm (3/4 inch).
- .6 Where a threshold is installed under a fire door. The clearance shall be in accordance with the hardware manufacturer's instructions and listing.
- .7 Products evaluated for fire doors with a bottom clearance in excess of 19 mm (3/4 inch) and listed for use at or under the bottom of the fire door shall be permitted where installed in accordance with their listings.
- .2 Sound Control Steel Doors and Frames:
- .1 Supply and install doors and frames to meet STC ratings as scheduled or indicated.
- .2 Doors and frames with STC ratings shall accept standard door hardware.
- .3 Supply and install door cores, insulated frames, perimeter acoustic seals, and automatic door bottoms to meet STC ratings.
- .4 Where STC ratings cannot be achieved with standard hollow metal doors and frames with standard door cores, insulated frames, perimeter acoustic seals, and automatic door bottoms to meet STC ratings then supply and install sound control steel doors and frames which have been tested as an assembly.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Hollow metal doors and frames manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
- .1 All Steel Doors 2000 Ltd.
 - .2 Apex Industries Inc.
 - .3 Artek Door (1985) Ltd.
 - .4 Daybar Industries Ltd.
 - .5 Fleming Door Products (Assa Abloy).
 - .6 Gensteel Doors.
 - .7 LMT Group Inc.
 - .8 M.J. Daley Manufacturing Co. Ltd.
 - .9 Shanahan's Manufacturing Ltd.
 - .10 Trillium Steel Doors Limited.
 - .11 Vision Hollow Metal Limited.

2.4 MATERIALS

- .1 Steel:
- .1 Tensioned levelled steel to ASTM A924/A924M, galvanized or galvanized to ASTM A653/A653M, Commercial Steel CS, Type B, coating designation ZF180 (G60) or ZF120 (A40).
 - .2 Steel shall be free of scale, pitting, coil breaks, surface blemishes, buckles, waves, and other defects.
 - .3 Minimum thickness of coated sheet steel complying with ASTM A653/A653M in accordance with Appendix 1: Steel Thicknesses and gauges of CSDMA "Recommended Specifications for Commercial Steel Door and Frame Products".
- .2 Door Core Materials:
- .1 Honeycomb: Structural small cell 25.4 mm (1") maximum kraft paper 'honeycomb'. Weight: 36.3 kg (80 lb.) per ream minimum, density: 16.5 kg/m³ (1.03 lbs/ft³) minimum, sanded to required thickness.
 - .2 Fiberglass: Loose batt type, density 24 kg/m³ (1.5 lbs/ft³) minimum, conforming to ASTM C553 or ASTM C592.
 - .3 Temperature Rise Rated (TRR): Core composition to provide the fire-protection rating and limit the temperature rise on the unexposed side of door to 250°C at 30 or 60 minutes, as determined by governing building code requirements. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, covering the Standard Method of Tests of Door Assemblies and shall be listed by a nationally recognized testing agency having a factory inspection service.
- .3 Frame Insulation: Loose batt type, minimum density 24 kg/m³ (1.5 lbs/ft³) conforming to ASTM C553 or ASTM C592 or spray foam insulation.
- .4 Miscellaneous:

- .1 Door Silencers: Single stud rubber/neoprene type.
- .2 Interior Top Caps:
 - .1 Include flush caps at bottom of dutch door top panel and at top of dutch door bottom panel.
 - .2 Include flush caps at tops of doors which are visible from above in spaces such as atriums and the like when the doors are open.
- .3 Low Profile Metal Vision Frame:
 - .1 Accurately fitted, mitred at corners and fastened to frame opening with counter-sunk oval head sheet metal screws.
 - .2 Finish: As selected by Consultant from manufacturer's full range of colour.
 - .3 Product: LoPro Lo-Profile Metal Vision Frame by Anemostat Door Products.
- .4 Channel glazing stops formed from minimum 0.81 mm (0.032") (20 gauge) steel, 15.9 mm (5/8") high. Countersink exposed fasteners. Use flat head screws at maximum 305 mm (12") on centre.

2.5 FABRICATION, GENERAL

- .1 Welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.
- .2 Countersink exposed fasteners unless otherwise shown. Use flat head screws.
- .3 Glazing:
 - .1 For glazing materials up to and including 8 mm thick, doors shall be provided with snap-in glazing stops.
 - .2 For glazing materials greater than 8 mm thick, doors shall be provided with screw fixed glazing stops. Screws shall be installed at maximum 305 mm on centre.
 - .3 Glazing trim and stops shall be butted at corners, with removable glazing stops located on the 'push' side of the door.
- .4 Finish: Rust inhibiting primer finish.
- .5 Operating Clearances:
 - .1 Provide clearance at floor with allowance made for indicated finish flooring materials.
 - .2 Clearances for fire-rated doors shall comply with NFPA 80.
 - .3 Clearances for non-fire-rated doors:
 - .1 Not more than 3 mm (1/8 inch) at jambs and heads, except not more than 6 mm between pairs of doors.
 - .2 Not more than 19 mm (3/4 inch) at bottom.
- .6 Manufacturing Tolerances: Comply with CSDMA "Recommended Dimensional Standards For Commercial Steel Doors and Frames."

2.6 FABRICATION FRAMES

- .1 Interior Frames:
 - .1 Fabricate interior frame products from 16 gauge sheet steel.
 - .2 Frames shall be welded construction. Continuously weld internally all perimeter corner joint profile faces. Knock down frames are not permitted.
- .2 Interior Window Frames:
 - .1 Fabricate interior window frame products from 18 gauge sheet steel.
 - .2 Frames shall be welded construction. Continuously weld internally all perimeter corner joint profile faces. Knock down frames are not permitted.
 - .3 Face: 16 mm.
 - .4 Wide Soffit: 4.7 mm wide soffit.
 - .5 Product "Trimwall-A40 Paintable Galvanneal" by Fleming Door Products (Assa Abloy).
- .3 Frame product shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.
- .4 Mortised cutouts shall be protected with steel guard boxes except at metal stud locations.
- .5 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm (60 inches) provide two (2) anchors, and an additional anchor for each additional 760 mm (30 inches) of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 152 mm (6 inches) from the top and bottom of each jamb, and intermediate anchors at 660 mm (26 inches) on centre maximum. Fasteners for such anchors shall be provided by others.
- .6 Each door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two (2) for double door openings, except on gasketed frame product.
- .7 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .8 Welded Type
 - .1 Frame product shall be accurately mitered or mechanically jointed.
 - .2 As defined in Appendix 2 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products", frame product perimeter corner joints shall be:
 - .1 Profile welded; punch-mitered - continuously welded on the profile faces, rabbets, returns and soffit intersections, or saw-mitered - continuously welded on the profile faces, rabbets, returns, stops and soffit intersections. Punch or saw-mitered, at the manufacturer's discretion. All profile welded frame product exposed faces shall be filled and ground to a smooth, uniform, seamless surface. Face welded; continuously welded on the profile faces, with exposed faces filled and ground to a smooth, uniform, seamless surface.
 - .3 Joints at mullions, sills and center rails:

- .1 Be coped accurately, butted and tightly fitted.
- .2 At intersecting flush profile faces, be securely welded, filled and ground to a smooth, uniform, seamless surface.
- .3 At intersecting recessed profile faces, be securely welded to concealed reinforcements, with exposed hairline face seams.
- .4 At all other intersecting profile elements, have exposed hairline face seams.
- .4 Welding shall conform to CSA W59.
- .5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two (2) holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 152 mm (6 inches) of the base of the jamb, shall be substituted.
- .6 Weld in two (2) temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.
- .7 Glazing stops shall be formed steel channel, minimum 16 mm (0.625") height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .8 When required due to site access, when advised by the Contractor responsible for coordination or installation, as indicated on the Drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
- .9 Prior to shipment, mark each frame product with an identification number as shown on the accepted submittal drawings.

2.7 FABRICATION DOORS

- .1 Interior Doors:
 - .1 Fabricate interior doors, except as otherwise specified, with 18 gauge face sheet, laminated to honeycomb core under pressure.
 - .2 Provide top and bottom of doors with continuous inverted, recessed, steel end channels extending the full width of the door, welded to each face sheet at 152 mm (6 inches) on center maximum.
 - .3 Longitudinal edges shall be mechanically inter-locked with visible edge seams.
- .2 Welded Stiffener Construction:
 - .1 Both face sheets for interior doors shall be formed from a sheet of 18 gauge steel.
 - .2 Doors shall be reinforced with vertical stiffeners, securely welded to each face sheet at 152 mm (6 inches) on center maximum.
 - .3 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.
 - .4 Vertical stiffeners:
 - .1 Galvanized steel "z-shaped" or 'hat-shaped" with minimum 1.20 mm thickness.
 - .2 Run the full height of the door and be spaced 150 mm on centre across the width of the door.

- .3 Spot welded to the faces of the door.
- .4 Fire-rated core materials shall comply with tested assembly.
- .3 Holes 12.7 mm (0.5") diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm (0.5") diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.
- .4 Lock and hinge edges shall be bevelled 3 mm in 50 mm unless door hardware or door swing dictates otherwise.
- .5 Prior to shipment, mark each door with an identification number as shown on the reviewed shop drawings.

2.8 FABRICATION REINFORCEMENTS/DOOR COMPONENTS

- .1 Doors:
 - .1 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the accepted hardware schedule and templates provided by the hardware supplier.
 - .2 Doors shall be reinforced only, where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.

- .2 Frames:
 - .1 Frame product shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the accepted hardware schedule and templates provided by the hardware supplier.
 - .2 Frame product shall be reinforced only, where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.

- .3 Provide the minimum steel gauges for door and frame component parts

Minimum Steel Gauges For Accessory Component Parts for Doors and Frames	Gauge
Lock Reinforcements	16
Strike Reinforcements	16
Exit Device Reinforcements	16
Surface Applied Closer Reinforcements	14
Hinge Reinforcements	12
Hinge Reinforcements – High Frequency Type	10
Flush Bolt Edge Reinforcements	12
Flush Bolt Guide Reinforcement	10
Reinforcements for Surface Applied Hardware Unless Otherwise Specified	16
Top and Bottom Channels	16
Astragals	12
Steel Top Caps	20
Glazing Trim (Screw Fixed or Snap-In Types)	20
Mortar Guard Boxes	22
Floor Anchors	16
Wall Anchors: Masonry Strap Type	18
Wall Anchors: Masonry Wire Type	0.156" (4.0 mm) diameter

Wall Anchors: Masonry Stirrup-Strap Type	16
Wall Anchors: Steel/Wood Stud Type	20
Wall Anchors: Steel/Wood Stud Tension and Associated Wall Type	20
Wall Anchors: Existing Masonry /Concrete Wall Type	20
Jamb Spreaders	20

2.9 ELECTRIFIED HARDWARE

- .1 Where electrically or electronically operated door hardware is scheduled, provide inter-connected with CSA approved 12.7 mm diameter conduit and connectors.
- .2 Refer to electrical documents for general electrical rough-in details. At door locations indicated in electrical documents as requiring rough-in only of electrical (ie. where no electrically or electronically operated door hardware is specified in the door hardware schedule), provide enclosures, boxes, and conduit to permit future installation of devices without removal of grout, demounting of frames, or installation of exposed conduits.
- .3 Provide rough-in of electrical where electrically or electronically operated door hardware is scheduled for rough in of future electrified hardware. Provide enclosures, boxes, and conduit to permit future installation of devices without removal of grout, demounting of frames, or installation of exposed conduits.
- .4 Frame electrical connection boxes shall be positioned flush to edge of frame face return. Clearance shall be maintained to allow wall material to be consistently applied for length of frame member. Frame connection boxes shall be welded in place and positioned to allow necessary clearance for electrical trade to install conduit and connection components, with conduit layout in a manner that takes conduit up to ceiling in an uninterrupted configuration and to accommodate wire installation.
- .5 Doors with electrified devices shall be manufactured to include wire raceway in door panel to accommodate electrified devices, such as electric hinge, power transfer units, electrified locks, electrified door closures and electrified exit devices. Construction of raceways shall provide a continuous conduit or channel between entry and exit points to accommodate wire installation after door manufacture.
- .6 Doors with electrified locks may require extended space to accommodate plug-type connection components or wire collection space.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Prior to installation, remove temporary shipping spreaders.
- .2 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.

- .3 Door and frame product shall be checked for correct size, swing, rating and opening number.

3.3 INSTALLATION, GENERAL

- .1 Fire-rated door and frame product shall be installed in accordance with the terms of their listings and requirements of NFPA-80.
- .2 Finish paint in accordance with Section 09 91 00 "Painting".

3.4 INSTALLATION FRAMES

- .1 Placing Frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
- .2 Set frames plumb, square, level and at correct elevation.
- .3 Secure anchorages and connections to adjacent construction.
- .4 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm (48") in width.
- .5 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- .6 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

3.5 INSTALLATION DOORS

- .1 Install doors, and hardware in accordance with hardware templates and manufacturer's instructions.
- .2 Install glazing and door silencers.

3.6 INSTALLATION DOOR HARDWARE

- .1 Install doors hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 "Door Hardware".

3.7 ADJUSTING

- .1 Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- .2 Touch-up exposed surfaces that have been scratched or otherwise marred during shipment, installation, and handling shall be with a rust inhibitive primer.

3.8 CLEANING

- .1 Remove grout materials from steel door and frame surfaces immediately following installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Interior flush wood doors with high pressure decorative laminated facings.
 - .2 Interior flush wood doors with paint grade facings.

1.2 REFERENCES

- .1 Definitions:
 - .1 MDO: Medium Density Overlay.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Cooperate with door hardware during preparation of shop drawings and execution of shop fabrication. Be responsible to provide adequate reinforcing, clearances, for door hardware specified and for accurate installation of door and door hardware on site.

1.4 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for each type of door, including the following:
 - .1 Door core materials and construction.
 - .2 Door edge construction
 - .3 Door face type and characteristics.
 - .4 Door louvers.
 - .5 Door trim for openings.
 - .6 Door frame construction.
 - .7 Factory-machining criteria.
 - .8 Factory-priming and finishing specifications.
- .2 Shop Drawings:
 - .1 Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 - .2 Details of frame for each frame type, including dimensions and profile.
 - .3 Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - .4 Dimensions and locations of blocking.

- .5 Dimensions and locations of mortises and holes for hardware.
- .6 Dimensions and locations of cutouts.
- .7 Clearances and Undercuts.
- .8 Finishing requirements including NAAWS 3.1 finish system number, sheen, and required application steps.
- .9 Include schedule identifying each unit, with door marks and numbers relating to numbering Door Schedule on drawings.
- .10 Indicate fire ratings for fire rated doors.
- .3 Samples for Verification:
 - .1 Corner section of door with factory finishes applied to actual door face materials, approximately 200 mm (8 inches) by 250 mm (10 inches), for each material and finish.
 - .1 For each wood species and transparent finish, provide set of three samples showing showing full range of grain variation, colour and matching, natural characteristics reflecting wood species cut, matching, and species, and manufacturing characteristics expected in finished Work.
 - .2 Any doors provided which do not match the accepted sample shall be removed from site and replaced by the door manufacturer at no cost to the Owner.
 - .3 Submit high-pressure decorative laminate samples at the same time as Section 06 40 23 Interior Architectural Woodwork.
 - .2 Frames for light openings, 150 mm (6 inches) long, for each material, type, and finish required.

1.5 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for any cleaning or use practices or materials which may damage or disfigure wood doors.

1.6 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each type of wood door from single source from single manufacturer.
- .2 Quality Standard: Materials, fabrication, and finishing of wood doors shall be in accordance with North American Architectural Woodwork Standards (NAAWS) 4.0.
 - .1 Grade Classification: Custom Grade.
- .3 Manufacturer Qualifications: A firm with no less than 5 years' experience in producing architectural woodwork similar to that indicated for this Project and whose products have a record of successful in-service performance, as well as sufficient production capacity to produce required units complying with the requirements of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Protect wood doors during transit, delivery, storage and handling to prevent damage, spoilage, and deterioration.
- .2 Do not deliver wood doors until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If wood doors must be stored in other than installation areas, store only in areas whose field conditions meet requirements specified under paragraph 1.7 "Field Conditions" of this section.
- .3 Do not deliver finished Products during rainy or damp weather.

1.8 FIELD CONDITIONS

- .1 Environmental Conditions:
 - .1 During Installation: Obtain and comply with wood door manufacturer's advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install wood doors until these conditions have been attained.
 - .2 During Service Life of Wood Doors: Obtain and comply with wood door manufacturer's advice for optimum temperature and humidity conditions for wood doors during storage and installation. Do not install wood doors until these conditions have been attained.
 - .3 Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for wood doors at time of installation do not exceed 5% to 10%.
- .2 Verify dimensions of other construction by accurate field measurements before manufacturing wood doors; show recorded measurements on final shop drawings.

1.9 WARRANTY

- .1 Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - .1 Failures include, but are not limited to, the following:
 - .1 Delamination of veneer.
 - .2 Warping (bow, cup, or twist) more than 6.4 mm (1/4 inch) in a 1067-by-2134-mm (42-by-84-inch) section.
 - .3 Telegraphing of core construction in face veneers exceeding 0.25 mm in a 76.2-mm (0.01 inch in a 3-inch) span.
 - .2 Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors and frames.
 - .3 Warranty Period: Life of installation.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 WDMA I.S.1-A Performance Grade:

- .1 Heavy Duty unless otherwise indicated.
- .2 Standard Duty doors for:
 - .1 Mechanical rooms.
 - .2 Electrical rooms.
 - .3 Water/fire pump rooms.
 - .4 Telephone/data rooms.
 - .5 Storage rooms.
- .2 Structural-Composite-Lumber-Core Doors:
 - .1 WDMA I.S.10.
 - .2 Screw Withdrawal, Face: 3100 N (700 lbf).
 - .3 Screw Withdrawal, Edge: 1780 N (400 lbf).

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Wood Door Manufacturer List: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 Baillargeon Doors, Inc.
 - .2 Eggers Industries.
 - .3 Lambton Doors.
 - .4 Marshfield-Algoma by Masonite Architectural.
 - .5 Marshfield Door Systems.
 - .6 Mohawk Flush Doors, Inc.

2.4 FLUSH WOOD MDO FACED DOORS FOR OPAQUE FINISH

- .1 Particleboard-Core Doors:
 - .1 Solid core, minimum five plies with stiles and rails bonded to core, then entire unit abrasive planed.
 - .2 Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde or straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.

- .3 Blocking: Provide wood blocking in particleboard-core doors as follows and as applicable to door hardware schedule:
 - .1 HB-1, minimum 125 mm (5") wide, full door width, top-rail blocking for closure devices or flush bolts or for sliding door hardware.
 - .2 HB-2, minimum 125 mm (5") wide, full door width, bottom-rail blocking for doors with protection plates (kick plates, armour plates), concealed door seals, automatic bottoms, pivots or floor bolts.
 - .3 HB-4, minimum 125 mm (5") wide x 250 mm (10") high blocking for doors with mortise locks and pockets.
 - .4 HB-5, minimum 125 mm (5") wide x 250 mm (10") high blocking for hinges.
 - .5 HB-6: Not applicable.
 - .6 HB-7, minimum 125 mm (5") wide, full door height, for doors with continuous type hinges.
- .4 Door Edges:
 - .1 Vertical edges (stiles) shall be finished with closed-grain solid hardwood edgeband. Face and crossbands shall be covered. Exposed oriented strand top and bottom lumber is not permitted.
 - .2 Horizontal edges (rails) shall be finished with closed-grain solid hardwood edgeband. Exposed oriented strand top and bottom lumber is not permitted.
- .2 Thickness of doors shall be minimum 45 mm (1-3/4") unless otherwise indicated on Drawings.

2.5 PLASTIC LAMINATE FACED DOORS

- .1 Particleboard-Core Doors:
 - .1 Solid core, minimum five plies with stiles and rails bonded to core, then entire unit abrasive planed.
 - .2 Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde or straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
 - .3 Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
 - .4 Blocking:
 - .1 Provide wood blocking in particleboard-core doors as follows and as applicable to door hardware schedule:
 - .1 HB-1, minimum 125 mm (5") wide, full door width, top-rail blocking for closure devices or flush bolts or for sliding door hardware.
 - .2 HB-2, minimum 125 mm (5") wide, full door width, bottom-rail blocking for doors with protection plates (kick plates, armour plates), concealed door seals, automatic bottoms, pivots or floor bolts.

- .3 HB-4, minimum 125 mm (5") wide x 250 mm (10") high blocking for doors with mortise locks and pockets.
- .4 HB-5, minimum 125 mm (5") wide x 250 mm (10") high blocking for hinges.
- .5 HB-6: Not applicable.
- .6 HB-7, minimum 125 mm (5") wide, full door height, for doors with continuous type hinges.
- .5 Door Edges:
 - .1 Exposed Vertical, bottom, and Top Edges: Hardwood edges for staining to match faces.
 - .6 Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices and where flush wood doors have full glass lites.
- .2 Thickness of doors shall be minimum 45 mm (1-3/4") unless otherwise indicated on Drawings.

2.6 LIGHT FRAMES AND LOUVERS

- .1 Wood Beads for Light Openings in Wood Doors: Manufacturer's standard wood beads unless otherwise indicated:
 - .1 Wood Species: Same species and door faces.
 - .2 Profile: Flush rectangular beads.

2.7 HIGH-PRESSURE DECORATIVE LAMINATE

- .1 Refer to Section 06 40 23 "Interior Architecture Woodwork."

2.8 FABRICATION

- .1 Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - .1 Comply with NFPA 80 requirements for fire-rated doors.
- .2 Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 - .1 Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - .2 Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- .3 Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
 - .1 Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into

jambes of metal door frames.

- .4 Openings: Factory cut and trim openings through doors.
 - .1 Light Openings: Trim openings with moldings of material and profile indicated.
 - .2 Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 81 00 "Glass Glazing."
- .5 Electrified Door Hardware: Where electrically or electronically operated door hardware is indicated on the door schedules or on drawings details or on the door hardware schedule and templates provided by the door hardware supplier, doors with electrified devices shall be manufactured to include wire raceway in door panel to accommodate electrified devices, such as electric hinge, power transfer units, electrified locks, electrified door closures and electrified exit devices. Construction of raceways shall provide a continuous conduit or channel between entry and exit points to accommodate wire installation after door manufacture.

2.9 FINISHING

- .1 Doors shall be factory finished by Section 06 40 23 "Interior Architectural Woodwork."
- .2 Doors for Opaque Finish:
 - .1 Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Division 09 Section 09 91 00 "Painting."
 - .2 Apply finish coats in accordance with Division 09, Section 09 91 00 "Painting". Sand in between coats and protection site applied coats from dust and construction debris during finishing.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work.
- .2 Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
- .3 Reject doors with defects.
- .4 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Provide all blocking and nailers which are to be built in for installations of other Work not included in this Section.

3.3 INSTALLATION

- .1 Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- .2 Install fire-rated doors according to NFPA 80.
- .3 Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - .1 Clearances:
 - .1 Provide 3.2 mm (1/8 inch) at heads, jambs, and between pairs of doors.
 - .2 Unfinished Concrete Floors / Sealed Concrete Floors: Provide 13 mm (1/2 inch) from bottom of door to top of unfinished concrete floor.
 - .3 Floor Finishes: Provide 9.5 mm (3/8 inch) from bottom of door to top of floor finish.
 - .4 Floor Transition Trim Threshold: Provide 6.4 mm (1/4 inch) from bottom of door to top of floor transition trim threshold.
 - .5 Comply with NFPA 80 for fire-rated doors.
 - .2 Bevel non-fire-rated doors 3.2 mm (1/8 inch) in 51 mm (2 inches) (3-1/2 degrees) at lock and hinge edges.
 - .3 Bevel fire-rated doors 3.2 mm (1/8 inch) in 51 mm (2 inches) (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- .4 Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- .5 Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.4 ADJUSTING

- .1 Repair damaged wood doors where possible to eliminate defects functionally and visually; where not possible to repair, replace wood doors.
- .2 Touch-ups. Where required to repair damage to finished surfaces, any dents, scratches or gouges shall be sanded and filled as needed and the entire surface where the damage occurred shall be refinished.
- .3 Rehang or replace doors that do not swing or operate freely.

3.5 PROTECTION

- .1 Protect wood doors during construction to ensure that work will be without damage or deterioration until Substantial Performance of the Work.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Non-rated access panels **AP-01**.

1.2 REFERENCES

- .1 Definitions:
 - .1 Concealed: For the purposes of access doors and panels means services and equipment in suspended ceilings, non-accessible chases, and furred-in spaces.
 - .2 Exposed: For the purposes of access doors and panels means not concealed and does not apply to the concealed definition included in this Section.

1.3 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of access door and panel. Highlight applicable model number and options proposed.
- .2 Shop Drawings:
 - .1 Indicate access door and panel locations identifying size, type, and location of access doors and panels to be installed.
 - .2 Include access door and panel finishes, metal thicknesses, anchorage and securement details.

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications: Subcontractor executing the work of this section shall have a minimum of ten (10) years continuous experience in successful installation of work of similar type and quality.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials in protected dry areas.
- .2 Ensure that finish metal members are not bent, dented, or otherwise deformed.
- .3 Deliver products supplied under the work of this section only to those who are responsible for installation, to the place they direct, and to meet installation schedules.

1.6 FIELD CONDITIONS

- .1 Comply with access door and panel manufacturer's written for field conditions before,

during and after application of access door and panels.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MANUFACTURERS

- .1 Access doors and panels manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 Acudor.
 - .2 Cendrex
 - .3 Mifab.
 - .4 The William Brothers Corporation.

2.3 ACCESS PANELS

- .1 Non-Rated Access Panel **AP-01**:
 - .1 Description: Door face recessed 16 mm (5/8") for gypsum board infill; with concealed flange for gypsum board installation and concealed hinge.
 - .2 Optional Features: Gasketing.
 - .3 Locations: Ceiling.
 - .4 Minimum size of access doors shall be:
 - .1 600 mm (2'-0") x 600 mm (2'-0").
 - .5 Uncoated Steel Sheet for Door: Nominal 1.52 mm (0.060"), 16 gauge, factory applied prime powder coat or baked enamel finish, standard white colour.
 - .6 Latch and Lock: Cam latch, key operated.
 - .7 Hardware:
 - .1 Key-operated cylinder cam latch .
 - .2 Concealed hinge .
 - .8 Products: Subject to compliance with requirements, provide one of the following:
 - .1 Model AHA-GYP by Cendrex
 - .2 Model CAD-DW Mifab.

.3 Model WB-RDW The William Brothers Corporation.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

- .1 Install access panels and doors in wall and ceiling assemblies for access to mechanical, electrical, security, and communication services inside assemblies.
- .2 Install access panels and doors in accordance with access panel and door manufacturer's written instructions.
- .3 All parts of the installation requiring periodic maintenance shall be accessible. Wherever valves, dampers and other appurtenances are concealed by building construction, access doors and panels shall be furnished by this Section. This Section is responsible for the proper location of the access doors.
- .4 Wherever possible, items requiring access shall be located in easily accessible areas (i.e. exposed or T-bar ceilings).
- .5 Group items in order to minimize the number of access doors and panels required.
- .6 Each access door and panel shall be installed to provide complete access to equipment for maintenance and servicing.
- .7 Site paint access doors and panels with factory applied prime powder coat or baked enamel finish in accordance with Section 09 91 00 Painting.

3.3 INSTALLATION TOLERANCES

- .1 Install access panels and doors plumb and level to a maximum variation of 1.5 mm (1/16").

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the requirements of this Section in accordance with requirements of the Contract Documents
- .2 Section Includes:
 - .1 Interior transaction windows.

1.2 COORDINATION

- .1 Coordinate anchorage installation for transaction windows. Furnish setting drawings, templates, and directions for installing anchorages, including anchor bolts and items with integral anchors that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- .1 Product Data: For each type of product.
 - .1 Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- .2 Shop Drawings:
 - .1 Include elevations, sections, and installation details for each wall-opening condition.
 - .2 Include details for each frame type, including dimensioned profiles and metal thicknesses.
 - .3 Include locations of reinforcements and preparations for hardware.
 - .4 Details of each different opening condition.
 - .5 Include details of anchorages, joints, field splices, connections, and accessories.
 - .6 Include details of moldings, removable stops, and glazing.
 - .7 Samples: For each exposed product and for each color and texture specified, in manufacturer's standard sizes.
- .3 Samples for Initial Selection: For each type of exposed factory-applied color finish.
 - .1 Include Samples of seals, gaskets, and accessories involving color selection.
- .4 Samples for Verification: For each type of the following products:
 - .1 Framing Member and Finish: 300 mm long. Include trim.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: For transaction windows to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five (5) years documented experience.
- .2 Installer's Qualifications: Subcontractor with minimum five (5) years continuous experience in installation of transaction windows of similar scope and extent to that indicated for this Project and whose work has a record of successful completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials in protected dry areas.
- .2 Ensure that finish metal members are not bent, dented, or otherwise deformed.
- .3 Deliver products supplied under the work of this section only to those who are responsible for installation, to the place they direct, and to meet installation schedules.

1.7 FIELD CONDITIONS

- .1 Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.

Part 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- .1 Structural Requirements:
 - .1 Determine sizes of components, metal thicknesses, bracing, fastener types including spacing, deflection details and components, to withstand within acceptable deflection limitations, variations from plumb in vertical and horizontal lines, their own weight, forces applied by movements of the building structure and attached adjacent components and maximum design loads in accordance with the OBC.
 - .2 Design and install transaction windows to accommodate tolerances of related Works not included in this Section including building structure movements and deflections.
 - .3 Transaction window framing shall be constructed to be durable and prevent impact and forced entry equal to or better than specified glazing.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 INTERIOR TRANSACTION WINDOWS

- .1 Include laminated glazing, stainless steel window frame with opening 305 mm wide x 152 mm high at bottom edge of glazing as indicated, and speaker port.
- .2 Framing:
 - .1 Framing: ASTM A240/A240M, austenitic stainless-steel, Type 304, to suit structural and finish requirements.
 - .2 Frame and Trim Finish: Stainless steel, #4 brushed finish.
 - .3 Basis of Design Product: SCBS3812SL Brushed Stainless 120" Shallow U-Channel by CRL
- .3 End Cap: Manufacturer's standard matching framing material and finish.
- .4 Glazing: GL-20 as specified in Section 08 81 00 "Glass and Glazing."
- .5 Speaker Port:
 - .1 Non-powered, circular voice port fabricated from stainless steel with brushed finish, with exterior plates minimum 125 mm in diameter, with natural voice transmission.
 - .2 Material: Stainless steel, #4 brushed finish.
 - .3 Basis of Design Product: SST5 Brushed Stainless Steel 5" Speak-thru by CRL.

2.4 ACCESSORIES

- .1 Fasteners: Aluminum, nonmagnetic, stainless steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.
- .2 Glazing Gaskets: Manufacturer's standard extruded or molded rubber or plastic, to accommodate glazing thickness indicated; in black.
- .3 Polyamide Epoxy Coating: Two-part, high-build, fast curing epoxy.
 - .1 Solids: 83 percent +/- 2 percent by weight.
 - .2 VOC: <100 g/L.

2.5 FABRICATION

- .1 General: Fabricate transaction windows to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with sharp arrises. Where practical, fit and assemble units in manufacturer's plant.
- .2 To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- .3 Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted and mitered connections.
- .4 Fabricate frames for glazing with removable stops to allow glazing replacement without

dismantling frame.

- .5 Locate removable stops on the inside of spaces accessed by keyed doors.
- .6 Fabricate components to allow secure installation without exposed fasteners.

2.6 GENERAL FINISH REQUIREMENTS

- .1 Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

- .1 Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

- .1 Install transaction windows plumb, rigid, properly aligned, and securely fastened in place; according to manufacturer's written instructions.
- .2 Metal Protection:
 - .1 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - .2 Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with polyamide epoxy coating.
- .3 Install frame components in the longest possible lengths with no piece less than 1220 mm; components 1830 mm or shorter shall be one piece.
 - .1 Use concealed installation clips to produce tightly fitted and aligned splices and connections.
 - .2 Secure clips to extruded main-frame components and not to snap-in or trim members.
 - .3 Do not leave screws or other fasteners exposed to view when installation is complete.
- .4 Glass: Install glass according to Section 08 81 00 "Glass and Glazing" and aluminum-frame manufacturer's written instructions.

- .5 Erection Tolerances:
 - .1 Plumb: 3.2 mm in 3 m; 6.35 mm in 12.2 m.
 - .2 Level: 3.2 mm in 6 m; 6.35 mm in 12.2 m.
 - .3 Alignment:
 - .1 Where surfaces abut in line or are separated by reveal or protruding element up to 12.7 mm wide, limit offset from true alignment to 1.6 mm.
 - .2 Where surfaces are separated by reveal or protruding element from 12.7 to 25.4 mm wide, limit offset from true alignment to 3.2 mm.
 - .3 Where surfaces are separated by reveal or protruding element of 25.4 mm wide or more, limit offset from true alignment to 6 mm.
 - .4 Location: Limit variation from plane to 3.2 mm in 3.6 m; 12.7 mm over total length.
- .6 Diagonal Measurements: Limit difference between diagonal measurements to 3.2 mm.

3.3 ADJUSTING

- .1 Inspect installation, correct misalignments, and tighten loose connections.
- .2 Clean exposed frame surfaces promptly after installation, using cleaning methods recommended in writing by frame manufacturer and according to AAMA 609 & 610.

3.4 PROTECTION

- .1 After installation, mark glazing with an 'X' using removable plastic tape.

END OF SECTION

08 71 00 – Door Hardware

PART 1 - GENERAL

1.1 **Section Includes**

- 1.1.1 Door hardware for swinging and sliding Aluminium, Hollow Metal and Wood door openings.
- 1.1.2 Low energy automatic door operators.

1.2 **Related Sections**

1.2.1 Coordinate Work with the following sections:

- .1 Section 03 33 00 - Architectural Concrete
- .2 Section 06 10 00 - Rough Carpentry
- .3 Section 06 20 00 - Finish Carpentry
- .4 Section 08 11 13 - Hollow Metal Doors and Frames
- .5 Section 08 14 16 - Flush Wood Doors
- .6 Section 08 14 73 - Interior Sliding Wood Doors
- .7 Section 09 90 00 - Painting and Coating
- .8 Division 26 - Electrical
- .9 Division 28 - Electronic Safety and Security

1.3 **References**

- 1.3.1 ANSI A156 Series Standards
- 1.3.2 NFPA 80, Standard for Fire Doors and Other Opening Protectives.
- 1.3.3 NFPA 105, Standard for Smoke Door Assemblies
- 1.3.4 NFPA 101, Life Safety Code
- 1.3.5 Door and Hardware Institute – Recommended locations for Architectural Hardware for Standard Steel Doors and Frames
- 1.3.6 Door and Hardware Institute – Recommended locations for Architectural Hardware for Flush Wood Doors
- 1.3.7 Door and Hardware Institute – Sequence and Format for the Hardware Schedule
- 1.3.8 Door and Hardware Institute – Key systems and Nomenclature
- 1.3.9 Door and Hardware Institute – Abbreviations and Symbols used in Architectural Door and Hardware Schedules and Specifications

1.4 **Quality Assurance**

1.4.1 Manufacturer Qualifications:

- .1 Company registered with BHMA and specializing in manufacturing the Products specified in this section with minimum five years documented experience.

1.4.2 Supplier:

- .1 Furnish hardware from supplier who has actively supplied hardware for similar projects for a minimum of five years.

1.4.3 Installer:

- .1 Install hardware using installers who have a minimum of five years' experience actively installing commercial door hardware for similar projects.

1.4.4 Fire Rated Openings:

- .1 Hardware installed on fire rated doors assemblies shall comply with NFPA80 as tested and listed by door, frame, and hardware manufacturers.
- .2 Latch bolt assemblies, door closing devices and fire exit hardware shall bear labels or marks from testing as proof of compliance with fire rated door assemblies.
- .3 Provide fire exit hardware on doors bearing a label stating, "Fire Door to be Equipped with Fire Exit Hardware".

1.4.5 Pre-Installation Meeting:

- .1 Prior to installation of hardware, meet with installer and hardware supplier to review door, frame, and hardware requirements for the project. Provide installer with copy of approved finish hardware schedule. Review manufacturers installation instructions for each hardware item.
- .2 Send a letter of compliance indicating when this meeting was held and who was in attendance to the Consultant and Owner.

1.5 **Submittals**

1.5.1 General Requirements:

- .1 Furnish submittals in accordance with Division 1, General Requirements.

1.5.2 Schedules:

- .1 Furnish hardware schedule electronically in .pdf format, vertical format, formatted for letter sized document 216mm x 279mm. Conform to DHI publication "Sequence and Format for the Hardware Schedule". Hardware lists indicating Architect's door numbers, door locations, sizes, handing, hardware manufacturer's catalogue numbers, finish symbols and quantities required.
- .2 It is the responsibility of the hardware supplier to update and keep the hardware schedule current. All approved hardware changes shall be noted in the hardware schedule and kept current throughout the duration of the project. Update pages as necessary and provide copies

to the contractor and to the architect. Where changes occur to electrical products and functions, the hardware supplier shall be responsible for producing new elevations and methods of operation both for submittal with changes and update the hardware schedule.

- .3 Furnish a key schedule for review, prepared, and detailed with keying nomenclature as per DHI published document “Key Systems and Nomenclature”. Included special keying notes and stamping instructions. Furnish chart illustrating keying system hierarchy.

1.5.3 Product Data:

- .1 Furnish manufacturers catalogue and technical data in .pdf format for each hardware items used. Highlight design, function, accessories, options, and fasteners to facilitate review with each hardware schedule submitted.

1.5.4 Templates:

- .1 Furnish manufacturers hardware templates and required information to door and frame manufacturer to enable accurate sizes, locations of cut-outs and reinforcement for hardware.
- .2 Furnish manufacturers hardware and installation instructions to required trade to arrange for provisions for accurate setting and fitting of hardware.

1.5.5 Wiring Diagrams:

- .1 Submit wiring diagrams electronically in .pdf format after receipt of approved hardware schedule. Include project name, date, and contact information.
- .2 Provide a written description of functional use of electrical hardware. Include door and frame elevations showing the location of each item of electrical hardware to be installed.
- .3 Using Architect’s opening numbers, generate point-to-point drawings referencing elevation drawings submitted with hardware schedule. Include lines representing terminations, colour of conductors, labels for each component and terminal, and an operational description of the system function.
- .4 Furnish system diagrams for openings requiring access control and shared power supplies, distance of wire runs from power supply, cable quantity, number, and gauges of wires.

1.5.6 Samples:

- .1 Provide samples of all materials and finishes upon owner’s request.
- .2 Submit samples of the complete line of hardware and finishes to Owner Agent for approval when requested and accompanying any proposal for substitution.
- .3 Hardware shall not be ordered from the manufacturer until the Owner Agent has approved the samples. The hardware and finishes supplied shall be identical to the approved samples.
- .4 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish, and hardware package number.
- .5 After approval samples will be returned for incorporation in the Work Submit samples of each type of hardware in finish indicated. Samples are to remain undamaged and in working condition through submittal and review process. Items will be returned to the supplier or

incorporated into this scope of work. Provide mock-ups of various door conditions to confirm requirements.

1.5.7 Operation and Maintenance Manuals:

- .1 Furnish operation and maintenance manual at date of substantial completion and building turnover, with project information, date, name and contact information for the hardware supplier. Furnish two (2) complete copies of the maintenance manuals to the owner in printed format and single copy in .pdf format to include the following items:
 - .1 Copy of approved “As-Built” hardware schedule, including all approved changes to date, door numbers and locations, highlight fire rated doors to aid annual fire door inspection.
 - .2 Copy of approved keying schedule.
 - .3 Copy of floor plan with keying nomenclature assigned to door numbers as per approved keying schedule.
 - .4 Catalogue data for each product.
 - .5 As-Installed wiring diagrams, elevation drawings and operational descriptions for each opening connected to power.
 - .6 Installation template and instructions, adjustments instructions, parts list, and maintenance manuals for locksets, exit devices, door closers and automatic door operators.
 - .7 Warranty information.

1.5.8 Delivery and Storage:

- .1 Marking and Packaging:
 - .1 Deliver hardware to job site in one shipment, in manufacturers original packaging marked to correspond with the Architect's door numbers and the approved hardware schedule hardware sets.
 - .2 Mark all locksets, exit devices, cylinders, auxiliary hardware, and key switches with keyset symbol.
 - .3 Replace damaged wet packaging with new.
- .2 Job Site Delivery:
 - .1 Jointly receive hardware upon delivery to job site against approved hardware schedule with hardware supplier. Record missing or damaged hardware. Replace or repair, as necessary.
 - .2 Deliver hardware for doors and frames to manufacturer that is being installed during fabrication.
- .3 Storage:

- .1 Store door hardware items in a temperature controlled secured room or space protected from damage or loss.
- .2 Store door hardware off the floor and on shelving.
- .3 Store large items of hardware (e.g. exit devices, automatic door operators, thresholds and gasketing) on wooden pallets. Arrange locksets and keyed by Architect's door opening number.
- .4 Arrange remaining items by hardware set number.

1.6 **Warranty**

1.6.1 All hardware items, except those as listed below, shall be guaranteed in writing by the manufacturer shall be free from defects and workmanship for a minimum of three (3) years commencing on the date of substantial completion and building turn over. In the event of product failure, promptly repair or replace at no additional cost to the owner.

- .1 Hinges: Lifetime
- .2 Power Transfers: Two (2) years
- .3 Mortise Locksets: Ten (10) years
- .4 Electric Strikes: Five (5) years
- .5 Door closers: Twenty-Five (25) years
- .6 Automatic Door Operators, Swinging Door: Two (2) Years
- .7 Flat Goods: One (1) Year
- .8 Weather Seals: One (1) Year

PART 2 - PRODUCTS

2.1 **Design and Performance Requirements**

- 2.1.1 Perform work in accordance with Authorities Having Jurisdiction and as outlined herein.
- 2.1.2 Employ a qualified hardware consultant to inspect completed installation and certify that hardware has been supplied and installed in accordance with manufacturer's printed instructions and as specified.
- 2.1.3 Fire rated assemblies:
 - .1 Hardware: Selected and installed in accordance with applicable codes and regulations, NFPA- 80 and approved Ontario Fire Marshal.
 - .2 Fire rated doors and frames: ULC labelled hardware.
 - .3 Locksets and latches on fire rated doors: 19mm throw minimum.

2.2 **Materials**

- 2.2.1 Ensure that hardware selected will function correctly, meets Contract requirements and Ontario Building Code and Authorities Having Jurisdiction.
- 2.2.2 Ensure that each hardware item is of same type, design and by same manufacturer.
- 2.2.3 Manufacturer's names or trademarks are not permitted on exposed surfaces of hardware.
- 2.2.4 Include in packing slip a list of parts, name of supplier and door number in which lock is to be installed.
- 2.2.5 Hardware for fire rated and labelled door and frame assemblies: ULC listed or as accepted by Authorities Having Jurisdiction.
- 2.2.6 ANSI A156 product references.
- 2.2.7 Metal finishes shall be free from defects, clean, unstained and of a uniform colour for each type of finish required. Exposed surfaces and anchors: Specified finish symbol of item.
- 2.2.8 Screws and Fasteners:
 - .1 Provide manufacturers recommended fasteners for each application, door, and frame material. Provide sex nuts and bolts or through bolts and grommets for surface overhead stops and magnetic locks. Provide thread-to-the-head wood screws for mortise hinges on wood doors. Provide sheet metal screws for surface applied weather strip and protection plates, except for lead lined doors where protection plates will be applied with adhesive and adhesive tape. Provide stainless steel machine screws with lead anchors for thresholds.
Provide machine screws with metal expansion shields where hardware is installed in concrete, masonry, or tile. Fasteners shall have Philips's type head drives. Match exposed fasteners to hardware finish.
- 2.3 **Mortise Butt Hinges:**
 - 2.3.1 Provide three knuckle concealed bearing hinges with non-removable pin (NRP) option on reverse bevel doors with locking hardware. Hinge width to accommodate door trim, door closer projection and allow for 180-degree swing. Provide standard weight or heavy weight butt hinges as specified. Doors up to 1520mm in height supply 2 hinges, doors up to 2286mm in height, supply 3 hinges, and doors greater than 2286mm in height add one hinge for every additional 760mm of door height. Supply ferrous (steel) hinges at all interior nonrated and fire rated doors, non-ferrous (stainless steel) for all exterior doors and interior nonrated and fire-rated doors and doors in high humidity or corrosive areas. Through wire hinges are not acceptable.
 - .1 Supply the following as specified:
 - .1 McKinney TA786
 - .2 Ives 3CB1HW
 - .3 Best CB1900R
- 2.4 **Flush Bolts and Accessories:** Manual and Automatic Flush Bolts
 - 2.4.1 Manual Flush Bolts:
 - .1 Provide manual flush bolts that conform to ANSI A156.16. Flush bolts shall be on cast brass material, 13mm adjustable bolt head, 19mm throw, 19mm backset, rod length to

accommodate door height. cUL listed for 45-minute fire rated doors. Flush bolts are to be fitted top and bottom in the leading edge of the inactive leaf of a pair of doors.

.1 Supply the following as specified:

- .1 Standard Metal F65UL
- .2 Ives FB458
- .3 Rockwood 555

2.4.2 Automatic Self Latching Flush Bolts:

.1 Provide automatic flush bolts that conform to ANSI A156.3. Flush bolts shall be on cast brass or stainless steel material, 13mm adjustable bolt head, 19mm throw, 19mm backset, rod length to accommodate door height. cUL listed for 45-minute fire rated doors. Automatically engages when inactive door closes. When the active door is closed, the bolts project into the frame, securing the inactive leaf until top bolt is released by pressing plunger button on the bolt face. (cUL) Listed, with a closing force (5 lbs. maximum).

.1 Supply the following as specified:

- .1 Standard Metal F7805/FB
- .2 Ives FB51P, FB52
- .3 Hager 293D, 293T x AFB
- .4 Rockwood 2845, 2845 x 18BFB/19BFB

2.4.3 Dust Proof Strike:

.1 Provide dust proof strike that shall confirm to ANSI A156.16. Dust proof strike to be made of brass material. Designed for use with the bottom flush bolt of all flush bolts. Equipped with a spring loaded plunger that returns to the floor or threshold surface level anytime the flush bolt is retracted.

.1 Supply the following as specified:

- .1 Standard Metal F68
- .2 Ives, DP2
- .3 Hager, 280X
- .4 Rockwood 570

2.5 Locks, Latches and Deadlocks:

2.5.1 Mortise Locks and Latches:

.1 Provide mortise locks that conform to ANSI A156.13 Series 1000 Grade 1. Locks shall be fire tested and meet UL/ULC testing for 3-hour fire rated door assembly. Locks shall comply with UL10C positive pressure test for door assemblies. Provide locks with standard latches featuring a 2 3/4" backset and a 3/4" latch throw. Provide proper latch throw for UL listing at pairs of doors.

.1 Supply the following as specified:

- .1 Sargent 8200 series
- .2 Schlage L9000 series
- .3 Dormakaba M9000 series

2.5.2 Strike Plates:

- .1 Provide 124mm (4-7/8") high ASA type strike plates with curved lip, strike lip sized to minimally clear jamb and/or trim detail and projection. Include dust box for each strike in single openings. Provide a flat lip strike at paired openings with overlapping strike.

2.6 **Cylinders, Keying Systems and Key Control**

2.6.1 Cylinders:

- .1 Provide mortise cylinders with cams and tail bars to suit the corresponding locks and exit devices. Include appropriate spacers, blocking rings and collars. Provide construction keying to be used over the duration of the project.
- .2 General Contractor shall coordinate staging of permanent core installations with owner.

2.7 **Surface Door Closers**

2.7.1 Heavy Duty Surface Manual Door Closers:

- .1 Provide heavy duty ANSI 156.4, Grade 1 Certified closers. All surface closers shall be of full rack and pinion construction. Closing speed, latching speed and backcheck shall be controlled by key operated valves. Closers to be sized in accordance with manufacturers recommendations. Closers shall be non-handed to meet a variety of door conditions and design requirements. All closer arms are to be forged steel furnished with heavy duty arms, delayed action, special mounting brackets, arms, and templates for overhead stops. Closers to be mounted as regular, parallel arm and top jamb mounted. Install closers on room side, away from corridor view where possible. Closer covers shall be of high impact plastic material of flame-retardant grade.

.1 Supply the following as specified:

- .1 Sargent 350 series
- .2 LCN 4040XP series
- .3 Dormakaba 8900 series

2.8 **Automatic Door Operators**

2.8.1 Heavy Duty Automatic Door Operators:

- .1 Provide heavy duty ANSI A156.10 or ANSI 156.19 non handed overhead surface applied electromechanical low energy swing door operator enclosed in an aluminum header no larger than 117mm (4-5/8") in height. The operator shall function as a manual door closer in the direction of swing with or without electrical power. Provide control features that include power- hold-close, built in lock delay, on-off-hold open switch control to control door function, on-off power switch, fire alarm integration, field adjustable handing, push and go, power assist opening activation, integrated connections for safety sensors and other accessories, wind load and stack pressure. Furnish with microprocessor monitored with power boost to ensure secure opening and closing in changing conditions. Install on room side, away from corridor view. Furnish with special mounting plates, brackets, arms, and template for use with overhead stops. Provide automatic operator powered by 24 volt, 1/4 hp motor with onboard power supply with capability of delivering both 12 volt and 24 volt outputs to a maximum of 1.0 ampere combined load. Coordinate with division 26 for provision of service to each operator from a junction box for multiple operators. Provide electrical conduit and wiring from specified controls to operators as outlined in manufacturers drawings.

- .1 Supply the following as specified:

- .1 Besam SW200i

- .2 Dormakaba ED250

- .3 Tormax 1201

2.9 Wave Actuators, Wave to Lock Kits, Emergency Call Kits

- 2.9.1 Provide touchless LED illuminated square short range wave switch actuators, 25mm to 75mm activation range, 114mm (4-1/2") x 114mm (4-1/2") x 51mm dimensions, stainless steel, vandal resistant, barrier free compliant with universal black inset wheelchair graphic with instruction "Wave to Open". Actuators shall be mounted in single gang electrical boxes with concealed tamper proof fasteners, hardware wired and rated to a minimum 5amp @ 30VAC. Finish: 630

- .1 Supply the following as specified:

- .1 Camden CM-325

- .2 No substitutions.

2.10 Door Trim

2.10.1 Door Pulls:

- .1 Provide door pulls for interior doors that are "D" shaped and manufactured from stainless steel solid bar stock, tubular design, 25mm outside diameter, 305mm in length with a compatible stainless steel back plate 101mm x 508mm. Where door pulls and push plates are required countersink door pull through bolts in door for flush fit and apply push plate over top of through bolts. Back to Back mounted pull sets to use heavy duty concealed fastening method.

- .1 Supply the following as specified:

- .1 Standard Metal Hardware 2012-2

- .2 Canadian Builders Hardware CBH 7030-1

- .3 Gallery Specialty Hardware GSH 4012-2

2.11 Doorstops

2.11.1 Overhead Stops and Holders:

- .1 Provide heavy duty surface and concealed overhead stops and holders, medium duty at doors less than 23 inches in width and interior low frequency use areas, size in accordance with manufacturers recommendations, non-hold open stops on fire rated doors, dead stop required at openings with maximum 90-degree limitation, special template for double acting continuous hinges, swing clear hinges. Use drop plates on closers where required for proper mounting of closers and overhead stops to work in conjunction with each other. Ensure there are no mounting conflicts between closers and overhead stops.

- .1 Supply the following as specified:

- .1 Sargent 690 series
- .2 Rixson 1ADJ series
- .3 Glynn Johnson 100 series

2.11.2 Wall Mounted Doorstops:

- .1 Provide ANSI A156.16 heavy duty cast brass/bronze, stainless steel wall bumpers with non-marring convex or concave, rubber center with fasteners and shields for securing to the wall. Contractor to provide necessary wall blocking where required.

- .1 Supply the following as specified:

- .1 Standard Metal Hardware S120 / S121
- .2 Canadian Builders hardware CBH140 / CBH 145
- .3 Gallery Specialty Hardware GSH 240B / GSH 250B

2.12 Thresholds and Gasketing

2.12.1 Gasketing:

- .1 Provide gasketing that conforms to ANSI A156.22 with air leakage not to exceed 0.000774 cu. m/s per m (0.50 cfm per foot) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable. Finish: Black

- .1 Supply the following as specified:

- .1 KN Crowder W-66
- .2 Pemko S88
- .3 Zero 188S

2.12.2 Weatherstrip:

- .1 Provide gasketing that conforms to ANSI A156.22 with air leakage not to exceed 0.000774 cu. m/s per m (0.50 cfm per foot) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; material of extruded aluminum with oblong holes for fasteners, with resilient or flexible seal strips that are easily replaceable.
 - .1 Supply the following as specified:
 - .1 KN Crowder W-25S
 - .2 Pemko 319_N
 - .3 Zero 429

2.12.3 Astragals:

- .1 Provide surface astragal sets of extruded aluminum with oblong holes for fastener and nylon brush insert at paired openings, sized to full height of door less 1 inch.
 - .1 Supply the following as specified:
 - .1 KN Crowder W-25
 - .2 Pemko 18041_NB
 - .3 Zero 8193

2.12.4 Door Bottoms and Sweeps:

- .1 Door Sweeps:
 - .1 Provide surface door sweeps of extruded aluminum material with oblong holes for fasteners and silicone rubber sweep material. Each unit sized to suit the door width.)
 - .1 Supply the following as specified:
 - .2 KN Crowder W-24S
 - .3 Pemko 321_N
 - .4 Zero 339

2.13 **Electrified Hardware**

2.13.1 Electric Strikes:

- .1 Provide electric strikes that conform to ANSI A156.31 Grade 1, UL10C and UL294. Designed for 50mm face frames with 12mm drywall penetration. Strike shall be of stainless steel

construction, non-handed with 12 V or 24V AC or DC with continuous duty solenoid and keeper designed with locking pin and capable of accommodating latch bolts with up to 19mm throw.

- .2 Electric strike shall not be used for card access doors. The exception being single use barrier free washrooms and pairs of doors with automatic door operators.

- .1 Supply the following as specified:

- .1 HES 1006 series, 1500 series

- .2 RCI R2164/2364

2.13.2 Magnetic Hold Open Devices

- .1 Provide magnetic hold open devices that conform to ANSI A156.15. Holding force shall be 25 to 40 pounds and shall be fail-safe. Provide magnetic hold-opens with triple-voltage coil that can receive 12 VDC, 24 VAC/DC, or 120VAC; or coordinate required voltage with electrical. Installation Div. 08 71 00. Connection/Test Div. 26. Finish 689.

- .1 Supply the following as specified:

- .1 Sargent 1560 series

- .2 LCN SEM series

- .3 Dormakaba EM series

2.13.3 Power Transfers

- .1 Provide power transfers that conform to ANSI/UL10C 3 Hours Rated. Standard 10 or 12 wire configuration. Heavy duty tamper resistant concealed power transfer. Provide enough concealed wires to accommodate electric function of specified hardware. Provide correct templates for door and frame cut-outs and preparations to hollow metal frame and aluminum frame manufacturers.

- .1 Supply the following as specified:

- .1 Securitron CEPT

- .2 Von Duprin EPT

- .3 Architectural Builders Hardware PT1000

2.14 Finishes

- 2.14.1 Provide hardware with finishes conforming to ANSI A156.18

	Steel	Stainless Steel	Brass/Bronze	Aluminum	Paint/Powder Coat	US/CAN
Clear Anodized				628	689	US28
Satin Nickel	646		619	670		US15
Polished Nickel	645		618	669		US14
Satin Stainless Steel		630				US32D
Polished Stainless Steel		629				US32
Satin Chrome	652		626	702		US26D
Polished Chrome	651		625	672		US26
Satin Brass	633		606	667	678	US4
Polished Brass	632		605	666	677	US5
Satin Bronze	639		612	668	680	US10
Oil Rubbed Bronze	640		613	703	695	US10B
Flat Black / Anodized Black	631		622	671	693	US19

2.15 Keying

2.15.1 Provide construction cylinders for each keyed alike hardware items with 10 operating keys.

2.16 **Installation Accessories**

2.16.1 Install equipment in accordance with the manufacturers' installation instructions. Adjust equipment per instructions and current ANSI/BHMA 156.19 American National Standard for Power assist and low energy power operated doors.

2.16.2 Door Operators:

- .1 Connect door operators to electrical power distribution system as specified in Division 26 Sections.

2.16.3 Controls:

- .1 Terminate wire to controls, press plates, safety sensors.

2.16.4 Equipment shall be installed by a AAADM certified technician who shall also be a factory trained technician.

2.16.5 Standard of Acceptance:

- .1 See sections 2.10 Automatic Door Operators and 2.11 Actuators above.

PART 3 - EXECUTION

3.1 **Examination**

- .1 Prior to door hardware installation, visually inspect door and frames to ensure they have been installed plumb, level, square, true, securely anchors and free from defects that would prevent the installation of finish hardware.
- .2 Confirm doors and frames are correctly sized, handed, fire labeled and prepped for scheduled door hardware.
- .3 Verify wires are run and ready for power to doors requiring electrified hardware.
- .4 Wash down masonry walls, complete painting and staining of doors and frames prior to installation of finish hardware.
- .5 Confirm finish flooring is complete at doorways.
- .6 Correct conditions that inhibit installation before continuing work.
- .7 Deficiencies to be submitted in writing and signed off when complete.

3.2 **Installation**

3.2.1 Install products in accordance with product manufacturer's written instructions for type and use.

3.3 **Installation Tolerances**

3.3.1 Hardware Installers shall have a minimum of five (5) years' experience in installation of hardware. Provide verification of installer's qualification to consultant for approval. All installers to attend review meetings with the hardware distributor.

- 3.3.2 Install hardware at mounting heights as specified in the manufacturer's templates or specific references in approved hardware schedule or approved elevation drawings.
- 3.3.3 Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturers published installation instructions. Provide security fasteners where ligature resistant hardware is scheduled.
- 3.3.4 Ensure that all locksets / latch sets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.
- 3.3.5 Ensure that all exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. Handing is part of installation procedure.
- 3.3.6 Follow all manufactures installation instructions. Adjustment of door closers is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.
- 3.3.7 Delayed action door closers are to be adjusted to forty (40) second delay for barrier free accessibility and movement of materials.
- 3.3.8 Install head seal prior to installation of "PA"-parallel arm mounted door closers and push side mounted door stops/holders. Trim, cut and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Install thresholds and saddles in a bed of caulking completely sealing the underside from water and air penetration.
- 3.3.9 Counter sink through bolt of door pulls under push plate during installation.
- 3.3.10 Install blocking material of sufficient type and size in cavities of metal and wood stud walls and partitions. Located concave and convex type door bumpers at the appropriate height to properly contact protruding trim.
- 3.4 **Field Quality Control**
 - 3.4.1 Verify each door leaf opens closes and latches properly. Inspect fire rated openings to ensure they are installed in compliance with NFPA 80 requirements. Test access control system and electrified hardware devices for proper operation, owner shall sign off on verification of operation. Verify electric door release hardware operates properly upon activation of the fire alarm system.
 - 3.4.2 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work, and corrective measures. Repair or replace as directed by owner.
 - 3.4.3 Before completion of the work but after the hardware has been installed, a certificate to owner shall be submitted stating that final inspection has been made and that hardware has been checked for installation and operation. Obtain the services of a technician from the manufacturer to complete this work.

END OF SECTION

DOOR HARDWARE

08 71 00

PROJECT:



HRH Finch – ABAMU

Prepared By: Chad Connors

Date: August 28, 2024

Revised:

Architectural Hardware Finishes

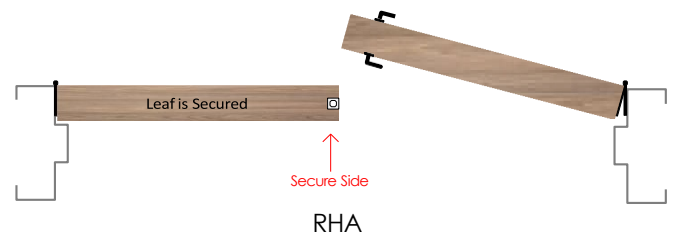
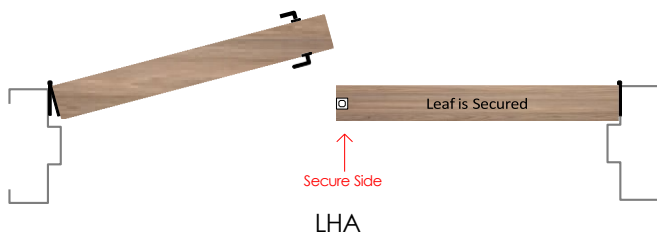
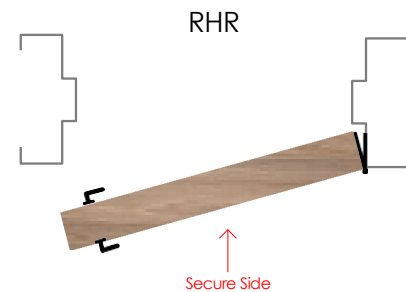
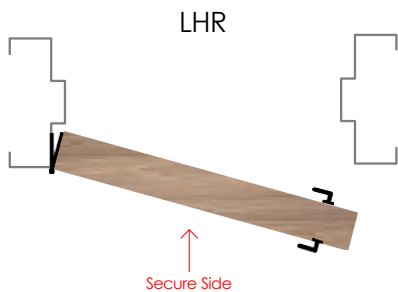
	Steel	Stainless Steel	Brass/Bronze	Aluminum	Paint/Powder Coat	US/CAN
Clear Anodized				628	689	US28
Satin Nickel	646		619	670		US15
Polished Nickel	645		618	669		US14
Satin Stainless Steel		630				US32D
Polished Stainless Steel		629				US32
Satin Chrome	652		626	702		US26D
Polished Chrome	651		625	672		US26
Satin Brass	633		606	667	678	US4
Polished Brass	632		605	666	677	US5
Satin Bronze	639		612	668	680	US10
Oil Rubbed Bronze	640		613	703	695	US10B
Flat Black / Anodized Black	631		622	671	693	US19

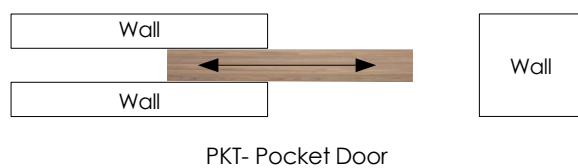
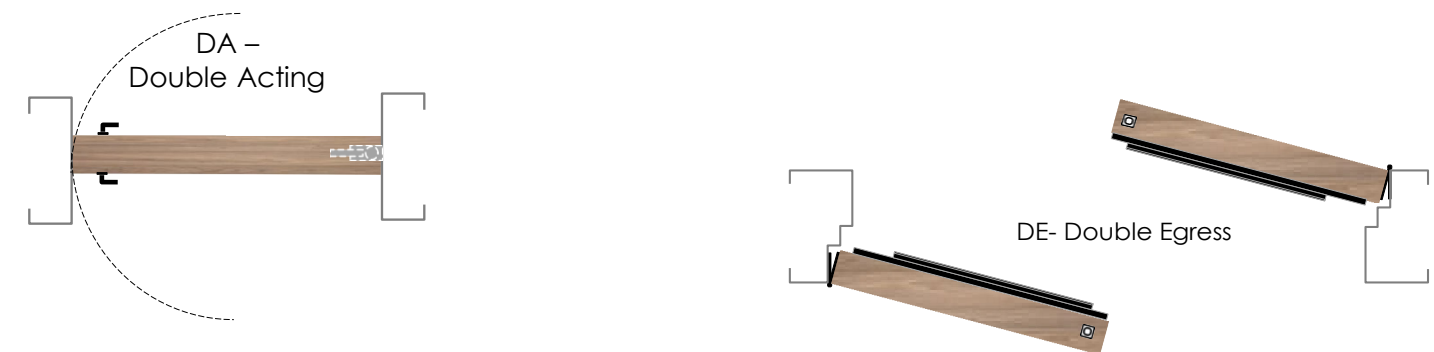
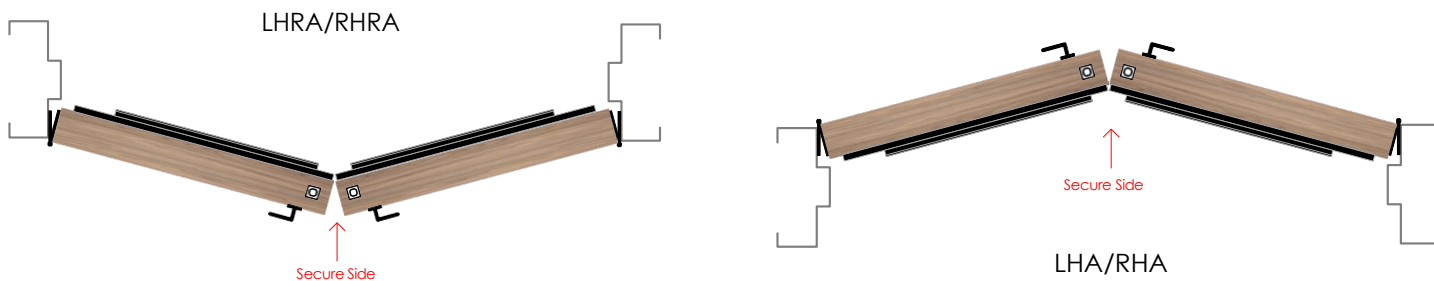
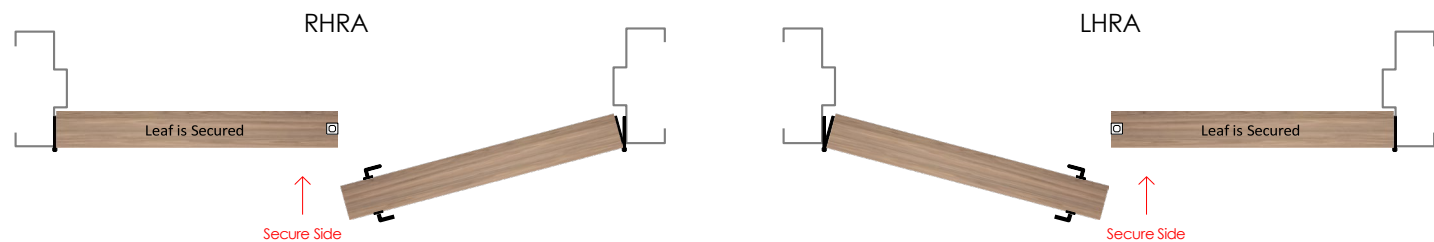
Door Handing's

Abbreviations

RH = Right Hand	RHA = Right Hand Active	SS = Single Slider
LH = Left Hand	LHA = Left Hand Active	BP = Bi-Parting Slider
RHR = Right Hand Reverse	RHA/LHA = Right & Left Hands Active	BF = Bi-Folding Slider
LHR = Left Hand Reverse	RHRA/LHRA = Right & Left Hand Reverse Active	TS = Telescopic Slider
RHRA = Right Hand Reverse Active	DA = Double Acting	PKT = Pocket Slider
LHRA = Left Hand Reverse Active	DE = Double Egress	

NOTE: The handing of a swing door is determined by placing yourself on the secured or keyed side of the door.





Products & Alternatives

NOTE: Only those products / brands listed here are acceptable and should be used to form a bid price. No unsolicited products will be considered. If acceptable alternates are listed here those too can be used to form a bid price provided, they are exactly the same as the specified item. If using an alternate product to form a price it is the bidder's responsibility to ensure that product is identical in every way to the specified item. If no alternates are listed, no alternate products are acceptable.

Product Type	Product#	Manufacturer	Alternate Manufacturer 1	Alternate Manufacturer 2
Hinge	TA786	McKinney		
Lockset	8200	Sargent		
Concealed Door Closer	268	Sargent		
Door Closer	351	Sargent		
Electric Strike	1006 / 1500	HES		
Flush Bolt Set	FB7805/FB	Standard Metal		
Roller Latch	F75	Standard Metal		
Surface Bolt	F67	Standard Metal		
Door Pull	2010-2	Standard Metal		
Pull Plate	H412	Standard Metal		
Overhead Stop	690	Sargent		
Magnetic Hold Open	1561	Sargent		
Auto Door Operator	Sw200i	Besam		
Touchless Actuator	CM-325	Camden		
Sliding Door Kit	CCSF-1-493-W	KN Crowder		
Power Transfer	CEPT	Securitron		
Coordinator	F7600	Standard Metal		
Wall Stop	S120	Standard Metal		
Kick Plate	K10A	Standard Metal		
Smoke / Sound Seal	W-66	KN Crowder		
Door Sweep	W-25S	KN Crowder		
Astragal Set	W-25	KN Crowder		

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SSD = Stainless Steel Door
ISSD = Insulated Stainless Steel Frame
STL = Steel Door
IC-ALD = Insulated Clad Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door
OHD = Overhead Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
SSF - Stainless Steel Frame
STL = Steel Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

Weblinks:

Weblinks do change from time to time as manufacturers move around their websites, please inform us if you have a none functioning weblink.

HARDWARE SCHEDULE



Heading# 1

Opening Information					
Opening Type:	Single	Opening Size:	1220 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	20 MIN

6	Total Openings							
1	Door#	D3044	Location:	Corridor CORR-L3-04	To	323 1-Bed Room	Handing:	RH
1	Door#	D3046	Location:	Corridor CORR-L3-04	To	322 1-Bed Room	Handing:	LH
1	Door#	D3048	Location:	Corridor CORR-L3-04	To	321 1-Bed Room	Handing:	RH
1	Door#	D3050	Location:	Corridor CORR-L3-04	To	320 1-Bed Room	Handing:	LH
1	Door#	D3051	Location:	Corridor CORR-L3-04	To	319 1-Bed Room	Handing:	RH
1	Door#	D3052	Location:	Corridor CORR-L3-04	To	318 1-Bed Room	Handing:	LH

Web Link

Site Verified

By Hardware Supplier					
18	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney	 ☐
6	Back-to-Back Door Pull	2010-2 x 2010-2 x BTB	630 / US32D / Satin Stainless Steel	Standard Metal	 ☐
6	Roller Latch	F75	626 / US26D / Satin Chrome	Standard Metal	 ☐
6	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent	 ☐
6	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent	 ☐
6	Magnetic Hold Open	1561	689 / US28 / Painted Aluminum	Sargent	 ☐
6	Smoke / Sound Seal	W-66 x 5480	Black	KN Crowder	 ☐
6	Door Sweep	W-25S x 1220	628 / US28 / Clear Anodized	KN Crowder	 ☐

.....End of Heading.....



Heading#

2

Opening Information					
Opening Type:	Single	Opening Size:	1220 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	20 MIN

6	Total Openings							
1	Door#	D3027	Location:	Corridor CORR-L3-01	To	329 1-Bed Room	Handing:	RH
1	Door#	D3028	Location:	Corridor CORR-L3-01	To	328 1-Bed Room	Handing:	LH
1	Door#	D3029	Location:	Corridor CORR-L3-01	To	327 1-Bed Room	Handing:	RH
1	Door#	D3030	Location:	Corridor CORR-L3-01	To	326 1-Bed Room	Handing:	LH
1	Door#	D3031	Location:	Corridor CORR-L3-01	To	325 1-Bed Room	Handing:	LH
1	Door#	D3045	Location:	Corridor CORR-L3-04	To	324 1-Bed Room	Handing:	RH

Web Link

Site Verified

By Hardware Supplier					
18	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney	☐
6	Back-to-Back Door Pull	2010-2 x 2010-2 x BTB	630 / US32D / Satin Stainless Steel	Standard Metal	☐
6	Roller Latch	F75	626 / US26D / Satin Chrome	Standard Metal	☐
6	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent	☐
6	Magnetic Hold Open	1561	689 / US28 / Painted Aluminum	Sargent	☐
6	Smoke / Sound Seal	W-66 x 5480	Black	KN Crowder	☐
6	Door Sweep	W-25S x 1220	628 / US28 / Clear Anodized	KN Crowder	☐
By Automatics Supplier					
6	Auto Door Operator	SW200i Pull	628 / US28 / Clear Anodized	Besam	☐
12	Touchless Actuator	CM-325-S/42	630 / US32D / Satin Stainless Steel	Camden	☐

Notes:

- 120VAC is required at the head of the door for all barrier free door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.

.....End of Heading.....

Heading# 3

Opening Information					
Opening Type:	Single	Opening Size:	1066 x 2130 x 44	STC Rating	None
Door Material:	SCWD	Frame Material:	ALF	Fire Rating	None

4	Total Openings							
1	Door#	D3027A	Location:	329 1-Bed Room	to/from	Washroom 2-pc.	Handing:	SS
1	Door#	D3028A	Location:	328 1-Bed Room	to/from	Washroom 2-pc.	Handing:	SS
1	Door#	D3029A	Location:	327 1-Bed Room	to/from	Washroom 2-pc.	Handing:	SS
1	Door#	D3030A	Location:	326 1-Bed Room	to/from	Washroom 2-pc.	Handing:	SS

Web Link

Site Verified

By Hardware Supplier					
4	Sliding Door Kit	CCSF-1-493-w x 2132 1 DR KIT	628 / US28 / Clear Anodized	KN Crowder	 ☐
4	Back-to-Back Door Pull	2010-2 x 2010-2 x BTB	630 / US32D / Satin Stainless Steel	Standard Metal	 ☐
4	Fascia	CC-480 x 2132	628 / US28 / Clear Anodized	KN Crowder	 ☐
4	End Cap	CC-482	628 / US28 / Clear Anodized	KN Crowder	 ☐

Notes:

- Ensure clear dimension of 865 minimum when door is in open position.

.....End of Heading.....



Heading#

4

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1									Web Link	Site Verified
1	Door#	D3033	Location:	Corridor CORR-L3-01	To	Quiet/Consonant Room	Handing:	LH		

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Smoke / Sound Seal	W-66 x 5235	Black	KN Crowder		☐
1	Door Sweep	W-25S x 965	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

5

Opening Information					
Opening Type:	Single	Opening Size:	685 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

2								
1	Door#	D3038	Location:	Corridor CORR-L3-01	To	WR Staff 2-Pc.	Handing:	RH
1	Door#	D3039	Location:	Corridor CORR-L3-01	To	WR Staff 2-Pc.	Handing:	LH

Web Link

Site Verified

By Hardware Supplier

6	Heavy Weight Butt Hinge	TA786 114 x 101	652 / US26D / Satin Chrome	McKinney		☐
2	Storeroom Lockset w/ Indicator	8251LNP x V20 x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
2	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		☐
2	Overhead Stop	697S	626 / US26D / Satin Chrome	Sargent		☐
2	Door Closer	351-O-DA	689 / US28 / Painted Aluminum	Sargent		☐
2	Smoke / Sound Seal	W-66 x 4945	Black	KN Crowder		☐
2	Door Sweep	W-25S x 685	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

2	Card Reader	By Security Provider	Black			☐
2	Door Contact	By Security Provider				☐
2	Access Controller	By Security Provider				☐
2	Power Supply	By Security Provider				☐

By Owner

2	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

6

Opening Information					
Opening Type:	Single	Opening Size:	1193 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1								
1	Door#	D3040A	Location:	Corridor CORR-L3-01	To	Soiled Utility Room	Handing:	LH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Kick Plate	K10A 203 x 1155 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		☐
1	Smoke / Sound Seal	W-66 x 5453	Black	KN Crowder		☐
1	Door Sweep	W-25S x 1193	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

7

Opening Information

Opening Type:	Single	Opening Size:	965 x 2130 x 44 (Dutch Door)	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2								
1	Door#	D3035A	Location:	Corridor CORR-L3-01	To	Nurse Station	Handing:	RH
1	Door#	D3035B	Location:	Corridor CORR-L3-04	To	Nurse Station	Handing:	RH

Web Link

Site Verified

By Hardware Supplier

8	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
2	Surface Bolt	F67UL	626 / US26D / Satin Chrome	Standard Metal		☐
2	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
2	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
2	Pull Plate	H412 (top leaf pull side mount)	626 / US26D / Satin Chrome	Standard Metal		☐
2	Hold Open Overhead Stop	698H	626 / US26D / Satin Chrome	Sargent		☐
2	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
2	Kick Plate	K10A 203 x 927 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		☐
2	Wall Stop	S120 (bottom leaf)	626 / US26D / Satin Chrome	Standard Metal		☐
2	Smoke / Sound Seal	W-66 x 5235	Black	KN Crowder		☐
2	Door Sweep	W-25S x 965	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

2	Card Reader	By Security Provider	Black			☐
2	Door Contact	By Security Provider				☐
2	Access Controller	By Security Provider				☐
2	Power Supply	By Security Provider				☐

By Owner

2	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

8

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1								
1	Door#	D3042	Location:	Nurse Station	To	Medication Room	Handing:	RH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Smoke / Sound Seal	W-66 x 5235	Black	KN Crowder		☐
1	Door Sweep	W-25S x 965	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Biometric Reader	By Security Provider				☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

9

Opening Information

Opening Type:	Single	Opening Size:	1220 x 2130 x 44	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1	Door#	D3025	Location:	Dining/Activity Room	From	Equipment Storage	Handing:	RHR

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114 NRP	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	699S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-P9	689 / US28 / Painted Aluminum	Sargent		☐

By Security Supplier

1	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

10

Opening Information

Opening Type:	Pair	Opening Size:	2 - 915 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1	Door#	D3026	Location:	Corridor CORR-L3-01	To	Dining/Activity Room	Handing:	RHA

Web Link

Site Verified

By Hardware Supplier

6	Heavy Weight Butt Hinge	TA786 114 x 101	652 / US26D / Satin Chrome	McKinney		☐
1	Self-Latching Flush Bolt w/ Fire Pin	F7805/FB	626 / US26D / Satin Chrome	Standard Metal		☐
1	Power Transfer	CEPT	630 / US32D / Satin Stainless Steel	Securitron		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Coordinator	F7672	600 / USP / Primed	Standard Metal		☐
2	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent		☐
2	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Smoke / Sound Seal	W-66 x 6090	Black	KN Crowder		☐
1	Astragal Set	W-25 x 2/2130	628 / US28 / Clear Anodized	KN Crowder		☐
2	Door Sweep	W-25S x 915	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Card Reader	By Security Provider				☐
2	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

11

Opening Information					
Opening Type:	Single	Opening Size:	1193 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1								Web Link	Site Verified
1	Door#	D3023	Location:	Corridor CORR-L3-01	To	Team Room/Alfred Office	Handing:	RH	

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	698S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Smoke / Sound Seal	W-66 x 5453	Black	KN Crowder		☐
1	Door Sweep	W-25S x 1193	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....

Heading# 12

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2130 x 44	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

2								
1	Door#	D3031A	Location:	325 1-Bed Room	From	Washroom 2-Pc.	Handing:	LHR
1	Door#	D3045A	Location:	324 1-Bed Room	From	Washroom 2-Pc.	Handing:	RHR

Web Link

Site Verified

By Hardware Supplier					
6	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney	 ☐
2	Passage Set	8215LNP	630 / US32D / Satin Stainless Steel	Sargent	 ☐
2	Wall Stop	S120	626 / US26D / Satin Chrome	Standard Metal	 ☐
1	Smoke / Sound Seal	W-66 x 5235	Black	KN Crowder	 ☐

.....End of Heading.....



Heading# 13

Opening Information					
Opening Type:	Single	Opening Size:	1066 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1								
1	Door#	D3032	Location:	Corridor CORR-L3-01	To	Shower Room	Handing:	RH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset w/ Indicator	8251LNP x V20 x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	699S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Kick Plate	K10A 203 x 1028 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		☐
1	Smoke / Sound Seal	W-66 x 5326	Black	KN Crowder		☐
1	Door Sweep	W-25S x 1066	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

14

Opening Information

Opening Type:	Single	Opening Size:	1220 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

3	Total Openings							
1	Door#	D3037A	Location:	Corridor CORR-L3-01	To	Clean Supply Room	Handing:	LH
1	Door#	D3037B	Location:	Corridor CORR-L3-04	To	Clean Supply Room	Handing:	RH
1	Door#	D3040B	Location:	Corridor CORR-L3-04	To	Soiled Utility Room	Handing:	LH

Web Link

Site Verified

By Hardware Supplier

9	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
3	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
3	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
3	Overhead Stop	699S	626 / US26D / Satin Chrome	Sargent		☐
3	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
3	Kick Plate	K10A 203 x 1182 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		☐
3	Smoke / Sound Seal	W-66 x 5480	Black	KN Crowder		☐
3	Door Sweep	W-25S x 1220	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

3	Card Reader	By Security Provider	Black			☐
3	Door Contact	By Security Provider				☐
3	Access Controller	By Security Provider				☐
3	Power Supply	By Security Provider				☐

By Owner

3	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....

Heading# 15

Opening Information					
Opening Type:	Single	Opening Size:	Existing Door & Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1									Web Link	Site Verified
1	Door#	D15.1	Location:	Corridor CORR-L3-01	From	Closet-soiled Hamper	Handing:	RHR		

By Hardware Supplier							
3	Heavy Weight Butt Hinge	TA786 114 x 101 (confirm size for existing)	652 / US26D / Satin Chrome	McKinney			
1	Storeroom Lockset	8204LNP x CMK (confirm for existing door)	630 / US32D / Satin Stainless Steel	Sargent			

Notes:

- Replace any non-functioning or broken devices with new to match existing. New hardware functions to match existing hardware function and keying at same door.

.....End of Heading.....



Heading#

16

Opening Information					
Opening Type:	Single	Opening Size:	1220 x 2130 x 44	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1								
1	Door#	D3063	Location:	Corridor CORR-L3-06	To	Office Swing Consult	Handing:	RH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	TA786 127 x 114	652 / US26D / Satin Chrome	McKinney		☐
1	Storeroom Lockset	8204LNP x CMK	630 / US32D / Satin Stainless Steel	Sargent		☐
1	Electric Strike	1500C	630 / US32D / Satin Stainless Steel	HES		☐
1	Overhead Stop	699S	626 / US26D / Satin Chrome	Sargent		☐
1	Door Closer	351-O	689 / US28 / Painted Aluminum	Sargent		☐
1	Smoke / Sound Seal	W-66 x 5480	Black	KN Crowder		☐
1	Door Sweep	W-25S x 1220	628 / US28 / Clear Anodized	KN Crowder		☐

By Security Supplier

1	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

By Owner

1	Permanent Cylinder	By Humber River Locksmith	626 / US26D / Satin Chrome	MFG		☐

.....End of Heading.....



Heading#

17

Opening Information

Opening Type:	Pair	Opening Size:	(Existing Door & Frame)	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1									
1	Door#	D-CORR-L3-01	Location:	Corridor CORR-L3-01	From	Corridor	Handing:	LHRA/RHRA	

Web Link

Site Verified

By Hardware Supplier

		Re-use existing door hardware				☐

By Security Supplier

2	Card Reader	By Security Provider	Black			☐
2	Door Contact	By Security Provider				☐
2	Magnetic Lock	By Security Provider				☐
2	Pull Station	By Security Provider				☐
1	Remote Door Release	By Security Provider				☐
1	Request to Exit	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

Notes:

- Replace any non-functioning or broken devices with new to match existing. New hardware functions to match existing hardware function and keying at same door.
- Remote release to be located at nurses' station.

.....End of Heading.....



Heading#

18

Opening Information

Opening Type:	Single	Opening Size:	(Existing Door & Frame)	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1									
1	Door#	D-CORR-L3-04	Location:	Corridor	From	Corridor CORR-L3-04	Handing:	LHR	

Web Link

Site Verified

By Hardware Supplier

		Re-use existing door hardware				☐

By Security Supplier

2	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Magnetic Lock	By Security Provider				☐
2	Pull Station	By Security Provider				☐
1	Remote Door Release	By Security Provider				☐
1	Request to Exit	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

Notes:

- Replace any non-functioning or broken devices with new to match existing. New hardware functions to match existing hardware function and keying at same door.
- Remote release to be located at nurses' station.

.....End of Heading.....



Heading#

19

Opening Information

Opening Type:	Single	Opening Size:	(Existing Door & Frame)	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1									
1	Door#	D-ST-L3-01	Location:	Stair ST-L3-01	From	Corridor CORR-L3-05	Handing:	LHR	

Web Link

Site Verified

By Hardware Supplier

		Re-use existing door hardware				☐

By Security Supplier

2	Card Reader	By Security Provider	Black			☐
1	Door Contact	By Security Provider				☐
1	Magnetic Lock	By Security Provider				☐
2	Pull Station	By Security Provider				☐
1	Remote Door Release	By Security Provider				☐
1	Request to Exit	By Security Provider				☐
1	Access Controller	By Security Provider				☐
1	Power Supply	By Security Provider				☐

Notes:

- Replace any non-functioning or broken devices with new to match existing. New hardware functions to match existing hardware function and keying at same door.
- Remote release to be located at nurses' station.

.....End of Heading.....

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Glass and glazing. including but not limited to doors, and windows
 - .2 Fire rated glazing.
 - .3 Fire rated vision control insulating glass unit with integrated cordless louvres.

1.2 REFERENCES

- .1 Definitions:
 - .1 Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
 - .2 Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036. Nominal glass thicknesses will be called out in this document. The more onerous of maximum or minimum thicknesses as defined in ASTM C1036 shall be used in all calculations and dimensions.
 - .3 Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- .2 Preinstallation Conference: Conduct conference at Project site.
 - .1 Verify project requirements.
 - .2 Review installation conditions under which work is to be performed including substrate conditions and possible site concerns.
 - .3 Inspection of surfaces to receive the work.
 - .4 Review ambient installation requirements.
 - .5 Coordination requirements with other subtrades.
 - .6 Review manufacturer's installation instructions, procedures to be adopted, and warranty requirements.

1.4 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of glass and glazing product.
- .2 Shop Drawings: Include elevations, sizes, dimensions, materials, edge details, anchorage, hardware, and attachments to other work. Show sections and profiles of panel units, arrangement and provision for jointing, anchoring and fastening, supports and other installation details. Indicate locations of panels on elevations. Show large scale details of edge conditions and typical conditions.
- .3 Delegated Design: Submit engineered submittal for glass indicated to comply with design / performance requirements, including analysis data.
- .4 Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of glass coating and sealant
- .5 Samples for Verification:
 - .1 Submit samples of each type of glass other than clear monolithic vision glass, minimum 250 mm (10 inches) square for the following:
 - .1 Laminated glass
 - .2 Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- .1 Product Certificates: For glass and glazing from manufacturer, evidencing compliance with testing requirements.
- .2 Certification: Provide certification from glass producer/fabricator or Exterior Wall Engineer that glass producer/fabricator has reviewed all glazing details and thicknesses and finds same suitable for the purpose intended in accordance with these specifications. This shall include a written wind load and thermal stress analysis showing a probability of failure of no greater than eight (8) lites per thousand for vertical panels and one (1) lite per thousand for horizontal panels at the design and test loads and local climatic thermal conditions.
 - .1 Certification, Tempered Glass Testing: Submit certification that tempered glass intended for use on the project has been tested to ANSI Z97.1 and CPSC 16 CFR 1201 II and CAN/CGSB 12.1.
- .3 Product Test Reports:
 - .1 For glazing sealants, for tests performed by a qualified testing agency.
 - .2 For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
 - .3 Preconstruction adhesion and compatibility test report.
- .4 Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: For maintenance data for each type of glass and applied coating to maintain throughout life the glazing systems.

1.7 QUALITY ASSURANCE

- .1 Quality Standard: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - .1 GANA Publications: "Laminated Glazing Reference Manual", "Glazing Manual.", and "Engineering Standards Manual."
- .2 Source Limitations:
 - .1 For Glass:
 - .1 Obtain each glass type as schedule in the Glass Schedule at the end of this Section from single source from single manufacturer for each glass type.
 - .2 For Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- .3 Installer Qualifications: A company with installers who are trained and experienced in the skills required and familiar with referenced standards and requirements of this section with minimum 3 years experience. Glazing foreperson shall have minimum 10 years experience. An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- .4 Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- .5 Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.

1.8 PRECONSTRUCTION TESTING

- .1 Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - .1 Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - .2 Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

- .3 Test no fewer than four (4) samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
- .4 Schedule enough time for testing and analyzing results to prevent delaying the Work.
- .5 For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

- .1 Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- .2 Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.
- .3 Retain packaging and sequencing numbers for decorative-glass units.

1.10 FIELD CONDITIONS

- .1 Environmental Limitations: conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - .1 Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 4.4 deg C (40 deg F).
- .2 Field Measurements: Verify actual dimensions of openings and construction contiguous with glass by field measurements before fabrication.

1.11 WARRANTIES

- .1 Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - .1 Warranty Period: 5 years from date of Substantial Completion..
- .2 Vision Control Glass in Interior Locations: Manufacturer's 20 year warranty against malfunction, mechanism failure and premature wear of internal parts, and material obstruction of glass units by dust or film formation due to failure of hermetic seal.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- .2 Regulatory Requirements: Fire rated glass shall bear permanent, non-removable label of ULC certifying it for use in tested and rated fire protective assemblies.
- .3 Delegated Design: Engage a qualified professional engineer to design glazing, including comprehensive engineering analysis. Glass thicknesses indicated are minimums and for detailing only. Confirm glass thicknesses and heat treatment by analyzing project loads and in-service conditions. Provide glass lites for various openings in nominal thickness indicated, but not less than the thickness and strength (including heat treatment) as required to comply with performance criteria specified.
- .4 Design glass in accordance with CAN/CGSB 12.20 and ASTM E1300, Structural Design of Glass for Buildings and make determinations as to thickness and tempering of glass as required to suit applications complying to the building code design and fire rating requirements and regulations of authorities having jurisdiction at the Place of Work, which shall be minimum, except where more stringent requirements are specified herein. In case of conflict of requirements comply with most stringent requirements.
 - .1 Vertical Glazing:
 - .1 For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - .2 Probability of Breakage: 8 lites per 1000.
- .5 Provide glazing capable of withstanding anticipated loads without failure, including loss or glass breakage attributable to defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Glass Manufacturer List: Products of the following manufacturer are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 AGC Glass North America.
 - .2 Cardinal Glass Industries.

- .3 Guardian Glass Industries.
- .4 Pilkington North America.
- .5 Prelco.
- .6 Schott-North America Inc.
- .7 Technical Glass Products.
- .8 Unicel Architectural Corp.
- .9 Viracon Inc.
- .10 Vitro Architectural Glass.

2.4 GLASS MATERIALS

- .1 Float Glass: CAN/CGSB 12.3, Glazing Quality. ASTM C 1036, Type I, Quality-Q3, Class I (clear) clear unless otherwise indicated.
- .2 Low Iron Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I, complying with other requirements specified and with visible light transmission not less than 91 percent and solar heat gain coefficient not less than 0.87.
 - .1 Products: Subject to compliance with requirements, provide one of the following:
 - .1 AGC Glass Company North America, Inc.; Krystal Klear.
 - .2 Guardian Industries Corp.; Ultrawhite.
 - .3 Pilkington North America; Optiwhite.
 - .4 PPG Industries, Inc.; Starphire.
- .3 Heat Treated Float Glass (Tempered or Heat Strengthened): Clear heat treated to CAN/CGSB 12.1 unless otherwise indicated ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
 - .1 Flatness Tolerances: Overall bow and warp shall not exceed 50 percent of values tabulated in ASTM C 1048.
 - .2 Tempered Safety Glass: Conform to CAN/CGSB 12.1 Type 2, Tempered Glass, Class A, ANSI Z97.1 and CPSC 16 CFR 1201 II.
 - .1 Provide heat soak testing conforming to EN14179 which includes a 2 hour dwell at 550°F ± 18°F (290°C ± 10°C).
 - .3 Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated. Direction of roller wave shall be consistent throughout building.
 - .1 Roller wave peak-to-valley deviation shall not exceed 0.002 inch "Peak to Valley" in the central area and 0.008 inch within 10-1/2 inches of the leading and trailing edge.
 - .2 For uncoated glass, comply with requirements for Condition A.
 - .3 For coated vision glass, comply with requirements for Condition C (other coated glass).

2.5 LAMINATED GLASS

- .1 Laminated Glass.
 - .1 Laminated glass to CAN/CGSB 12.1-M90, Use materials that have a proven record of no tendency to bubble, discolour, or lose physical and mechanical properties after fabrication and installation. Misalignments between laminated lites may not exceed 1/32" (0.79 mm).
 - .2 Comply with ASTM C1172 and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified.
 - .3 Blemishes that may form or grow over time shall not exceed the limits defined in ASTM C1172.
 - .4 Use materials that have a proven record of no tendency to bubble, discolour, or lose physical and mechanical properties after fabrication and installation. Misalignments between laminated lites may not exceed 0.8 mm (1/32").
 - .5 Interlayer:
 - .1 Interlayer shall be PVB interlayer
 - .2 Interlayer Thickness: Minimum 0.79 mm (0.030 inch); and thicker to comply with requirements.
 - .3 Basis of Design for PVB: Trosifol Clear or equivalent by Kuraray.
 - .6 Construction: Laminate glass with interlayer to comply with interlayer manufacturer's written instructions.
 - .7 Interlayer Colour: Clear unless otherwise indicated.

2.6 FIRE PROTECTION RATED GLAZING

- .1 Laminated Ceramic Glazing: Laminated glass made from two plies of clear, ceramic glass.
 - .1 Thickness: Approximately 8 mm (5/16 inch).
 - .2 Impact Safety Resistance: ANSI Z97.1 and CPSC 16 CFR 1201 (Cat. I and II).
 - .3 Fire-ratings: As indicated on drawings, from 20 minutes to 90 minutes, 3 hours in doors, with hose stream test.
 - .4 Visible Light Transmission: Approximately 80%.
 - .5 Surface Finish: Premium Grade, clear glass, polished for superior optical clarity.
 - .6 Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to CAN/ULC S106, UL 9, UL 10C, NFPA 252 or NFPA 257 including the hose-stream test.
 - .7 Basis-of-Design Product: FireLite Plus by Technical Glass Products.
- .2 Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers .
 - .1 Thickness: Approximately 19 mm (3/4").
 - .2 Impact Safety Resistance: ANSI Z97.1 and CPSC 16 CFR 1201 (Cat. I and II).
 - .3 Fire-ratings: Up to 2 hours.
 - .4 Visible Light Transmission: Minimum 85%.

- .5 Surface Finish: Premium Grade, clear glass, polished for superior optical clarity.
- .6 Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to CAN/ULC S106, UL 9, UL 10B, UL 10C, NFPA 252 or NFPA 257 including the hose-stream test.
- .7 Basis of Design: Pilkington Pyrostop by Technical Glass Products.

2.7 LOUVRES, FRAMES, AND OPERATORS

- .1 Control vision through insulating glass unit assemblies by means of rotating, cordless, interlocking, horizontal, extruded aluminum louvers with rotation controlled manually.
- .2 Louvers: Hollow extruded aluminum, interlocking profile 5 mm thick x 22 mm deep.. White finish.
- .3 Manual Operators: Ligature-resistant knob type.
- .4 Glass Frame (Trim Kit): Steel, factory-glazed, sized to accept vision control glass with 25 mm airspace for insertion into 44 mm thick doors; White finish.

2.8 GLAZING SEALANTS

- .1 General:
 - .1 Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - .2 Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - .3 Colours of Exposed Glazing Sealants: As selected by Consultant from manufacturer's full range.
- .2 Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
 - .1 Product: Subject to compliance with requirements, provide one of the following:
 - .1 The Dow Chemical Company ; Dow Corning® 795 Silicone Building Sealant.
 - .2 GE Construction Sealants; Momentive Performance Materials Inc.; SilGlaze II SCS2800
 - .3 Tremco Incorporated; Spectrum 2.
 - .2 Colors of Exposed Glazing Sealants: As selected by Consultant from manufacturer's full range.
- .3 Glass-To-Glass Butt Joints: ASTM C920, Type S, Grade NS, Class 25, Use G.
 - .1 Colour: Clear.

- .2 Products:
 - .1 999-A by Dow Corning.
 - .2 SCS1200 by Momenitive.
 - .3 860 by Pecora.

2.9 GLAZING TAPES

- .1 Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 - .1 AAMA 804.3 tape, where indicated.
 - .2 AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - .3 AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- .2 Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - .1 AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - .2 AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.10 MISCELLANEOUS GLAZING MATERIALS

- .1 General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- .2 Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- .3 Setting Blocks: Silicone material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- .4 Spacers: Silicone blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- .5 Edge Blocks: Silicone material of hardness needed to limit glass lateral movement (side walking).
- .6 Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material) and Type C (Closed Cell), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance, complying with requirements specified in Division 07, Section "Joint Sealants".
- .7 Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness

required to maintain watertight seal, made from one of the following except use silicone at structural silicone glazed assemblies:

- .1 Neoprene complying with ASTM C864.
 - .2 EPDM complying with ASTM C864.
 - .3 Silicone complying with ASTM C1115.
 - .4 Thermoplastic polyolefin rubber complying with ASTM C1115.
- .8 Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C509, Type II, black; of profile and hardness required to maintain watertight seal.
- .1 Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
- .9 Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.11 FABRICATION OF GLAZING UNITS

- .1 Fabricate glass and glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with performance requirements.
- .2 Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.
- .3 Cutting: Obtain sizes from shop drawings or field measurement. Cut lites to fit each opening with edge clearances and bite on glass as recommended by manufacturer. Do not nip glass edges.
- .4 Factory cut heavy float glass (1/2 inch and above). Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass larger than required so as to obtain, clean-cut edges without seaming or nipping.
- .5 Do not cut, seam, nip or abrade glass after heat-tempering. Before tempering glass, provide cutouts to receive hardware.
- .6 Butt Glazed Lites: Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- .7 Edgework for Exposed Edges: Where edges of glass are to be exposed in the finish work, provide ground and polished edges and slightly eased arrises and eased corners. Where edges butt, provide flat ground edges.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - .1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - .2 Presence and functioning of weep systems.
 - .3 Minimum required face and edge clearances.
 - .4 Effective sealing between joints of glass-framing members.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- .2 Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- .1 Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- .2 Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- .3 Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- .4 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- .5 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Place blocks to allow water passage to weep holes. Set blocks in thin course of compatible sealant suitable for heel bead.
 - .1 Glass Units Less Than 6'-0" (1.8 m): Locate setting blocks at sill one - quarter of the width in from each end of the glass unless otherwise recommended by the glass manufacturer.
 - .2 Glass Units 6'-0" (1.8 m) or Greater: Locate setting blocks at sill one - eighth of the width in from each end of the glass, but not less than 6 inches (150 mm), unless otherwise recommended by the glass manufacturer.
- .6 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

- .7 Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - .1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - .2 Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- .8 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- .9 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- .10 Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- .11 Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- .12 Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- .13 The installation of each lite of exterior glass shall be watertight, airtight, and capable of withstanding temperature changes, wind loading, and impact from operation (doors) without failure of any kind including loss or breakage of glass, failure of seal, exudation of sealant and excessive deterioration of glazing materials.

3.4 TAPE GLAZING

- .1 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- .2 Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- .3 Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- .4 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- .5 Do not remove release paper from tape until right before each glazing unit is installed.
- .6 Apply heel bead of elastomeric sealant.
- .7 Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of

removable stops. Start gasket applications at corners and work toward centers of openings.

- .8 Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 DRY GLAZING

- .1 Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- .2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- .3 Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .4 Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .5 Install gaskets so they protrude past face of glazing stops.

3.6 WET GLAZING

- .1 Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- .2 Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- .3 Tool exposed surfaces of sealants to provide a substantial wash away from glass.
- .4 Glazed Monolithic and Laminated Glass Units (Butt Glazing): Glass to glass glazing shall be in accordance with the recommendations of sealant and glass manufacturers and shall include the following.
 - .1 Mask both sides of each adjacent piece of glass to be glazed.
 - .2 Provide wood dowel, with a diameter of at least 3 times of the joint width, wrapped in polyethylene and firmly taped to interior face of glass to act as a back-up during glazing operations.
 - .3 Tool face of sealant slightly concave using extreme care not to chip or otherwise abrade corners of glass.
 - .4 Allow sealant to fully cure before removing wood polyethylene wrapped dowel.

3.7 CLEANING

- .1 Immediately after installation remove nonpermanent labels and clean surfaces.
- .2 Remove contaminating substances that come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- .3 Remove and replace glass that is damaged during construction period.

3.8 PROTECTION

- .1 Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

3.9 LAMINATED GLASS SCHEDULE

- .1 Interior Glass Type **GL-20**: Vision laminated glass.
 - .1 Laminated fully tempered clear safety glass with PVB interlayer.
 - .2 Overall Unit Thickness: 21.52 mm.
 - .1 Two (2) plies of 10 mm ,Clear Low Iron Heat Treatment FT Laminated Glass with PVB Thickness 0.060 inch (1.52 mm) Clear Interlayer.

3.10 FIRE-PROTECTION-RATED GLAZING SCHEDULE

- .1 Fire Rated Glass Type **GL-50**: 45-minute fire-protection-rated glazing; laminated ceramic glazing.
 - .1 Overall Thickness: Nominal 8 mm.

3.11 FIRE-PROTECTION-RATED VISION CONTROL GLASS SCHEDULE

- .1 Fire Rated Glass Type **GL-60**: 20-minute fire-protection-rated glazing; insulating laminated glass with intumescent interlayers.
 - .1 Basis-of-Design Product: Vision Control Mini by UniceL with Pilkington Pyrostop.
 - .2 Overall Unit Thickness: Nominal 44 mm.
 - .3 Airspace: 25 mm.

END OF GLASS AND GLAZING

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section includes
 - .1 Frameless polycarbonate mirror **MIR-01**.
 - .2 Dome mirror **MIR-02, MIR-03, MIR-04**.

1.2 ACTION SUBMITTALS

- .1 Product Data: Submit product data for mirrors.
- .2 Shop Drawings:
 - .1 Show dimensioned locations of mirrors in plan and elevations.
 - .2 Include installation instructions including anchorage and securement systems.
- .3 Samples:
 - .1 Submit 300 mm (12 inches) square sample of mirror.
 - .2 Submit one (1) set of mounting hardware.

1.3 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: For qualified Installer

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for any cleaning or use practices or materials which may damage mirrors.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications: A qualified installer who has completed mirror glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in mirror installations with a record of successful in-service performance
- .2 Source Limitations: Obtain mirrors from single source from single manufacturer.
- .3 Safety Glazing Products: For polycarbonate mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct

exposure to sun, or other causes.

- .2 Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.7 FIELD CONDITIONS

- .1 Maintain temperature and humidity conditions in installation areas as recommended by the product manufacturers before, during and after installation.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

- .1 Provide mirrored glass that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.
- .2 Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.
- .3 Level of Quality: High with no distortions, blemishes.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 FRAMELESS MIRRORS MIR-01

- .1 Polycarbonate Mirrors: Minimum 6 mm (1/4") thick polycarbonate sheet ("Lexan"), silver-coated, sealed against silver spoilage.
- .2 Dimension: As indicated on Drawings.

2.4 DOME MIRRORS

- .1 Quarter Dome Mirror **MIR-02**:
 - .1 Quarter-dome convex corner mirror manufactured from polycarbonate with concealed brackets / attachment for mounting to wall and ceiling and minimum 25 mm wide flange on ceiling edge.

- .2 Quarter-dome convex polycarbonate mirror minimum 605 mm in diameter with approximately 25 mm wide flange on ceiling edge.
- .3 Dome includes concealed brackets / attachment for mounting to ceiling and / or wall.
- .2 Half Dome Mirror **MIR-03**:
 - .1 Half-dome convex polycarbonate mirror minimum 605 mm in diameter with approximately 25 mm wide flange on ceiling edge.
 - .2 Dome includes concealed brackets / attachment for mounting to ceiling and / or wall.
 - .3 Polycarbonate mirror shall be foam backed for added impact durability.
- .3 Full Dome Mirror **MIR-04**:
 - .1 Full-dome convex polycarbonate mirror minimum 605 mm in diameter with approximately 25 mm wide flange on ceiling edge
 - .2 Dome includes concealed brackets / attachment for mounting to ceiling.
 - .3 Polycarbonate mirror shall be foam backed for added impact durability.

2.5 ACCESSORIES

- .1 Mirror Clips:
 - .1 Chrome finish heavy guage steel clip with sponge backing, formed with front leg and back leg not less than 7.9 and 22 mm in height, respectively, and a thickness of not less than 0.40 mm
 - .2 Basis of Design Product: 3061501 CRL Brite Chrome Quartet Mirror Clip by CR Lawrence.
- .2 Fasteners: Tamper resistant fasteners fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- .3 Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work.
- .2 Ensure that rough-in dimensions, blocking or back-up meets product manufacturer's minimum requirements or installation of such shall not affect installation of accessories.
- .3 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

- .1 Install mirrors with mirror hardware in accordance with product manufacturer's written installation instructions.
- .2 Provide adequate anchorage to ensure a rigid installation. Securely fasten components where fasteners are used.

3.3 INSTALLATION TOLERANCES

- .1 Install mirrors level and plumb to a tolerance of plus or minus 3.2 mm (1/8 inch).
- .2 Install mirrors 3.2 mm (1/8 inch) tolerance from indicated position.

3.4 CLEANING

- .1 Protect mirrors from breakage and contaminating substances resulting from construction operations.
- .2 Do not permit edges of mirrors to be exposed to standing water.
- .3 Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- .4 Clean and polish mirrors as recommended by product manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Glazing film **GF-01**.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with glass supplier for installation of film to glass panels in the factory before glass panels are brought to site or installed in door or window framing.

1.3 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of glazing film.
- .2 Shop Drawings: Submit shop drawings showing glazing film patterns in elevations.
- .3 Samples for Verification: Submit 100 mm (4") square samples of each glazing film type.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit materials manufacturers' recommended maintenance data for glazing film.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials with manufacturer's written instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Provide and maintain dry, off-ground weatherproof storage.
- .4 Store rolls of film in original container with ends caps closed and privacy film in plastic sleeve. Store film horizontally, flat on cross supports. Do not stand rolls of film on end. Stack film container rolls a maximum of 6 cartons high.
- .5 Remove from storage, in quantities required for same day use.

1.6 FIELD CONDITIONS

- .1 Comply with glazing film manufacturer's written requirements for temperatures, relative humidity, and substrate moisture and temperature for application of glazing film.

1.7 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each type of glazing film from one source and by a single manufacturer.
- .2 Installer Qualifications: Install work of this section only by a company or installer with minimum 5 years experience in application of similar products specified.

Part 2 Products

2.1 MANUFACTURER

- .1 Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 3M Canada
 - .2 Avery Dennison
 - .3 SolarGard

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 GLAZING FILM

- .1 Glazing Film **GF-01**:
 - .1 Translucent white and gold with frosted pattern on clear background, dimensionally stable, cast PVC film, 0.05 mm (2 mil) minimum thickness, with pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.
 - .2 Visible Light Transmittance: 72 percent minimum.
 - .3 Dimension: As indicated on Drawings.
 - .4 Basis of Design Product: Crystal Glass Finishes 7725SE-324 by 3M Canada.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine glass surfaces to receive glazing film and verify that they are free from defects and imperfections which will affect the final appearance of installed glazing film.
- .2 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems.

- .3 Correct such deficiencies before starting glazing film installation.

3.2 PREPARATION

- .1 Clean glass and adjacent framing of dust, grease, chemical residue or other residues to receive glazing film immediately before applying glazing film.
- .2 Protect adjacent materials from and absorb moisture accumulation generated by the glazing film cleaning and installation steps.

3.3 INSTALLATION

- .1 Install glazing film indicated in patterns as indicated on drawings.
- .2 Install glazing film to glass panels ensuring no blisters, bubbles, wrinkles, creases, tears, scratches, edge defects or distortions in accordance with product manufacturer's written requirements.
- .3 Cut glazing film edges straight and square to within 1 mm of edge of glass panel.
- .4 Film shall dry flat with no moisture dimples within a period of thirty (30) days.

3.4 INSTALLATION TOLERANCES

- .1 Install glazing film edges straight and square a uniform distance of 2.0 mm (0.078") from edge of glass edge or frame edge where glass is installed in a frame +/- 1 mm (0.040").

3.5 CLEANING

- .1 Clean up excess glazing film adhesive and droppings from surrounding surfaces with cleaning materials as recommended by glazing film adhesive manufacturer.

END OF SECTIONS

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Interior gypsum board panels.
 - .2 Non-load bearing steel framing members for gypsum board panels.
 - .3 Suspension systems for interior gypsum board panel ceilings and soffits.
 - .4 Shaft wall enclosures, chase enclosures, stair enclosures, horizontal enclosures.
 - .5 Steel framing firestopping seals.

1.2 RELATED REQUIREMENTS

- .1 Wood blocking and plywood blocking: Refer to Section 06 10 00 "Rough Carpentry".
- .2 Firestopping seals: Refer to Section 07 84 00 "Firestopping and Smoke Seals".
- .3 Acoustic Insulation **INS-02C**: Refer to Section 07 21 00 "Thermal Insulation".
- .4 Primer and painting: Refer to Section 09 91 00 "Painting."

1.3 REFERENCES

- .1 Definitions:
 - .1 Gypsum Board Construction Terminology: Refer to GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.
 - .2 Wet Areas: Wet areas as related to non-structural; metal framing shall include showers, janitor rooms, and washrooms.

1.4 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's technical data for each type of product specified including related accessories. Furnish a material list with technical data documenting the location and primary function, quality, and performance of each material component or system to be used in the Work.
 - .2 Firestop Track Seals:
 - .1 Provide manufacturer's independent laboratory test data certifying compliance with specified performance requirements.
 - .2 Include firestop top track seal manufacturer's printed installation instructions.

- .2 Shop Drawings: Submit detailed shop drawings, including plans, elevations, sections, details of components, and attachments to other units of Work, indicating the following:
 - .1 Details of unusual conditions in connection with gypsum board construction.
 - .2 Proposed locations of control joints, and expansion joints that are required but not shown.
 - .3 Locations of access doors occurring in gypsum board construction.
 - .4 Details of attachment to primary ceiling supports.
 - .5 Details of rated assemblies with copies of their respective approvals. Coordinate with Division 07, Section "Fire Resistive Joints" to provide combined submittals for partition head details and penetration details at rated partitions.
- .3 Gypsum Board Location Schedule: Submit for Consultant's information. Provide a gypsum board location schedule utilizing the same room designations shown on Drawings listing special gypsum board types, thicknesses of partitions, composition of assemblies, and any special requirements if any, for each room scheduled for special gypsum drywall installation.
- .4 Delegated-Design: Provide engineered shop drawings prepared, stamped, and signed by Professional Structural Engineer for gypsum board assemblies framing and suspension assemblies indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- .5 Samples for Verification: Full-size sample in 300 mm long length for each trim accessory indicated.

1.5 INFORMATIONAL SUBMITTALS

- .1 Product Certificates: Submit product certificates for:
 - .1 Mill reports covering chemical and mechanical properties, and coating designation for steel used in the work and indicating steel sheet complies with requirements, including base-metal thickness.
- .2 Field Quality Control Reports.

1.6 QUALITY ASSURANCE

- .1 Source Limitations:
 - .1 Single-Source Responsibility for Steel Framing: Obtain steel framing members for interior gypsum board assemblies from a single manufacturer, unless otherwise indicated.
 - .2 Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
 - .3 Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- .2 Installer Qualifications: The gypsum board work shall be performed by a firm having five (5) year experience in the application of gypsum board and shaft wall assemblies on

projects similar in size and scope to this Project.

- .3 Mockups: Before beginning gypsum board installation, install mockups of at least 100 ft² (9 m²) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - .1 Install mockups for each level of gypsum board finish indicated for use in exposed locations.
 - .2 Provide mockup of finishing procedures on paperless wallboard products, including one primer coat of paint.
 - .3 Mockup one penetration (duct, light fixture) through gypsum board. Show finishing of edges.
 - .4 Tile backer panels at one wall where Large Format Tile will be installed.
 - .5 Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - .6 Simulate finished lighting conditions for review of mockups.
 - .7 Subject to compliance with requirements, accepted mockups may become part of the completed Work if undisturbed at time of Substantial Performance of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- .2 Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.
- .3 Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal trim and framing components.
- .4 Store and handle gypsum panels in a manner to prevent mould growth on panels.
- .5 Comply with requirements of GA 801; GA 238 and GA-220.

1.8 FIELD CONDITIONS

- .1 Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for field conditions before, during and after application of gypsum boards.
- .2 When ambient outdoor temperatures are below 12°C maintain continuous, uniform comfortable building working temperatures of not less than 12°C for a minimum period of 48 hours before, during and following application of gypsum board and joint treatment materials or bonding of adhesives.
- .3 Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.
- .4 Provide adequate protection of materials and work of this section from damage by

weather and other causes. Provide protection of exterior sheathing board prior to exposure for periods greater than periods recommended and warranted by exterior sheathing board manufacturer. Protect work of other trades from damage resulting from work of this section.

- .5 Do not install panels that are wet, moisture damaged, or mould damaged.
 - .1 Indications that panels are wet or moisture damaged include, but are not limited to, discolouration, sagging, and irregular shape.
 - .2 Indications that panels are mould damaged include, but are not limited to, fuzzy or splotchy surface contamination and discolouration.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Structural Performance: Provide steel framing capable of withstanding design loads within limits and under conditions indicated.
 - .1 Unless otherwise indicated, engineer, fabricate and install gypsum board assemblies to ensure that the completed assembly withstands a minimum positive and negative pressure of 5 lbf/sq. ft. (239 Pa) normal to the plane of the wall.
 - .2 Deflection Limits: Framing systems to withstand design loads without deflections greater than the following:
 - .1 Interior Non-Load-Bearing Wall Framing:
 - .1 With Standard Gypsum Board: Horizontal deflection of L/240 of the wall height under dead load and a horizontal live load of 239 Pa (5 lbf/ ft²).
 - .2 With Standard Gypsum Board and Tile Backing Panels Scheduled to Receive Ceramic Tile Finishes: Horizontal deflection of L/360 of the wall height under dead load and a minimum positive and negative pressure of 5 239 Pa (lbf/ft²).
 - .3 With Cement Backerboard to Receive Stone Finishes: Horizontal deflection of L/720 of the wall height under dead load and a minimum positive and negative pressure of 239 Pa (5 lbf/ ft²).
 - .2 Deflection, Support Framing Shaft Wall Systems: Deflection of shaft wall systems shall be limited to L/240 of the span in height. In areas where room side finish is veneer plaster, lath and plaster or ceramic tile, deflection of shaft wall systems shall be limited to L/360 of the span in height.
 - .3 Ceiling Framing with Standard Gypsum Board: Vertical deflection of L/360 of the span of the greatest ceiling dimension under dead load and a vertical live load of 10 478 Pa (lbf/sq. ft.).
 - .4 Shaft Wall Assemblies Surrounding Horizontal Duct Enclosures: Engineer, fabricate, and install horizontal duct enclosures to safely span between supports indicated within the following deflection limits: Horizontal deflection of L/240 of the enclosure between supports.
 - .3 Engineer, fabricate and install gypsum board assemblies enclosing functions

including, but not limited to, stair towers, shafts, plenum and air shafts, and interior atria with slab on one side, so that the completed assembly will withstand a minimum positive and negative pressure of 478 Pa (10 lbf/ft²) normal to the plane of the wall.

- .1 Partitions surrounding stair enclosures shall meet the required pressure of 478 Pa (10 psf), spaced at 406 mm (16 inches) on center with a minimum of 18 gauge steel studs to meet the limiting height of the wall at a horizontal deflection of L/240.
 - .2 Atrium partitions with slabs on both sides shall meet the required pressure of 7.5 psf with a horizontal deflection of L/240.
 - .3 Loading Criteria for Partitions Surrounding Elevators Shafts: completed system shall withstand the minimum inward and outward air pressure recommended by the elevator manufacturer, but in no case less than 478 Pa (10 psf) while maintaining an airtight and smoke tight seal.
 - .4 Finished installation shall be smooth and flat not to exceed 1/8 inch in 10 ft.(3mm in 3048mm), noncumulative along entire run of partition. If not in compliance with this requirement, tile installer must correct before proceeding with installation
 - .5 Where non-structural metal studs specified in this section cannot comply with performance requirements specified or are not on the SSMA charts for floor to floor limiting heights, use non-load bearing cold formed metal framing specified in Division 05 Section "Cold Formed Metal Framing" to support partitions, suspended ceilings and imposed loads of finishes and equipment.
- .2 Delegated Design:
- .1 Provide engineered shop drawings prepared, stamped, and signed by Professional Structural Engineer for the seismic design of connections and restraint of metal framing assemblies to withstand seismic movement.
 - .2 Drawings of metal support system assemblies are diagrammatic and show design intent of finished profiles, shapes and forms; relationships between elements; location, identification, dimension and size of components, assemblies and accessories; and details and diagrams of connections.
 - .3 Based on stud spacing indicated on drawings, engineer, fabricate, assemble and install metal support systems to meet or exceed the criteria indicated and specified, to conform to the profiles indicated and to requirements of ASTM C754.
 - .4 For shaft wall assemblies provide design based on manufacturers systems.
 - .5 Where gypsum board is required to support imposed loads of wall and ceiling mounted items, coordinate with trades providing that work, to obtain imposed loads for engineering of gypsum wall board assemblies.
- .3 Fire-Resistance-Rated Assemblies:
- .1 For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated with ULC designs or other test design acceptable to AHJ and labelled in conformance with the accredited testing laboratory for the application specified.
 - .2 Where no test number is referenced, utilize and submit a tested approved assembly that achieves the fire rating required by the Drawings.
 - .3 Assemblies listed do not necessarily indicate all assemblies that may be used in

this project. Contractor may propose alternate ULC listed assemblies that meet the same requirements to the Consultant for consideration. Contractor may not substitute assemblies without written authorization by the Consultant.

- .4 Drawings, keys or written descriptions located in the Contract Documents to describe fire rated assemblies for beams, floors, roofs, columns, walls, partitions and through-penetration firestop systems do not necessarily call out each and every specific requirement of the designated UL listed assembly identified. It is the Contractor's responsibility to become thoroughly familiar with the corresponding requirements published in the most recent issue of the Underwriters Laboratories Inc. Fire Resistance Directory and construct the fire rated assemblies in strict accordance with those requirements.
- .5 Prescribed UL Design Numbers which may be called for on this Project and may be required as determined during the construction process if existing conditions dictate. The list of assemblies below is not intended to represent all rated conditions designated in whole of the Contract Documents or those that may be considered viable alternates (where approved by Consultant). UL listed fire rated assemblies include, but are not limited to the following:
 - .6 Wall Systems: Refer to Drawings.
 - .7 Division 07, Section 07 84 00 " Firestopping and Smoke Seals " for firestopping.
 - .8 Firestopping and smoke seal systems capable of maintaining an effective barrier against flame, smoke, gases and water in compliance with the requirements of CAN/ULC-S115 and not to exceed the opening sizes for which they are intended.
 - .1 Fire-resistive joint systems for floor-to-wall, head-of-wall, wall-to-wall joints. Joints capable of 50% movement.
- .4 STC-Rated Assemblies:
 - .1 Provide materials and construction identical to those tested in assembly indicated, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.
 - .2 STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."
- .5 Design Modifications: Make design modifications only as may be necessary to meet performance requirements and coordinate the Work. Variations in details and materials which do not adversely affect appearance, durability or strength shall be submitted to the Consultant for review. Submit calculations as required.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Interior gypsum board and tile backing panel manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 CertainTeed
 - .2 Continental Building Products.
 - .3 Georgia-Pacific.
 - .4 National Gypsum.
 - .5 USG.

2.4 FRAMING SYSTEMS

- .1 General:
 - .1 Comply with ASTM C 645.
 - .2 ASTM A653/A653M, G40(Z120) in general areas and G60 (Z180) in wet areas, hot-dip galvanized unless otherwise indicated. G40 equivalent coatings will not be accepted.
- .2 Steel Studs and Runners:
 - .1 Minimum Base-Metal Thickness: 0.455 mm (0.0179 inches) (25 gauge) unless otherwise indicated.
 - .1 Use heavier gauge metal framing to meet deflection requirements and use minimum 0.752 mm (0.0329 inches) (20 gauge studs) for impact resistant gypsum board.
 - .2 Depth: 92 mm (3-5/8 inches), unless otherwise indicated.
- .3 Slip-Type Head Joints: Where indicated, provide one of the following in thickness not less than indicated for studs and in width to accommodate depth of studs:
 - .1 Double-Runner System: ASTM C 645 top runners, inside runner with 51-mm- (2-inch-) deep flanges and fastened to studs, and outer runner sized to friction fit inside runner.
 - .2 Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
- .4 Firestop Top Track Seal: One-piece, pre-formed, polyurethane foam based, firestop seal for use with standard head-joint top tracks and bottom-joint tracks, and slip-type head joints in fire-rated construction at top or bottom of partition to maintain continuity of the fire-resistance-rated assembly indicated. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle-over the top track or under the bottom-track.
 - .1 Use only firestop top track seal product that has been tested for specific fire-rated construction conditions conforming to construction assembly type, space requirements and fire-rating required for each application.
 - .2 Performance Requirements:
 - .1 Movement: Plus or minus 50%.

- .2 Surface Burning Characteristics: Tested to CAN/ULC S102 with maximum FSV of 25 and SDV of 50.
- .3 Mold-Mildew Performance ASTM G21: Class 0.
- .4 Comply with CAN/ULC S115.
- .5 Smoke and Acoustic Track Seal: One-piece, pre-formed, polyurethane foam based, smoke and acoustic seal for use with standard head-joint top tracks and bottom-joint tracks, and slip-type head joints in non-fire-rated construction at top or bottom of partition. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle-over the top track or under the bottom-track.
 - .1 Use only firestop top track seal product that has been tested for specific fire-rated construction conditions conforming to construction assembly type, space requirements and fire-rating required for each application.
 - .2 Performance Requirements:
 - .1 Movement: Plus or minus 50%.
 - .2 Surface Burning Characteristics: Tested to CAN/ULC S102 with maximum FSV of 25 and SDV of 50.
 - .3 Mold-Mildew Performance ASTM G21: Class 0.
 - .4 Comply with CAN/ULC S115.
- .6 Sheet Steel Reinforcing and Blocking: Minimum 1.5 mm (0.0528 inch) base-metal thickness.
- .7 Cold-Rolled Channel Bridging: Minimum 1.34-mm (0.053-inch) base-metal thickness, with minimum 13-mm- (1/2-inch-) wide flanges.
 - .1 Depth: 38 mm (1-1/2 inches) or as otherwise indicated on Drawings .
 - .2 Clip Angle: Not less than 38 by 38 mm (1-1/2 by 1-1/2 inches), 1.72-mm- (0.068-inch-) thick, galvanized steel.
- .8 Hat-Shaped, Rigid Furring Channels: Minimum 0.84 mm (0.033 inch) base-metal thickness.
- .9 Resilient Furring Channels: 13-mm- (1/2-inch-) deep, steel sheet members designed to reduce sound transmission.
- .10 Cold-Rolled Furring Channels: 1.34-mm (0.053-inch) uncoated-steel thickness, with minimum 13-mm- (1/2-inch-) wide flanges.
- .11 Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.8 mm (0.033 inch).
- .12 Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59 mm) diameter wire, or double strand of 1.21-mm- (0.048-inch-) diameter wire.
- .13 Z-Shaped Furring: With slotted or nonslotted web, face flange of 31.8 mm (1-1/4 inches), wall attachment flange of 22 mm (7/8 inch), minimum uncoated-metal thickness of 0.45 mm (0.018 inch), and depth required to fit insulation thickness indicated.
- .14 Runner Tracks for Shaft wall: Manufacturer's standard J-profile track with manufacturer's

standard long-leg length, but at least 2 inches long and matching studs in depth.
Minimum Base-Metal Thickness: 33 mils.

2.5 SUSPENSION SYSTEMS

- .1 General:
 - .1 Comply with ASTM C645.
 - .2 ASTM A653/A653M, G40(Z120) in general areas and G60 (Z180) in wet areas, hot-dip galvanized unless otherwise indicated. G40 equivalent coatings will not be accepted.
- .2 Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 1.59 mm- (0.062-inch-) diameter wire, or double strand of 1.21-mm- (0.048-inch-) diameter wire.
- .3 Hanger Attachments to Concrete:
 - .1 Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E488.
 - .2 Type: Postinstalled, chemical anchor or expansion anchor.
 - .3 Powder-Actuated Fasteners: Not permitted.
- .4 Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint. Provide one of the following:
 - .1 Flat Hangers: Steel sheet, 25 by 5 mm (1 by 3/16 inch) by length indicated.
 - .2 Rod Hangers: ASTM A510/A510M, mild carbon steel rods, 6 mm (1/4 inch) in diameter.
- .5 Carrying Channels: Cold-rolled, commercial-steel sheet and minimum 13-mm- (1/2-inch-) wide flanges.
 - .1 Minimum Base-Metal Thickness: of 1.34 mm (0.053 inch)
 - .2 Depth: 38 mm (1-1/2 inches) or as otherwise indicated on Drawings
- .6 Furring Channels:
 - .1 Cold-Rolled Channels: 1.34-mm (0.053-inch) uncoated-steel thickness, with minimum 13-mm- (1/2-inch-) wide flanges, 19 mm (3/4 inch) deep.
 - .2 Steel Studs and Runners:
 - .1 Minimum Base-Metal Thickness: 0.84 mm (0.033 inch) or as otherwise indicated on Drawings.
 - .2 Depth: 64 mm (2-1/2 inches) or as otherwise indicated on Drawings.
 - .3 Hat-Shaped, Rigid Furring Channels:
 - .1 Minimum Base-Metal Thickness: 0.84 mm (0.033 inch) or as otherwise indicated on Drawings.
 - .2 Depth: 22 mm (7/8 inch) deep or as otherwise indicated on Drawings.
 - .4 Resilient Furring Channels: 13-mm- (1/2-inch-) deep members designed to reduce sound transmission.

2.6 INTERIOR GYPSUM BOARD PANELS

- .1 Panel Size:
 - .1 Thickness: 16 mm (5/8 inch) thick unless otherwise specified or indicated on Drawings.
 - .2 Width: 1,220 mm wide.
 - .3 Length: Use longest lengths practical to minimize joints.
 - .4 Long Edges: Square cut with tapered edges where available.
- .2 Standard Gypsum Board:
 - .1 Complying with ASTM C1396/C1396M.
 - .2 Use sag resistant type for ceiling and interior soffit applications.
 - .3 Use fire rated gypsum board where indicated on drawings complying with requirements of ASTM C1396/C1396M, Type X or Type C design.
- .3 Mould and Moisture Resistant Gypsum Board:
 - .1 ASTM C1396/C1396M or ASTM C1658/C1568M with moisture and mold resistant core and surfaces and Type X core where fire rating is indicated or scheduled on Drawings.
 - .2 Products:
 - .1 Glasroc Interior Drywall Type X Gypsum Board by CertainTeed Corporation.
 - .2 Weather Defense Interior Type X by Continental Building Products.
 - .3 DensArmor Plus Interior Panels, Type X by Georgia-Pacific Gypsum LLC.
 - .4 Gold Bond eXP Interior Extreme Gypsum Panel, Type X by National Gypsum Company.
 - .5 Sheetrock Brand Glass-Mat Panels Mold Tough, Firecode X Panels by USG Corporation.
- .4 Mould and Moisture Resistant Gypsum Shaftwall Liner:
 - .1 ASTM C1396/C1396M or ASTM C1658/C1568M; manufacturer's proprietary fire-resistive liner panels with moisture and mold resistant core and glass fibre reinforced face surfaces meeting the following performance characteristics:
 - .1 Mold resistant with a score of 10 as rated according to ASTM D3274.
 - .2 Thickness: 1 inch (25.4 mm).
 - .3 Long Edges: Double bevel.
 - .4 Products:
 - .1 GlasRoc Shaftliner Type X Gypsum Board by CertainTeed Corporation.
 - .2 Weather Defense Shaftliner Type X by Continental Building Products.
 - .3 DensGlass Shaftliner by Georgia-Pacific Gypsum LLC.
 - .4 Gold Bond eXP Shaftliner XP, Type X by National Gypsum Company.

- .5 Sheetrock Brand Glass-Mat Liner Panels Mold Tough Firecode X by
USG Corporation.
- .5 Abuse Resistant Gypsum Board:
 - .1 High density, fire resistant, type X core, with paper or glass scrim face with
gypsum core or gypsum fiberglass reinforced core that is resistant to scuffing
tested in accordance with ASTM C1629/C1629M meeting the following
performance characteristics:
 - .1 Mould resistant with a score of 10 as rated according to ASTM D3274.
 - .2 Surface abrasion minimum Level 3 to comply with ASTM
D4977/D4977M.
 - .3 Surface indentation minimum Level 1 to comply with ASTM D5420.
 - .2 Products:
 - .1 Extreme Abuse Resistant Drywall With M2Tech, Type X Gypsum Board
by CertainTeed Corporation.
 - .2 Protecta AR 100 Type X with Mold Defense by Continental Building
Products
 - .3 ToughRock Fireguard X Mold Guard Max Abuse-Resistant Gypsum
Board by Georgia-Pacific Gypsum LLC.
 - .4 DensArmor Plus Abuse-Resistant Interior Panel by Georgia-Pacific
Gypsum LLC.
 - .5 Gold Bond eXP Interior Extreme Products by National Gypsum
Company.
 - .6 Gold Bond XP Hi-Abuse Gypsum Board by National Gypsum Company.
 - .7 Sheetrock Brand Glass-Mat Panels Mold Tough AR Firecode X Panels
by USG Corporation.
- .6 Impact Resistant Gypsum Board:
 - .1 High density, fire resistant, type X core, with paper or glass scrim face with
gypsum core or gypsum fiberglass reinforced core in accordance with
ASTM C1629/C1629M meeting the following performance characteristics:
 - .2 Mold resistant with a score of 10 as rated according to ASTM D3274.
 - .3 Surface abrasion minimum Level 2 to comply with ASTM D4977/D4977M.
 - .4 Soft body impact penetration minimum Level 3 to comply with ASTM E695.
 - .5 Hard body impact resistance minimum Level 2 to comply with ASTM
C1629/C1629M.
 - .6 Products:
 - .1 Extreme Impact Resistant Drywall With M2Tech, Type X Gypsum Board
by CertainTeed Corporation.
 - .2 Protecta HIT 300 Type X With Mold Defense by Continental Building
Products.
 - .3 DensArmor Plus Impact-Resistant Interior Panel by Georgia-Pacific
Gypsum LLC.

- .4 Gold Bond XP Hi-Impact Gypsum Board by National Gypsum Company.
- .5 Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X Panels by USG Corporation.
- .6 Sheetrock Brand Mold Tough VHI Firecode X Panels by USG Corporation.

2.7 TRIM ACCESSORIES

- .1 Comply with ASTM C1047.
- .2 Material:
 - .1 Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, extruded aluminum or paper-faced galvanized steel sheet.
 - .2 Metal trim flanges shall be perforated and have fillable edge trim.
- .3 Metal Caps:
 - .1 Formed metal cap, fabricated of extruded aluminum, equal to 6063 T5, with tapered fins prepunched to accept screw fasteners. Provide preformed metal cap profile in maximum lengths, with factory primed corrosion resistant finish; short pieces will not be accepted.
 - .2 Products:
 - .1 Softforms Model No. SWC-212-2 manufactured by Pittcon Industries Inc. and supplied by Patry Products Inc.
- .4 Corner Beads:
 - .1 Protect external corners with metal drywall corner bead.
 - .2 Product:
 - .1 D100 Drywall Corner Bead by Bailey Metal Products Ltd.
- .5 "L" or "LC" Trim: Use metal drywall trim to provide solid protection to exposed gypsum board edges.
 - .1 Products:
 - .1 Casing "L" or "LC" Trim/Bead
 - .2 4411 Channel Trim by Bailey Metal Products Ltd.
 - .3 D200 Metal Drywall L Trim by Bailey Metal Products Ltd
 - .4 L Trim Molding by Fry Reglet Architectural Metals.
- .6 Reveal Trim: Use metal drywall reveal trim to provide crisp clean reveals where indicated around openings, frames, recessed baseboard or at ceiling and floors
 - .1 Product:
 - .1 D-300 by Bailey Metal Products Ltd.
- .7 Control Joints: Certified by manufacturer for use at fire resistance rated assemblies.
 - .1 Products:

- .2 No. 093 Zinc Control Joint by ClarkDietrich Building Systems.
- .3 DRM-50-25 2-PC by Fry Reglet Architectural Metals.

2.8 JOINT TREATMENT MATERIALS

- .1 Comply with ASTM C475/C475M.
- .2 Joint Tape for Gypsum Board: Pressure-sensitive or open-weave, glass-fiber reinforcing tape with setting-type joint compound, minimum 51 mm (2 inches) wide x minimum 0.3 mm (0.012 inches) thick.
 - .1 Interior Gypsum Board: Paper.
 - .2 Exterior Gypsum Soffit Board: Paper.
 - .3 Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - .4 Tile Backing Panels: alkali-resistant, open-weave, glass-fiber mesh.
- .3 Joint Compound:
 - .1 Interior Gypsum Boards: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats and complies with ASTM C475/C475M.

2.9 AUXILIARY MATERIALS

- .1 Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- .2 Fasteners for Panel Boards:
 - .1 Bugle head, fine thread, self-tapping, Type W or S or S-12 point to suit framing type and metal.
 - .2 Corrosion resistant finish to ASTM C1002 or ASTM C954.
 - .3 Screw sizing:
 - .1 #6 x 25 mm for single thickness board fastening.
 - .2 #6 x 32 mm for single thickness 15.9 mm board fastening.
 - .3 #7 x 41 mm for double thickness board fastening.
- .3 Expanded Metal Lath Security Mesh Fasteners: Use rivets.
- .4 Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- .5 Acoustic Insulation **INS-02C**:
 - .1 Sound batts to fill the full height of stud cavities. Refer to Division 07, Section 07 21 00 "Thermal Insulation".
 - .2 Thickness to suit stud sizes and STC required by design.
- .6 Acoustic Insulation Tie Wire: 1.6 mm diameter galvanized soft annealed steel wire.

- .7 Metal Backer Plates:
 - .1 Galvanized steel, minimum 152 mm (6 inch) wide x 1.50 mm (0.059 inch) thick x lengths to suit size of items to be attached; fastened to studs for attachment of surface mounted fittings and accessories.
 - .2 Elimination of backer plates or direct attachment of accessories or equipment to metal framing will not be permitted.
- .8 Wall Support Clips: Anchor top track to T-bar with Revoe clips by Revoe Manufacturing Ltd. or fasteners manufactured for this purpose. Do not penetrate or fasten to the exposed face of the ceiling grid system. Install clips as per manufacturer's Instructions and provide clips to suit T-bar grid type and ceiling panel edge.
- .9 Thermal Break Tape:
 - .1 6.4 mm (1/4 inch) thick, self adhesive, soft, low density closed cell neoprene type tape with acrylic type adhesive on one side.
 - .2 Products:
 - .1 Permastik 122X by Jacobs and Thompson Ltd.
 - .2 Arnofoam by Arno Adhesive Tape Incorporated.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.
- .2 Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

3.2 INSTALLATION, GENERAL

- .1 Comply with ASTM C754, ASTM C840, GA 216, and GA 600.
- .2 Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- .3 Install bracing at terminations in assemblies.
- .4 Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 STEEL FRAMING INSTALLATION

- .1 Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

- .2 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- .3 Install studs so flanges within framing system point in same direction.
- .4 Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - .1 Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - .2 Fire-Resistance-Rated Partitions:
 - .1 Firestop Top Track Seal: Install to maintain continuity of fire-resistance-rated assembly indicated. Install in accordance with the firestop manufacturer's printed installation instructions.
 - .3 Non-Fire Resistance Rated Partitions:
 - .1 Smoke and Acoustic Track Seal: Install to comply with smoke and acoustic device manufacturer's written installation instructions for products and applications indicated.
 - .4 Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - .1 Install two (2) studs at each jamb unless otherwise indicated.
 - .2 Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
- .5 Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- .6 Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - .1 Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- .7 Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- .8 Curved Partitions:
 - .1 Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - .2 Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 150 mm (6 inches) on centre.
- .9 Direct Furring: Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

- .10 Z-Furring Members:
 - .1 Erect insulation vertically and hold in place with Z-furring members spaced 610 mm (24 inches) on centre.
 - .2 Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 610 mm (24 inches) on centre.
 - .3 At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 305 mm (12 inches) from corner and cut insulation to fit.

3.4 SUSPENSION SYSTEMS INSTALLATION

- .1 Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- .2 Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- .3 Suspend hangers from building structure as follows:
 - .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - .1 Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - .2 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - .3 Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - .4 Do not attach hangers to steel roof deck.
 - .5 Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - .6 Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 - .7 Do not connect or suspend steel framing from ducts, pipes, or conduit.
- .4 Metal framing supporting horizontal gypsum board panels to be at 405 mm (16 inches) on centre maximum.
- .5 Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- .6 Seismic Bracing: Sway-brace suspension systems with hangers used for support.

3.5 APPLYING AND FINISHING INTERIOR GYPSUM BOARD AND TILE BACKING PANELS

- .1 Apply gypsum board with long dimension perpendicular to supports except at stud partitions where they shall parallel studs.
- .2 Butt the panel boards together for a light contact at the edges and ends, with not more than 1.5 mm of open space between the panel boards.
- .3 Offset the panel board joints a minimum of 150 mm from the corners of openings.
- .4 Where two different types of panel boards are installed together on the same surface, finish the panel boards so that the transition is not noticeable from a viewing distance of 915 mm.
- .5 Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 6.4 to 12.7 mm (1/4 to 1/2-inch) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- .6 Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 - .1 Control Joints: Install control joints at locations indicated on Drawings, or if not indicated, according to ASTM C840 and in specific locations approved by Consultant for visual effect.
- .7 Prefill open joints and damaged surface areas.
- .8 Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- .9 Gypsum Board Finish Levels: Finish panels to levels indicated below and according to GA 214:
 - .1 Level 1: Ceiling plenum areas, concealed areas, and where indicated except provide a higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
 - .2 Level 2: Panels that are substrate backers for tile.
 - .3 Level 4:
 - .1 At panel surfaces that will be exposed to view unless otherwise indicated.
 - .2 Primer and its application to surfaces are specified in Division 09 Section 09 91 00 "Painting."
 - .4 Level 5:
 - .1 Where indicated on Drawings and for the following:
 - .1 Curved partitions
 - .2 Partitions with continuous, unbroken length of 20 feet (6 m).
 - .3 Horizontal and vertical surfaces of soffits.
 - .4 Glass scrim faced gypsum board panels.
- .10 Existing Gypsum Board Surfaces: Completed installation at interface between existing

plaster or gypsum board panels and new gypsum board panels shall provide an inconspicuous joint. apply required amount of skim coats to make transition inconspicuous from a distance of 914 mm (36 inches).

3.6 ACOUSTIC BAFFLES

- .1 Where indicated on drawings in ceiling plenums above ceiling height partitions use INS05A acoustic baffle insulation for acoustical barriers. Laminate two layers of insulation with one side only foil facing using suitable adhesive, foil faces out, to achieve total thickness indicated on drawings. Properly fit rigid insulation and seal all penetrations to provide a continuous smoke tight barrier.

3.7 ACOUSTIC INSULATION

- .1 Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- .2 Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- .3 Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- .4 Where acoustical blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 610 mm on both sides of partition heads.
- .5 Mechanically fasten tie wire for the acoustic insulation material in wall assemblies where the cavity wall is greater than 150 mm; and to the non-faced side of the stud to retain the insulation, where the studs are not faced with panel board on both sides.

3.8 ACOUSTIC ASSEMBLIES

- .1 Where the sound rated partition walls intersect the non-rated sound rated partition walls, extend the sound rated construction to completely close the sound flanking paths through the non-rated construction.
- .2 Apply acoustic sealant to seal gaps to comply with ASTM C919 and the STC-rated assembly requirements.
- .3 Apply a single bead or double bead of the acoustic sealant for each base and face layer of the panel board, as applicable to STC-rated assembly, to seal both sides of the partition assembly between the panel board and the adjacent floor, wall and ceiling assembly of partitions which contain acoustic mineral fire batt insulation and as indicated on drawings.
- .4 Apply a bead of the acoustic sealant to seal:
 - .1 both sides of the partition assembly at the top and bottom of control joints;
 - .2 the intersections with the sound-isolating partitions that are extended to reduce

- the sound flanking paths; and
 - .3 the joint between the penetrations and the panel board.
- .1 Apply the acoustic sealant to clean, dry surfaces.
- .2 Apply the acoustic sealant to close voids. Leaks around the partition track and panel board are not permitted.
- .3 Seal the joints between face layers at vertical interior angles of intersecting partitions.

3.9 TRIM ACCESSORIES

- .1 Install trim accessories:
 - .1 where the panel board edges are exposed to view;
 - .2 where the panel board butts against other materials with no trim to conceal junction;
 - .3 at the perimeter of ceiling surfaces;
 - .4 at the top of partitions where the partitions do not terminate at ceilings or bulkheads; and
 - .5 where indicated on the drawings.
- .2 Install corner beads at all external corners, secure with screws to framing at 150 mm on centre on alternate flanges.
- .3 Install casing beads at gypsum board edges exposed to view, and where gypsum board butts against other materials with no trim to conceal junction, at control joints, at perimeter of ceiling surfaces, at tops of partitions where they stop against continuous ceiling surfaces, and where otherwise indicated on Drawings: Secure casing beads with screws at 300 mm on centre.
- .4 Mitre the corners.
- .5 Eliminate sharp and rough edges.
- .6 Use maximum continuous practical length pieces per location.
- .7 Flanges shall be free from dirt, grease, or other material that adversely affects the bond of joint treatment or decoration.
- .8 Install control joints as indicated on the drawings and to comply with ASTM C840 and GA-216.

3.10 INSTALLATION TOLERANCES

- .1 Steel Framing:
 - .1 Install work within 3 mm of dimensioned location.
 - .2 Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

- .2 Suspension Systems:
 - .1 Install suspension systems that are level to within 3 mm (1/8 inch) in 3.6 m (12 feet) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
- .3 Finished Panel Surfaces:
 - .1 Maximum of 1.5 mm (1/16 inches) within 305 mm (12 inches) of straight edge for surface flatness
 - .2 The alignment of accessories with the board panels will not exceed the tolerances specified.
 - .3 The end joints of accessories will be flush aligned to a maximum offset of 0.5 mm (0.019 inch).

3.11 FIELD QUALITY CONTROL

- .1 Inspections: Perform field inspection of gypsum board assemblies work for compliance with requirements. Inspection shall include the following:
 - .1 Acknowledging acceptance of gypsum board assemblies installations to comply with "Delegated Design" during progress of the work.
- .2 Prepare inspection report.

3.12 CLEANING

- .1 Remove debris and rubbish from the framing cavities before enclosing the framing cavity with the panel board.
- .2 Clean the joint compound droppings from the accessories and panel board materials to a condition ready for painting.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Acoustic ceilings tiles **ACT-01**.
 - .2 Acoustic ceiling grid.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.3 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for each type of ceiling tile, ceiling grid, and perimeter mouldings.
 - .2 Submit manufacturer's standard ceiling tile and grid details.
 - .3 Highlight applicable model number and options proposed.
- .2 Coordination Drawings:
 - .1 Submit reflected ceiling plans showing acoustic panel ceilings, of which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - .1 Ceiling grid members.
 - .2 Structural members to which ceiling grid will be attached.
 - .3 Method of attaching ceiling grid hangers to building structure.
 - .4 Identify carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - .5 Size and location of ceiling tiles.
 - .6 Items penetrating finished ceiling and ceiling-mounted items including the following:
 - .1 Lighting fixtures.
 - .2 Diffusers.
 - .3 Grilles.
 - .4 Speakers.
 - .5 Sprinklers.

- .6 Access panels.
- .7 Perimeter mouldings.

.3 Samples for Verification:

- .1 Submit 150 mm (6-inch) square sample of each acoustic ceiling tile type.
- .2 Submit 150 mm (6-inch) long sample of exposed wall molding and suspension system, including main runner and cross tees.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for any cleaning including cleaning materials or practices which may damage acoustic tiles or grid.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - .1 Ceiling tiles: Full-size tiles equal to 2% of quantity installed.

1.6 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each type of acoustical ceiling tile and its supporting grid from single source from single manufacturer.
- .2 Installer Qualifications: Provide work of this section, executed by competent installers with minimum 5 years experience in application of products specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- .2 Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- .3 Handle acoustical panels carefully to avoid chipping edges or damaging units.

1.8 FIELD CONDITIONS

- .1 Maintain temperature and humidity conditions in installation areas as recommended by the product manufacturers before, during and after installation.
- .2 Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Regulatory Requirements:
 - .1 Acoustical Ceiling Tile:
 - .1 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
 - .2 Smoke developed rating 50 or less in accordance with CAN/ULC-S102.
- .1 Deflection Limitation, Completed Ceiling: L/360 of span maximum deflection.
- .2 Suspended ceiling grid shall provide adequate support for the electrical fixtures.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Acoustic Panel Ceilings Manufacturer List: Products of the following manufacturers are acceptable subject to conformance to requirements of Contract Documents.
 - .1 Armstrong World Industries, Inc.
 - .2 Certain Teed.
 - .3 Rockfon.
 - .4 CGC / USG.

2.4 ACOUSTIC CEILING TILE

- .1 Acoustic Ceiling Tile **ACT-01**:
 - .1 Type III, Form 2, Pattern C E classification to ASTM E1264.
 - .2 Material: Wet-formed mineral fibre.
 - .3 Surface Finish: Factory-applied latex paint.
 - .4 Colour: White.
 - .5 Surface Texture: Medium.
 - .6 Size: 610 x 1220 x 16 mm (24 x 24 x 5/8 inch).
 - .7 Edge: Square lay-in.
 - .8 CAC: Minimum 35 to ASTM C1414.
 - .9 NRC: Minimum 0.55 to ASTM C423.

- .10 Dimensionally stable.
- .11 Acoustical Ceiling Grid: Use Type 1.
- .12 Surface Burning Characteristics: To CAN/ULC-S102:
 - .1 Flame-Spread Rating: 25 or less.
 - .2 Smoke Developed Classification: 50 or less.
- .13 Basis of Design: Fine Fissured 1729 by Armstrong Ceiling and Wall Solutions.

2.5 ACOUSTIC CEILING GRID

- .1 Acoustic Ceiling Grid Type 1:
 - .1 Complying with ASTM C635 intermediate system designation.
 - .2 Interlocking tee system, main tee shall have a double web. Cross tee with rectangular bulb, web extended to form positive interlock with main tee webs, lower flange extended and offset to provide flush intersection.
 - .3 Grid system shall be designed to support acoustical tiles in patterns indicated consisting of main tees and cross tees. The system shall provide lock joint intersections of cross and main tees.
 - .4 Basic Steel Material: Commercial quality cold rolled steel 0.455 mm (0.017") (26 gauge) minimum thickness, galvanized to zinc coating designation Z180 (G60).
 - .5 Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - .6 Hold-Down Clips: Provide hold-down clips for holding down ceiling panels and that fit the type of suspension system specified and accepted by the Consultant.
 - .7 Product: Prelude XL 15/16" Exposed Tee by Armstrong Ceiling and Wall Solutions.
 - .8 Colour: White

2.6 INSTALLATION ACCESSORIES

- .1 Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three (3) design load, but not less than 2.66 mm (12 gauge).
- .2 Attachment Devices: Size five (5) times the design load indicated in ASTM C 635/C635M, Table 1, "Direct Hung".

2.7 METAL FINISH

- .1 Exposed tee bar grid and trim components shall be shop painted satin sheen baked vinyl enamel white colours.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.
- .2 Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete.

3.2 INSTALLATION, GENERAL

- .1 Install acoustical panel ceilings to comply with ASTM C636/C636M and according to product manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- .2 Install acoustic panel ceilings free from distorted, warped, soiled, or damaged panels or grid.
- .3 Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION CEILING GRID

- .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
- .2 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
- .3 Support ceilings directly from permanent metal forms. Support ceilings from floor deck when approved by Consultant.
- .4 Space hangers not more than 1,220 mm (48 inches) on centre along each member supported directly from hangers unless otherwise required by product manufacturer's written requirements or reviewed shop drawings. Provide hangers not more than 8 inches (203 mm) from ends of each member. Install hanger wires plumb and straight.
- .5 Size supplemental suspension members and hangers to support ceiling loads.
- .6 Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - .1 Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - .2 Screw attach moldings to substrate at intervals not more than 16 inches (406 mm) on centre and not more than 3 inches (76 mm) from ends.
 - .3 Miter corners accurately and connect securely.
- .7 Do not use exposed fasteners, including pop rivets.

3.4 INSTALLATION CEILING TILES

- .1 Install acoustical tiles in coordination with suspended system, with edges resting on flanges of main runner and cross tees.
- .2 Scribe and cut acoustic ceiling tiles to fit adjacent work. Cut edges to match factory cut edges where acoustic ceiling tiles are installed in suspension grid. Cut edges square at openings for services or penetrations.
- .3 For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- .4 Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
- .5 Provide hold-down clips to hold acoustic ceiling tiles tight to grid system where specified.

3.5 INSTALLATION TOLERANCES

- .1 Install edge moulding level with ceiling suspension system to a tolerance of 3.2 mm (1/8 inch) in 3,657 mm (12 feet).
- .2 Install acoustical ceiling tile and grid to provide finished ceiling system square with adjoining walls and level to within 3.2 mm (1/8 inch) in 3,657 mm (12 feet).

3.6 ADJUSTING

- .1 Replace acoustic ceiling tiles, grids, mouldings, and trims which have damaged finishes in finished faces or other visual imperfections not acceptable to the Consultant.

3.7 CLEANING

- .1 Comply with manufacturer's written instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with new product.

3.8 END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Resilient base **BB1**.

1.2 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of resilient base applicable to the Work of this Section.
- .2 Samples for Verification:
 - .1 Submit samples of each type of resilient base in each colour, manufacturer's standard size samples but not less than 300 mm (12 inches) long.
 - .2 Submit samples of each type of resilient flooring transition strips in each colour, manufacturer's standard size samples but not less than 300 mm (12 inches) long.

1.3 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for any cleaning or use practices or materials which may damage the resilient base.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - .1 Resilient Base: Continuous length equal to 5% of amount installed of each resilient base type and colour, but not less than 15 m (50 ft.).

1.5 QUALITY ASSURANCE

- .1 Source Limitations: Resilient base installed as part of the work of this section shall be from the same production run.
- .2 Installer Qualifications: Perform work of this Section only by an installer who is known to have been responsible for satisfactory applications similar to that specified during a period of at least five years.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in accordance with product manufacturers written instructions.

- .2 Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10°C (50°F) or more than 32°C (90°F).

1.7 FIELD CONDITIONS

- .1 Maintain ambient temperatures within range recommended by product manufacturer, but not less than 21°C (70°F) or more than 35°C (95°F), in spaces to receive resilient products for forty-eight (48) hours before installation, during installation, and 48 hours after installation.
- .2 Until Substantial Completion of the Work, maintain ambient temperatures within range recommended by manufacturer, but not less than 13°C (55°F) or more than 35°C (95°F).
- .3 Move resilient products and installation materials into installation areas where they will be installed at least forty-eight (48) hours in advance of installation.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - .1 Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 RESILIENT BASE

- .1 Rubber wall base **BB1**:
 - .1 Inside corners: Formed on site.
 - .2 Outside corners: Formed on site.
 - .3 Rubber base meeting ASTM F1861, Type TP, Group 1.
 - .4 Height: 111 mm (4.375")
 - .5 Colour: 20 Charcoal.
 - .6 Products: Johnsonite TightLock for Resilient by Tarkett

2.4 INSTALLATION ACCESSORIES

- .1 Adhesives: Water-resistant as recommended by manufacturer to suit products and substrate conditions.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Concrete Substrates:
 - .1 Shall be prepared according to ASTM F710.
 - .2 Mechanically remove, according to adhesive manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair or affect resilient flooring transition strips adhesive bond.
- .2 Do not install resilient products until they are same temperature as the space where they are to be installed.
- .3 Sweep and vacuum clean substrates to be covered immediately before installing resilient products.
- .4 Install resilient products after other finishing operations, including painting, have been completed.

3.3 INSTALLATION, GENERAL

- .1 Install resilient base in accordance with product manufacturer's written installation instructions.
- .2 Spray paints, permanent markers and other indelible ink markers shall not be used to write on the back of resilient material or used to mark the substrate as they could bleed through and permanently stain the resilient material. If such contaminants are present on the substrate they shall be mechanically removed prior to the installation of the resilient material.

3.4 INSTALLATION RESILIENT BASE

- .1 Install resilient base in lengths as long as practicable without gaps at seams and without gaps at finished flooring and with tops of adjacent resilient base pieces aligned.
- .2 Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

- .3 Do not stretch resilient base during installation.
- .4 Install site fabricated resilient base inside and outside corners.
- .5 Scribe and fit resilient base to door frames and other obstructions.
- .6 Joints shall be tightly fitted, straight and vertical, and not less than 610 mm (24") from corners.
- .7 Provide joints in base over substrate control joints.

3.5 INSTALLATION TOLERANCES

- .1 Resilient Base: Install straight and level to variation of 3 mm (1/8") over 3 m (10'-0").

3.6 CLEANING

- .1 Comply with manufacturer's written instructions for cleaning and protection of resilient products.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Resilient sheet flooring **FL2**
 - .2 Vinyl sheet homogenous flooring with integral cove base **FL3**

1.2 RELATED REQUIREMENTS

- .1 Large Area Patching and Levelling Compound: Refer to Section 03 54 16 Hydraulic Cement Underlayment.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Preinstallation Conference: Conduct conference at Project site.
 - .1 Review methods and procedures related to sheet flooring installation including, but not limited to, the following:
 - .1 Verify project requirements.
 - .2 Review installation conditions under which work is to be performed including substrate conditions and possible site concerns.
 - .3 Review installation conditions and preparation of existing terrazzo flooring and base.
 - .4 Inspection of surfaces to receive the work.
 - .5 Review ambient installation requirements.
 - .6 Coordination requirements with other subtrades.
 - .7 Review manufacturer's installation instructions, procedures to be adopted, and warranty requirements.

1.4 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for each type of sheet flooring and accessory applicable to the Work of this Section.
 - .2 Include manufacturer's written installation recommendations for each type of substrate.
- .2 Shop Drawings: Submit layout drawings for sheet flooring pattern and details to tie into floor drains, transition locations to other flooring types.

- .3 Samples for Verification:
 - .1 Submit approximately 152 mm (6 inch) x 203 mm (8 inch) of each different colour and pattern of sheet flooring specified.
 - .2 Submit approximately 203 mm (8 inch) long sample of heat-welding bead of each colour required.
 - .3 Submit sample of cover former and each type of cap strip.
 - .4 Submit samples of flooring transition trim if heat-welding to existing sheet flooring is not possible.
 - .5 Seam Samples: For each sheet flooring product, color, and pattern specified; submit a seam sample showing sheet flooring and heat-welding bead. Seam shall run lengthwise and in center of 152 mm (6 inch) x 230 mm (8 inch) sample applied to rigid backing and prepared by installer for this Work.

1.5 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for installer.
- .2 Field Quality Control Reports: Submit moisture testing, relative humidity test, and surface pH test reports.

1.6 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for each type of sheet flooring. Include cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

1.7 QUALITY ASSURANCE

- .1 Installer Qualifications: Perform work of this Section only by an installer standing who has adequate skilled workers to perform the Work, and is known to have been responsible for minimum ten (10) satisfactory installations similar to that specified during a period of at least five (5) years.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Acclimatize sheet flooring in installation area for minimum twenty-four (24) hours prior to installation before unrolling and other materials in installation area for minimum twenty-four (24) hours prior to installation.
- .2 Stand rolls of sheet flooring upright on a level floor.

1.9 FIELD CONDITIONS

- .1 Ambient Conditions:
 - .1 Maintain indoor ambient temperature of not less than 20° and below 29°C, and a floor temperature of not less than 20°C for minimum 72 hours before installation during installation, and at least 72 hours after installation.
 - .2 Area of installation shall not be with 5°C of dew point.

- .3 Acclimatize installation materials for a minimum of forty-eight (48) hours before installation in installation area.
- .2 Ensure that adequate ventilation is provided during installation and curing of materials of this section.
- .3 In areas that are exposed to intense or direct sunlight, products shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.
- .4 Until Substantial Performance of the Work, maintain ambient temperatures within range recommended by product manufacturer.

1.10 WARRANTIES

- .1 Warranty Period: Ten (10) years from date of Substantial Completion..

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Regulatory Requirements:
 - .1 Resilient sheet floor coverings are permitted to extend through openings of 3/4 hour, 1 hour or 1-1/2 hour rated fire protection fire door assemblies without a sill if the resilient floor coverings have a minimum critical radian flux of 0.22 W/cm² in accordance with NFPA 253 or ASTM E648 as defined by requirements of NFPA 80.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 RESILIENT SHEET HOMOGENOUS FLOORING FL2

- .1 Polyurethane reinforced resilient sheet flooring complying with ASTM F1700 Class I, Type A and meet the following requirements:
 - .1 Overall Thickness: 2.0 mm.
 - .2 Slip Resistance:
 - .1 Minimum of R9 in accordance with EN 51130.
 - .2 SCOF minimum of 0.6 in accordance with ASTM D2047
 - .3 Fire Resistance: Maximum FSV of 300 and SDV of 500 in accordance with CAN/ULC-S102

- .4 Resistance to Chemical: Pass in accordance with ASTM F925
- .5 FloorScore Certified.
- .6 Colour: Silent Dove 1540.
- .7 Product: Classic Mystique PUR by Polyflor.

2.4 VINYL SHEET SAFETY FLOORING FL3

- .1 Slip resistant vinyl sheet flooring complying with ASTM F1303, Type II, Grade 1, Class A and meet the following requirements:
 - .1 Overall Thickness: 2.0 mm.
 - .2 Slip Resistance:
 - .1 SCOF minimum of 0.6 in accordance with ASTM D2047
 - .2 DCOF minimum of 0.6 wet in accordance with ANSi B101.3
 - .3 Phthalate-free.
 - .4 FloorScore Certified.
 - .5 Colour: Winter VMI2053
 - .6 Product: Walkway 20 by Altro.

2.5 INSTALLATION ACCESSORIES

- .1 Vinyl Sheet Flooring Factory Fabricated Cove Base:
 - .1 Cove Base Sheet Vinyl: Fabricated from the same material and dye lots as specified vinyl sheet flooring in maximum practical lengths.
 - .2 Cove Base Dimensions:
 - .1 Height/Riser: Refer to Drawings
 - .2 Cove leg/toe extension on the floor: 75 mm (3").
 - .3 Cove Former:
 - .1 Manufacturer's standard puncture-proof aluminum reinforcement factory bonded to sheet flooring, 38 x 38 mm (1-1/2" x 1-1/2") formed cove shape.
 - .2 Product: FlashCove Prefabricated Bases Inc. "FlashCove Prefabricated Bases".
 - .4 Cove Cap:
 - .1 PVC or vinyl cove cap moulding with rounded exposed edge to finish edge of sheet vinyl, approximately 6 mm (1/4") wide lipped edge and with thickness to suit flooring thickness.
 - .2 Vinyl material. Visible fasteners are not permitted.
- .2 Transition Flooring Trim:
 - .1 Weld to existing corridor sheet flooring where possible.
 - .2 Use vinyl welding rod where heat welding new vinyl sheet flooring to existing vinyl sheet flooring.
 - .3 Use linoleum welding rod where heat welding new vinyl sheet flooring to existing

-
- linoleum flooring.
- .4 Use rubber welding rod where heat welding new vinyl sheet flooring to existing rubber flooring.
- .5 Where heat welding to existing sheet flooring is not possible due to aesthetic or technical concerns, the flooring Subcontractor shall recommend a transition trim detail and strip product to be used to provide a flush transition to adjacent flooring type. Such detail and strip product shall be accepted by Consultant and submitted as part of submittals. Allow for various options in Contract Price.
- .3 Seam Construction:
- .1 Colour matched welding rod.
- .2 Colour shall be selected by Consultant to match sheet flooring colour/pattern.
- .4 Sheet Flooring Adhesive: Low-VOC formulation, type as recommended by vinyl sheet flooring manufacturer, compatible with materials and designed for rolling loads from carts and bed stretchers.
- .5 Prefabricated Flash Cove Base Adhesive: Low-VOC formulation, type as recommended by both sheet flooring manufacturer and prefabricated flash cove base manufacturer.
- .6 Floor Drains:
- .1 Modify / replace existing drains to a three (3) piece drain clamping ring.
- .2 Where existing floor drains cannot be easily modified and where the Consultant and Owner have been consulted in writing that existing drains cannot be easily modified, use a drain strainer cover at existing 5 inch (127 mm) round drains.
- .7 Patching and Levelling Compound:
- .1 Cementitious material as recommended by resilient flooring manufacturer and patching and levelling compound manufacturer compatible with materials, and to suit substrate types for patching and levelling substrate surfaces prior to installation of resilient.
- .2 Gypsum based substrates and underlayments are not acceptable.
- .3 Basis of Design:
- .1 K 60 Ardite by Ardex.
- .8 Control Joint Filler: Elastomeric sealant filler compatible with flooring and adhesive.
- .1 Basis of Design:
- .1 Ardifix by Ardex.
- .9 Sealant: Sealant for sealing around pipes, adjacent surfaces and at cap strips.
- .1 Product: AltroMastic by Altro.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting sheet flooring performance and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work.
- .2 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Do not install sheet flooring over concrete slabs or cementitious patching and levelling compound until materials are cured and are sufficiently dry to bond with adhesive and substrates and have pH range recommended by sheet flooring manufacturer.
- .2 Do not install sheet flooring until painting and finishing work are complete.
- .3 Flooring substrates shall be smooth and level within a tolerance of 3.2 mm (1/8 inch) in 3 m (10 feet) radius. Apply patching and leveling compound to level prepared substrates to meet specified tolerance.
- .4 Do not install flooring materials over expansion joints.
- .5 Repair surface spalls and imperfections with patching compound.
- .6 Concrete Substrates:
 - .1 Shall be prepared according to ASTM F710 and ACI 302.2 R.
 - .2 Mechanically remove according to sheet flooring and adhesive manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, adhesives and other contaminants that might impair or affect sheet flooring adhesive bond.
 - .3 Perform moisture testing, relative humidity testing, and surface pH testing.
 - .4 Proceed with installation of sheet flooring Work after testing shows limits comply with specified requirements.
- .7 Existing Flooring Substrates:

- .1 Ensure existing flooring is well bonded, sound, smooth, and free of waxes, polishes, or other foreign materials that may affect bond of vinyl sheet flooring to substrate or will telegraph to finished face of completed vinyl sheet flooring installation.
- .2 Mechanically prepare the surface (minimum light sanding) or as recommended by patching and levelling compound manufacturer or as recommended by adhesive manufacturer to ensure proper bonding of materials.
- .8 Sweep and vacuum clean substrates to be covered immediately before sheet flooring.

3.3 INSTALLATION

- .1 Install sheet flooring in accordance with product manufacturer's written installation instructions. Do not install flooring with visible defects.
- .2 Spray paints, permanent markers and other indelible ink markers shall not be used to write on the back of resilient material or used to mark the substrate as they could bleed through and permanently stain the resilient material. If such contaminants are present on the substrate they shall be mechanically removed prior to the installation of the resilient material.
- .3 Unroll sheet flooring in flooring manufacturer's required sequence where more than one roll is used to obtain pattern/shade match. Where matching cannot be accomplished, do not install and contact Consultant for written direction.
- .4 Unroll with the flooring decorative side facing up for minimum ten (10) minutes then back-rolled loosely and again unrolled to eliminate stress in material.
- .5 Lay out floor sheets from center marks established with principal walls, discounting minor offsets, so sheet flooring at opposite edges of room are of equal width. Adjust as necessary.
- .6 Discard broken, cracked, chipped, or deformed sheet material.
- .7 Adhere sheet flooring products using adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
 - .1 Adhesive coverage rates and adhesive trowel size shall comply with sheet flooring manufacturer's and adhesive manufacturer's written instructions.
- .8 Scribe, cut and fit sheet flooring to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings without gaps. Bind or seal cut edges as recommended by sheet flooring manufacturer.
- .9 Extend sheet flooring into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- .10 Terminate sheet flooring in straight lines at centreline of door in openings where adjacent floor finish or sheet flooring colour is dissimilar unless otherwise indicated on Drawings.
- .11 At door opening locations where finished flooring is adjacent to weather-stripping or automatic door bottoms provide patching and levelling compound to provide full contact between finished flooring and weather-stripping or automatic door bottoms. Taper

patching an levelling compound to transition with adjacent flooring substrate to be provide smooth and seamless transition at maximum slope of 3:1000 (height to distance) ratio.

- .12 Install sheet flooring accurately fitted at perimeter of rooms, cut with precision at columns, door frames and at other obstructions.

.13 Floor Drains:

- .1 Fit sheet flooring and mechanically fasten to drain outlets to warranty flooring as a watertight installation. Existing drain covers shall be modified in the field and replaced with a membrane clamping style stainless steel drain ring for round drain outlets and installed in accordance with sheet flooring manufacturer's written instructions where existing drains are not a clamping type.
 - .1 Fit rings over slip resistant sheet vinyl and permit inside diameter that will allow clean-out plate to be removed after installation. Drill into concrete to accommodate lead or plastic anchors. Screw drain rings to create a tight seal with beveled head stainless steel screws.
- .2 Where existing floor drains cannot be easily modified and were the Consultant and Owner have been consulted in writing that existing drains cannot be easily modified, use a drain strainer cover at existing 127 mm (5") round drains.

- .14 Finished flooring installation shall not show telegraphing of defects in substrate. Finished flooring installation shall be homogenous free of substrate lines, adhesive trowel lines, pockets, bumps and unevenness which are outside of specified tolerances.

.15 Vinyl Sheet Flooring Factory Fabricated Cove Base:

- .1 Dry-fit prefabricated flash cove base; cut and fit material to required lengths. Mitre cut inside and outside corners.
- .2 Dry-fit and cut cove cap prior to prefabricated flash cove base installation.
- .3 Scribe glue line on walls and floor at edge of prefabricated flash cove base material.
- .4 Apply full spread adhesive to achieve 100% coverage. Apply to both substrate and prefabricated flash cove base surfaces for full length of prefabricated flash cove base material. Apply prefabricated flash cove base to wall surface straight and level.
- .5 Slide cove cap behind prefabricated flash cove base material.
- .6 Hand roll prefabricated flash cove base material onto wall and floor surface removing bumps, ripples and fishmouths. Remove excess adhesive.
- .7 Heat weld all seams in prefabricated flash cove base material.
- .8 Where sheet flooring is coved up wall surfaces and other abutments, installation shall be in accordance with sheet flooring installation instructions using the following accessories.

3.4 FIELD QUALITY CONTROL

- .1 Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- .2 Tests:
 - .1 Field testing shall be performed during the course of the Work to verify that

concrete floors to receive work of this section are dry and exhibit negative alkalinity or carbonization.

- .2 Moisture Testing: Maximum moisture vapour emission rate 1.36 kg of water/100 m² (3 lb of water/1000 ft²) in a twenty-four (24) hour period or more stringent requirements in accordance with sheet flooring and adhesive manufacturer's written instructions.
 - .1 Test for moisture vapour transmission in accordance with ASTM F1869.
 - .2 Perform tests so that each test area does not exceed 93 m² (1,000 ft²)
 - .3 Perform minimum one (1) test in each installation area.
 - .4 Evenly space test areas in each installation areas where multiple tests are completed.
- .3 Relative Humidity Test: Using in situ probes to ASTM F2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
- .4 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710.
- .5 Perform additional moisture tests recommended in writing by adhesive and sheet flooring manufacturers. Proceed with installation only after substrates pass testing.
- .6 Prepare test reports.

3.5 CLEANING

- .1 Remove excess adhesive and other surface blemishes using cleaner recommended by sheet flooring manufacturer.
- .2 Perform initial maintenance and cleaning according to the sheet flooring manufacturer's written instructions.
- .3 Allow flooring to dry prior to applying protection.

3.6 PROTECTION

- .1 Allow no traffic over installation until adhesives have fully cured, minimum twenty-four (24) hours for light traffic, minimum forty-eight (48) hours for light rolling loads, minimum seventy-two (72) hours for heavy loads.
- .2 Protect sheet flooring against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by sheet flooring manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Architectural film interior surfacing for doors and elevator doors **WC-01**.

1.2 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's descriptive data for architectural film surfacing and accessories.
 - .2 Include sample warranty form for architectural film surfacing, fabrication and installation instructions, and maintenance instructions.
- .2 Samples for Verification: Submit minimum 10" (200 mm) square samples of each type of architectural film surfacing.

1.3 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for installer prepared by the architectural film surfacing manufacturer.
- .2 Certificates of Compliance: Certification that architectural film surfacing meets specified fire hazard classification requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data:
 - .1 Submit maintenance instructions for any specific warnings of any maintenance practice or materials which may damage or disfigure the architectural film surfacing.
 - .2 Include cleaning instructions.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - .1 Minimum 2% of amount installed of each type of architectural film surfacing.

1.6 QUALITY ASSURANCE

- .1 Source Limitations: Architectural film surfacing installed as part of the work of this section

shall be from the same production run.

- .2 Installer Qualifications: Perform work of this Section only by an installer who is an authorized installer of architectural film surfacing manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver Products to Place of the Work undamaged and with labels intact. Inspect containers to verify that they have not been opened.
- .2 Store products in accordance with product manufacturers written instructions.

1.8 FIELD CONDITIONS

- .1 Maintain temperature and humidity conditions in installation areas as recommended by product manufacturers before, during and after installation.
- .2 Do not install architectural film surfacing below 12C or above 29C

1.9 WARRANTIES

- .1 Furnish architectural film surfacing material manufacturer's and distributor's five (5) year warranty providing coverage for material and workmanship defects and specifically for: Reduced gloss, developed texture, decomposition, swelling, clouding, tackiness, crazing, bubbling, and cracking of architectural film surfacing.

Part 2 Products

2.1 MANUFACTURERS

- .1 Architectural film surfacing Manufacturers: The following manufacturers are acceptable subject to conformance to requirements of Contract Documents and subject to submitting a product substitution to Consultant for approval.
 - .1 3M Canada.
 - .2 Koroseal.
 - .3 LX Hauslys.
 - .4 Takiron.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 ARCHITECTURAL FILM SURFACING

- .1 Architectural Film Surfacing **WC-01:**
 - .1 Description:
 - .1 Architectural overlay with pressure sensitive adhesive backing.
 - .2 Precision manufactured from blend of synthetic, engineered plastics, produced using calendaring process. and printed using high-definition presses.
 - .2 Thickness: 0.20 mm nominal without adhesive layer.
 - .3 Fire hazard classification: Class A, tested to ASTM E84.
 - .4 Fire door overlays: Meet UL 10B and 10C.
 - .5 Pattern: To be selected by Consultant from manufacturer's full range.
 - .6 Basis of Design Product: Di-Noc by 3M Canada

2.4 INSTALLATION ACCESSORIES

- .1 Primer: Water based, as recommended by architectural film surfacing manufacturer.
- .2 Sealer: Water based, as recommended by architectural film surfacing manufacturer.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Comply with manufacturer's instructions for surface preparation.
- .2 Remove dust, dirt, grease, adhesive residue from wall surfaces that may affect or inhibit adhesive bond.
- .3 Finish sand surfaces to achieve proper adhesive bond surface. Re-clean surfaces after any sanding is complete. Apply proper surface sealer, primer, or secondary adhesive as required by substrate complexity. Protect prepared surface from contamination until application.
- .4 Existing Doors: Remove existing hardware, tag and save for reinstallation.
- .5 Prepare other non-porous substrates to smooth, dry, clean surface, free of flaking, unsound coatings, cracks, and defects

3.3 INSTALLATION

- .1 Apply architectural film surfacing in accordance with manufacturer's installation instructions.
- .2 Install architectural film surfacing without gaps.
- .3 For three-dimensional components, heat product to mold to substrate so that pattern has continuous, realistic, even appearance.
- .4 Remove air bubbles, wrinkles, blisters, and other defects
- .5 Remove architectural film showing evidence of coming loose or showing any blisters, imperfect seams, wrinkles, dried adhesive, or other imperfections and apply new architectural film.

3.4 CLEANING

- .1 Consult with manufacturer's authorized installer for specific cleaning requirements based on finish, substrate, and applicable environment.
- .2 Clean completed surfaces in accordance with manufacturer's instructions.
- .3 Do not use caustic, acidic, or abrasive cleaners

3.5 PROTECTION

- .1 Protect completed surfaces from damage using temporary nonstaining coverings recommended by surfacing manufacturer.

3.6 REPAIR

- .1 Utilize manufacturer's authorized installer to repair damaged architectural film using materials and procedures approved by architectural film manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes: All labor, materials, tools and other equipment, services and supervision required to complete work as well as surface preparation for the application of paint systems of this section for interior painting.

1.2 REFERENCES

- .1 Definitions:
 - .1 "Gloss Level 1" means a gloss and sheen level which is a matte finish (flat) that measures a maximum of 5 units gloss at 60° and a maximum of 10 units sheen at 85°;
 - .2 "Gloss Level 2" means a gloss and sheen level which is a high side sheen flat (velvet-like finish) that measures a maximum of 10 units gloss at 60° and 10 to 35 units sheen at 85°;
 - .3 "Gloss Level 3" means a gloss and sheen level which has an eggshell-like finish that measures 10 to 25 units gloss at 60° and 10 to 35 units sheen at 85°;
 - .4 "Gloss Level 4" means a gloss and sheen level which has a satin-like finish that measures a 20 to 35 units gloss at 60° and minimum 35 units sheen at 85°;
 - .5 "Gloss Level 5" means a gloss and sheen level which has a semi-gloss finish that measures 35 to 70 units gloss at 60°;
 - .6 "Gloss Level 6" means a gloss and sheen level which has a gloss finish that has measures 70 to 85 units gloss at 60°; and
 - .7 "Gloss Level 7" means a gloss and sheen level which has a high gloss finish that measures greater than 85 units gloss at 60°.

1.3 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for each type of product.
 - .2 Product List: Provide an inclusive list of project coating materials. Indicate each material and cross-reference to schedules with specific coating, finish system, color designation, sheen, and application methods. Identify each material by manufacturer's catalog number and general classification.
 - .3 Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, preparing, and applying each coating material proposed for use.
 - .4 Include product data sheet showing "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- .2 Samples for Verification:

- .1 Submit 8 inch (200) x 10 inch (250mm) drawdowns of each colour on coated card stock identified with project name and Consultant's colour code. Submit drawdowns at least 30 calendar days prior to commencement of painting.

1.4 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for installer.
- .2 Field Quality Control Reports. Submit inspection and test reports.

1.5 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for any cleaning.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- .2 Paints: Sealed 4 litre can of each type and colour and gloss of paint used in the Work.

1.7 QUALITY ASSURANCE

- .1 Source Limitations: The painting materials shall be from a single source of manufacturing for each painting system.
- .2 Quality Standard:
 - .1 Materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (MPI) for "Premium Grade".
 - .2 Paint manufacturers and products used shall be as listed under the Approved Product List (APL) section of the MPI Painting Manual unless otherwise specified.
 - .3 Where non-MPI listed products or systems are to be used, the paint or coating manufacturer shall provide as part of this work, certification of all surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to the Owner.
- .3 Installer Qualifications: Company with a minimum of five (5) years proven satisfactory experience with a qualified crew of painters. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman.
- .4 Mockups: Build mockups to set quality standards for materials and execution.
 - .1 Prepare a sample room or mock-up areas to include the finishing of all materials and surfaces specified and scheduled for the work.
 - .2 Mock-ups shall serve as a standard for the balance of the work. Subsequent work carried out and not in the Consultant's opinion equal to the standard shall be repainted without charge.

- .3 If Consultant determines mockups do not comply with requirements, reconstruct mockups until mockups are accepted.
- .4 Acceptance of mockups does not constitute acceptance of deviations from the Contract Documents contained in mockups unless Consultant specifically approves such deviations in writing.
- .5 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Performance of the Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver the painting and coating materials in the sealed, original labelled containers that bear the manufacturer's name, brand name, type of paint or coating, colour designation, mixing and reducing application requirements, standard(s) compliance as applicable and materials content.
- .2 Store the paints and coatings in the original labelled containers in a dry, heated and well ventilated, single designated area.
- .3 Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings as required.
- .4 Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from the site on a daily basis.

1.9 FIELD CONDITIONS

- .1 Perform no painting work until ambient air and substrate temperatures and humidity conditions are maintained at the levels indicated in product manufacturer's written instructions before, during installation, and after installation of work of this section.
- .2 Perform no painting work when the maximum moisture content of the substrate exceeds amounts specified.
- .3 Concrete and masonry surfaces shall be installed at least 28 days prior to painting work and must be visually dry on both sides.
- .4 Provide a minimum lighting level of 323 Lux (30 foot candles) on surfaces to be painted.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".

- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MANUFACTURERS

- .1 Paint manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 Benjamin Moore.
 - .2 Dulux Paints Inc
 - .3 Sherwin Williams Co.
 - .4 PPG Industries Canada Ltd.
 - .5 Pratt and Lambert.

2.3 MATERIALS

- .1 Use top line of selected manufacturer's products.
- .2 All paint products shall comply with MPI standards and be listed in the "MPI Approved Products List."
- .3 Painting and coating systems shall have a minimum volume solids of 30% before tinting.
- .4 The material used for priming, painting and coating will not have exceeded its shelf life or one year since the date of manufacture, whichever is less.
- .5 Material Compatibility:
 - .1 Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - .2 For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

2.4 EQUIPMENT

- .1 Painting Equipment: Type of product suitable for paint application and substrate type. Use clean equipment in good working condition.
- .2 Spray Painting Equipment: Ample capacity, suited to the type and consistency of paint or coating being applied and kept clean and in good working order at all times.

2.5 MIXING AND TINTING

- .1 Unless otherwise specified herein, paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in accordance with product 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 If required, thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

2.6 PAINT COLOURS

- .1 Interior Paint Colours:
 - .1 **PT1:**
 - .1 Colour: Silver Satin OC-26 by Benjamin Moore or approved equals.
 - .2 **PT2:**
 - .1 Colour: November Skies 2128-50 by Benjamin Moore or approved equals.
 - .3 **PT3:**
 - .1 Colour: Stormy Monday 2112-50 by Benjamin Moore or approved equals.
 - .4 **PT4:**
 - .1 Colour: Blue Lake 2053-40 by Benjamin Moore or approved equals.
- .2 If an item or surface is not specifically mentioned to be painted, paint the item or surface the same as similar adjacent materials or surfaces whether the Contract Documents indicates the colour.
- .3 If the Contract Documents do not indicate colour or gloss level, the Consultant will select from the product manufacturer's full range of standard colors and glosses available.

2.7 GLOSS LEVELS

- .1 Gloss Levels shall comply with gloss levels defined by the Master Painters Institute.

2.8 INTERIOR PAINT SYSTEMS

- .1 Structural Steel and Metal Fabrications:
 - .1 MPI INT 5.1S Institutional Low-Odor/VOC Latex System, Gloss Level 4.
 - .1 Primer Coat: MPI #107, Primer, Rust-Inhibitive, Water Based.
 - .2 Intermediate Coat:, matching topcoat.
 - .3 Topcoat: MPI #146, Latex, Interior, Institutional Low Odor/VOC.

- .2 Galvanized Metal:
 - .1 INT 5.3M High Performance Architectural Latex. (over w.b. galvanized primer). Minimum Volume Solids of 36% before tinting, Gloss Level 4.
 - .1 Primer Coat: MPI #134, Primer, galvanized, water based.
 - .2 Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - .3 Topcoat: MPI #140, Latex, interior, high performance architectural.
- .3 Wood doors for site finish / wood base:
 - .1 MPI INT 6.3P Water-Based Light-Industrial Coating (MPI Gloss Level 5):
 - .1 Primer Coat: MPI # 45, Primer sealer, alkyd, interior.
 - .2 Intermediate Coat: Light-industrial coating, interior, water based, matching topcoat.
 - .3 Topcoat: MPI #153, Light-industrial coating, interior, water based, semigloss
- .4 Plaster and Gypsum Board:
 - .1 General Areas, Ceiling:
 - .1 Existing Painted Surfaces:
 - .1 RIN 9.2B High Performance Architectural Latex, Gloss Level 2.
 - .2 New Surfaces:
 - .1 INT 9.2B High Performance Architectural Latex. (over Latex Primer / sealer), Gloss Level 2.
 - .1 Primer Coat: MPI #50, Primer sealer, latex, interior.
 - .2 Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - .3 Topcoat: MPI #138, Latex, interior, high performance architectural, (MPI gloss level 2).
 - .2 General Areas, Corridors:
 - .1 Existing Painted Surfaces:
 - .1 RIN 9.2B High Performance Architectural Latex, Gloss Level 3.
 - .1 Primer Coat: MPI #50, Primer sealer, latex, interior.
 - .2 Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - .3 Topcoat: MPI #139, Latex, interior, high performance architectural, (MPI gloss level 3).
 - .2 New Surfaces:
 - .1 INT 9.2B High Performance Architectural Latex. (over Latex Primer / sealer), Gloss Level 3.
 - .1 Primer Coat: MPI #50, Primer sealer, latex, interior.
 - .2 Intermediate Coat: Latex, interior, high performance

- architectural, matching topcoat.
- .3 Topcoat: MPI #139, Latex, interior, high performance architectural, (MPI gloss level 3).
- .3 Storage areas, and other back of house “dry” rooms:
 - .1 Existing Painted Surfaces:
 - .1 RIN 9.2B High Performance Architectural Latex, Gloss Level 3.
 - .1 Primer Coat: MPI #50, Primer sealer, latex, interior.
 - .2 Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - .3 Topcoat: MPI #139, Latex, interior, high performance architectural, (MPI gloss level 3).
 - .2 New Surfaces:
 - .1 INT 9.2B High Performance Architectural Latex. (over Latex Primer / sealer), Gloss Level 3.
 - .1 Primer Coat: MPI #50, Primer sealer, latex, interior.
 - .2 Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - .3 Topcoat: MPI #139, Latex, interior, high performance architectural, (MPI gloss level 3).
- .4 Washrooms, Work/Utility rooms, Janitors Closets and other back of house “wet” areas:
 - .1 Existing Painted Surfaces:
 - .1 RIN 9.2D Epoxy, Gloss Level 6.
 - .1 Primer Coat: MPI #17.
 - .2 Intermediate Coat: Epoxy, gloss, matching topcoat.
 - .3 Topcoat: MPI #77, Epoxy, gloss.
 - .2 New Surfaces:
 - .1 INT 9.2F Epoxy Modified Latex, Gloss Level 5.
 - .1 Primer Coat: MPI #50 Latex Primer Sealer.
 - .2 Intermediate Coat: Epoxy-Modified Latex, matching topcoat.
 - .3 Topcoat: MPI #115 Epoxy-Modified Latex.
 - .1 Products:
 - .1 Tru Glaze WB 4426/4220 Water Borne Epoxy by Devoe High Performance Coatings (AkzoNobel)
 - .2 Aquapon WB EP Epoxy 98E-X/98E-100 by Protective and Marine Coatings (PPG Architectural)
 - .3 Waterbased Catalyzed Epoxy B73W311/B73V300 by Pro Industrial

(Sherwin Williams).

- .5 Gypsum board to receive wall coverings: Prime in accordance with wall covering manufacturer's written requirements.
- .6 Paperless glass mat mould resistant gypsum board Finish in accordance with gypsum board manufacturers' recommendations. 1 coat 100% acrylic primer with mildewcide, and a minimum of 40% solids by volume, 2 coats acrylic latex enamel, gloss level 3 (gloss range 15-20).

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.
- .2 Do not apply paint or other finish to wet, frozen or rusty materials. Prepare such defective surfaces as necessary to obtain a satisfactory surface.

3.2 PREPARATION

- .1 Remove and securely store all miscellaneous hardware and surface fittings / fastenings, electrical plates, mechanical louvers, door and window, removable rating / hazard / instruction labels, washroom accessories, light fixture trim, and the like from surfaces, doors and frames, prior to painting.
- .2 Doors shall be removed before painting to paint bottom and top edges.
- .3 Substrate defects shall be made good and sanded by others ready for painting particularly after the first coat of paint.
- .4 Start of finish painting of defective surfaces shall indicate acceptance of substrate and any costs of making good defects shall be borne by the painter including re painting of entire defective surface (no touch up painting).
- .5 Confirm preparation and primer used with fabricator of steel items.
- .6 Prepare surfaces in accordance with MPI requirements for specific substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas and to comply with paint manufacturer's written recommendations.
- .7 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .8 Prime and back-prime wood materials in contact with cementitious substrates.
- .9 Remove dust, grease, rust and loose extraneous matter from surfaces.

- .10 Wash and neutralize alkaline surfaces using proper type of solution compatible with paint to be used.
- .11 Wood Doors:
 - .1 Immediately after wood doors have been fitted, remove doors for finishing in a horizontal position on saw horses. Sand all surfaces of doors thoroughly with a hand block and/or pad sander using a good grade of 150 to 180 grit sandpaper to remove grain rise and handling marks.
 - .2 Where dark stains are scheduled to be applied over a light wood, thorough initial sanding is important to remove blotchiness and to reduce a barber pole effect.
 - .3 Do not use steel wool on Oak doors.
- .12 Wood Surfaces:
 - .1 Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - .2 Sand surfaces that will be exposed to view, and dust off.
 - .3 Prime edges, ends, faces, undersides, and backsides of wood.
 - .4 After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- .13 Metal Surfaces
 - .1 Steel Substrates: Remove rust, loose mill scale. Clean using methods recommended in writing by paint manufacturer but not less than the following SSPC-SP3.
 - .2 Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
 - .3 Galvanized Steel: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
 - .4 Aluminum Substrates: Remove loose surface oxidation.
 - .5 Roughen aluminum, copper, and precoated finishes to be painted, with garnet abrasive.
- .14 Concrete Surfaces:
 - .1 Thoroughly remove form oil and parting compounds.
 - .2 Fill voids and pinholes in concrete which will be visible after painting.
- .15 Masonry Surfaces:
 - .1 Fill minor cracks, holes and fissures with cement grout and smooth to a flush surface to match texture of masonry units.
- .16 Gypsum Board Surfaces
 - .1 Fill minor cracks, holes and imperfections with patching plaster. Allow to dry and sand smooth.
 - .2 Sand taped joints of gypsum board and remove dust.

- .17 Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections. Touch up shop primed surfaces with same primer as required.
- .18 Do not thin paint in excess of manufacturer's recommendations.
- .19 Proceed with Work only when surfaces are dry and conditions are suitable.

3.3 APPLICATION, GENERAL

- .1 Apply Products in accordance with manufacturer's application instructions.
- .2 Use factory mixed paint to required colours.
- .3 Apply paint with uniform sheen, colour and texture free from brush and roller marks, runs and sags.
- .4 Coatings including primers, but not fillers, may be applied by brush, roller or spray as appropriate to the conditions and at the discretion of the applicator.
- .5 Roll-in sprayed application of filler coat on concrete and concrete block.
- .6 Each coat of paint shall be dry and hard before application of additional coats. Sand and touch up suction spots.
- .7 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").
- .8 Repaint entire plane of surfaces exhibiting incomplete or unsatisfactory coverage.
- .9 Regardless of the number of coats specified for any surface, apply additional paint to completely cover and hide substrate and to produce a solid uniform appearance.
- .10 Tint undercoats in different shades of final coats.
- .11 Paint exposed surfaces, except where the Contract Documents indicate that a surface or material is not to be painted or is to remain natural.
- .12 Apply paint to minimum dry film thickness recommended by manufacturer.
- .13 Match final coat of paint to accepted paint colour and finish samples and mock-ups.
- .14 Surfaces to be excluded from painting:
 - .1 Do not apply paint or any other finish to:
 - .1 Metals with factory applied finish except as specified to be painted.
 - .2 Stainless steel.
 - .3 Aluminum except as specified to be field painted by this Section.
 - .4 Coil coated steel.
 - .5 Finishing hardware except ferrous metal and prime coated items.
 - .6 Handles for valves.

- .7 Specification, instruction plates, and decals on equipment.
- .8 ULC, WH, CSA or other rating or certification labels.
- .9 Dials, gauges, read outs or sensors.
- .10 Shop finished finish carpentry woodwork.
- .11 Shop finished architectural woodwork.
- .12 Shop finished wood doors.
- .13 Pre-painted fire hose cabinets.
- .14 Exposed data and communications cabling.
- .15 Pre-painted mechanical and electrical materials.
- .16 Factory finished mechanical and electrical equipment and materials.

3.4 MECHANICAL AND ELECTRICAL COMPONENTS

- .1 Paint exposed bare and covered pipes and ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- .2 Except as noted in exclusions, paint exposed mechanical and electrical materials, and equipment including copper piping, conduit, primed and finish coated surfaces of enclosures and grilles, convactor covers, casings, pipes, ducts, plenums, equipment, insulation covering of pipes, ducts and plenums and hangers and metal supporting structures the same colour as the adjacent surfaces. This includes items in electrical and mechanical service rooms, storage areas and closets.
- .3 Provide color banding for insulated and uninsulated piping in accordance with ANSI A13.1, "Scheme for the Identification of Piping Systems" and the Owner's specific requirements.

3.5 WOOD DOORS

- .1 Apply fillers and wiping stains when doors are in a horizontal position.
- .2 Apply fillers and wiping stains in accordance with manufacturers' application instructions.
- .3 Finish all exposed edges of doors, including top and bottom edges.

3.6 GRILLES, ACCESS PANELS AND ACCESS DOORS

- .1 Remove grilles and access panels for convectors and ventilation system and paint separately. Replace when painting is completed.
- .2 Paint backs of units, wall or insulation visible through grilles and visible portions of ducts behind grilles, flat black.
- .3 Paint sides of access doors and frames to match the surface in which they occur.

3.7 ENCLOSED LIGHT RECESSES

- .1 Paint interior surfaces of enclosed light recesses semi-gloss white unless specified otherwise.

3.8 INSTALLATION TOLERANCES

- .1 Inspect the painted and coated surfaces and confirm the following Nonconformities do not exist:
 - .1 Brush marks, roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing as a result of inefficient application methods, skipped or missed areas, or foreign materials in the painting or coatings.
 - .2 Evidence of poor coverage at lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before the painting or coating system is sufficiently dry or any other contributory cause.
 - .4 Damage due to application of the painting or coating system on moist surfaces or caused by inadequate protection from weather.
 - .5 Damage or contamination of the painting or coating due to blown contaminants.
- .2 Inspect the painted and coated surfaces and confirm the following Nonconformities are not apparent under the natural lighting source for the exterior surfaces and the final lighting source (including daylight) for the interior surfaces:
 - .1 Visible defects on vertical or horizontal surfaces when viewed standing from a distance of not less than 1,000 mm.
 - .2 Visible defects on the ceiling, soffit or other overhead surfaces when viewed standing.
 - .3 The final coat of painting or coating on any surface exhibiting a lack of uniformity of colour, sheen, texture or hiding across the full surface area that painting or coating system was applied to.

3.9 FIELD QUALITY CONTROL

- .1 Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- .2 Manufacturer's Field Service: Manufacturer's representative shall be present at preinstallation meeting, first installation, and periodically during installation. Manufacturer's rep shall provide on-site training of installers for the initial installation crew.
- .3 Tests: Field testing shall be performed prior to commencement of the Work where substrates are to be painted. Testing requirements shall be determined by qualified testing agency from among the following tests. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense:
 - .1 Alkalinity Test:
 - .1 Test concrete and concrete masonry units surfaces for alkalinity. The pH of the surface shall be between six (6) and nine (9).
 - .2 Moisture Test:
 - .1 Check the moisture content of the surfaces to be painted using a

calibrated electronic moisture meter. The maximum moisture content will not exceed the following or the values as defined by the painting and coating manufacturer, whichever is the more stringent:

- .1 Maximum 12% for concrete and concrete masonry units.
- .2 Maximum 12% for gypsum board.
- .3 Maximum 12% for plaster.
- .4 Maximum 15% for wood.
- .2 Conduct the moisture tests on the concrete floors using the cover patch test in compliance with ASTM D4263.
- .3 Conduct 3 tests on concrete floor substrates for areas up to 93 m², and one additional test for each additional 9 m².
- .4 Conduct 3 tests on concrete vertical substrates for areas up to 93 m², and one additional test for each additional 9 m².
- .5 Conduct 3 tests on concrete ceiling substrates for areas up to 93 m², and one additional test for each additional 9 m²; and
- .6 Conduct 3 tests on concrete masonry units for areas up to 93 m², and one additional test for each additional 9 m²; and
- .7 Remove and replace deficient materials for retesting as specified above.
- .4 Prepare test reports.

3.10 ADJUSTING

- .1 At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
- .2 Where required to repair damage to finished surfaces, any dents, scratches or gouges shall be sanded and filled as needed and the entire surface where the damage occurred shall be refinished.

3.11 CLEANING

- .1 After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- .2 Clean and reinstall items removed for painting upon completion of painting work in each area.
- .3 Do not use solvent or reactive cleaning agents on items that will mar or remove finishes.
- .4 Doors shall be re-hung where doors were removed for painting.

3.12 PROTECTION

- .1 Protect all adjacent surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any

damage caused by failure to provide such protection.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Patient-bed service walls.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate locations of blocking for patient bed service walls.
 - .2 Coordinate with Owner equipment items to be mounted to service walls not referenced in this Section.
- .2 Scheduling: Supply products to be built-in ample time to be incorporated into the Work together with measurements, templates and other information required for location of same.
- .3 Preinstallation Conference: Conduct conference at Project site.
 - .1 Verify project requirements, including mockup requirements.
 - .2 Verify substrate conditions.
 - .3 Coordination of products, installation methods and techniques and with other building Subcontractors.
 - .4 Review product manufacturer's installation instructions and procedures to be adopted and conditions under which work shall be done.
 - .5 Review procedures to be adopted.
 - .6 Members in attendance:
 - .1 Patient bed service wall manufacturer's technical representative.
 - .2 Contractor.
 - .3 Patient bed service wall installers.
 - .4 Work of other Subcontractors including electrical, medical gas, and plumbing.

1.3 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for patient bed service walls.
 - .2 Include product description, required field conditions, and manufacturer's installation instructions.
- .2 Shop Drawings:

- .1 Identify medical gas terminals layout, equipment brackets and services, layout, electrical connection terminals layout, dimensions, finishes, materials, locations of cut-outs and adjacent construction.
- .2 Show mounting heights, installation details including blocking and fasteners to be used.
- .3 Samples for Initial Section: Manufacturer's colour charts consisting of actual sections of colours showing the full range of colours available.
- .4 Samples for Verification:
 - .1 Submit three (3) 300 mm long samples of aluminium extrusions.
 - .2 Submit three (3) 300 mm x 300 mm samples of each type of plastic laminate

1.4 INFORMATIONAL SUBMITTALS

- .1 Product Certificates: Submit product certificates for patient bed service walls indicating compliance with design and performance requirements.
- .2 Field Quality Control Reports:
 - .1 Submit independent inspection and testing reports.
 - .2 Submit manufacturer's field review report.

1.5 CLOSEOUT SUBMITTALS

- .1 Maintenance Data:
 - .1 Submit maintenance instructions for any cleaning or use practices or materials which may damage or be detrimental to the performance of patient bed service walls.
 - .2 Indicate methods for repairing the patient bed service wall units.

1.6 QUALITY ASSURANCE

- .1 Source Limitations: Obtain patient bed service walls from single source from a single manufacturer.
- .2 Manufacturer qualifications:
 - .1 Provide work of this Section, executed by competent manufacturer with minimum of fifteen (15) years experience in manufacture and fabrication of Products, systems and assemblies specified herein.
 - .2 If requested by the Owner or Consultant, submit names of projects with locations, names of Owner and consultant where the products to be used have been used previously and performed satisfactorily, date installed, and size of installation.
- .3 Installer qualifications:
 - .1 Installation shall be executed by the manufacturer or his authorized representative. Employ only qualified installers with proven experience in this type of work.

- .2 Subcontractor shall designate a single individual as project foreperson who shall be at the Project Site all times during installation.
- .4 Mockups:
 - .1 Build one (1) full size mockup of patient bed service wall in location selected by Consultant.
 - .2 Mock-up shall be reviewed by Consultant, Construction Manager, installer, and patient bed service wall manufacturer's technical representative.
 - .3 Co-ordinate the work required for mockups with all work of other Sections.
 - .4 If Consultant determines mockups do not comply with requirements, adjust or reconstruct mockups until mockups are accepted.
 - .5 Do not proceed with the work of this Section until mockups have been reviewed and accepted by the Consultant.
 - .6 Acceptance of mockups does not constitute acceptance of deviations from the Contract Documents contained in mockups unless Consultant specifically approves such deviations in writing.
 - .7 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Handle and store products in accordance with product manufacturers written instructions and in such a manner which will prevent damage to other surfaces and/or materials.
- .2 Handle and store materials and products at the Project site in such a manner which will prevent damage to other surfaces and/or materials and protect Products from moisture.
- .3 Patient bed service walls not meeting the requirements of the Contract Documents or damaged shall be identified and removed from the Place of Work and replaced with new Products.

1.8 FIELD CONDITIONS

- .1 Do not install patient bed service walls until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in product manufacturer's written instructions before, during installation, and after installation of work of this section.

1.9 WARRANTY

- .1 Submit a written warranty for the work of this Section for five (5) years from the date of Substantial Performance of the Work, issued in the name of the Owner and signed by this Subcontractor.

Part 2 Products

2.1 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Site wiring shall be CSA Certification or Ontario Hydro approved.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MANUFACTURERS

- .1 Acceptable patient bed service wall manufacturers:
 - .1 Amico Corporation
 - .2 Interspec Systems Limited; www.interspecsystems.com.
 - .3 Hill-Rom Canada; www.hill-rom.com.
 - .4 Class 1 Inc.; www.class1inc.com.
- .2 Basis of design:
 - .1 "Majestic Series 5 Feet Surface Mounted Headwall - 1 Tier" by Amico Corporation.

2.4 MATERIAL

- .1 No trademarks and/or labels will be accepted on exposed finished surfaces.
- .2 Ensure surfaces are free from defects impairing appearance, strength and durability.
- .3 Aluminum:
 - .1 Aluminum sheet or plate shall be aluminum alloy 3003-H14 or alloy 5005-H32 or alloy 6061-T6 to suit conditions, and conform to ASTM B 209M.
 - .2 Aluminum extrusions shall be extruded aluminum alloy AA-6063- T5 or T6 and conform to ASTM B 221M.
- .4 Stainless Steel:
 - .1 Stainless steel shall be AISI Type 316 stainless steel that conform to ASTM A 167, ASTM A 240/A 240M and ASTM A 666.

2.5 PATIENT BED SERVICE WALLS

- .1 1325 mm long surface mounted single tier horizontal type patient bed service walls as indicated, complete with but not limited to the following:
 - .1 Two (2) medical vacuum outlets.

- .2 Three (3) duplex electrical receptacles.
- .3 One (1) nurse call station.
- .2 Patient bed service wall casings:
 - .1 Refer to Drawings for dimensions and services layout and requirements.
 - .2 Access panels:
 - .3 Laminating core: Random wafer board core of minimum 720 kg/m³ density, sanded both sides and conform to CSA O437.0, Grade R-1, or medium density fiberboard free of urea formaldehyde resins, having minimum 780 to 800 kg/m³ density, and conform to ANSI A208.2, Grade 130-MR50.
 - .4 Facing and backing sheets: NEMA LD 3, grades as follows:
 - .1 General purpose standard (HGS): 1.6 mm thick.
 - .2 Backing sheet (VGS): 0.5 mm thick.
 - .3 Colour and texture: As selected later by the Consultant from the manufacture's full available colour and texture.
- .3 Service fittings and fixtures panels:
 - .1 Material: 0.102 mm thick, extruded aluminum or aluminum plate with clear satin anodized finish.
 - .2 Ensure surfaces are free from defects impairing appearance, strength and durability.
 - .3 Provide panels pre-punched in accordance with services layouts.
 - .4 Provide blank filler plates for any unspecified spaces, finished to match the panels.
- .4 Side rails:
 - .1 Material: 0.102 mm thick extruded aluminum with clear satin anodized finish.
 - .2 Ensure surfaces are free from defects impairing appearance, strength and durability.
 - .3 Provide rails pre-punched in accordance with services layouts.
- .5 Quick connect recess:
 - .1 Back panel: Access panel construction as specified herein.
 - .2 Soffit, side and sill panels: Side rail construction as specified herein.
- .6 Conduit: Flexible RW90-X Link conduit.
 - .1 Within patient bed service wall casing: 19 mm diameter PVC type.
 - .2 Between master and slave patient bed service wall units: 19 mm diameter steel EMT type.
 - .3 Provide a separate ground conductor in every conduit.

2.6 COMPONENTS

- .1 Room grounding:

- .1 Ground cables: Model No. FLC-3-1010 by Isolation Systems.
 - .2 Ground cables: Model No. FLC-3-1010 by Isolation Systems.
 - .1 Cable: 10 gauge copper cable.
 - .2 Jacketing: Green neoprene.
 - .3 Provide a ground cable to ground all permanent metallic items in the patient area, e.g. door frames, heating convactor units, duplex receptacles etc. Provide a complete grounded zone within a 2000 mm radius of the patient bed.
 - .4 Connect the room grounding cables to equalized ground bus of patient area.
 - .5 Conceal ground cables in wall and ceiling constructions.
- .2 Electrical systems (master patient bed service wall units):
- .1 Supply master patient bed service wall units complete with CSA listed electrical devices including associated conduit, wiring and connections.
 - .2 Provide service connection points and circuits in accordance with the layout on Drawings.
 - .3 Provide following electrical devices pre-wired:
 - .1 Receptacles: Hospital Grade, CSA certified, red to denote emergency power.
 - .2 15 amperes: Duplex, 125 Volt CSA configuration 5-15R.
 - .4 Ground jacks: SLR-3S duplex type by Hampden Limited.
 - .5 Face plates: Aluminum or AISI Type 316 stainless steel.
 - .6 Arrange and pay for CSA or Ontario Hydro inspection and approval of the pre-wired master patient bed service wall units in the fabricating shop prior to delivery to the Project Site.
- .3 Electrical systems (slave patient bed service wall units):
- .1 Supply slave patient bed service wall units complete with RAP's and associated conduit to electrical devices listed.
 - .2 Provide service connection points and circuit conduit in accordance with the layout of the Drawings.
 - .3 Provide the following electrical devices:
 - .1 Receptacles: 15 amperes duplex, 125 Volt, Hospital Grade, CSA certified, red to denote emergency power.
 - .2 Ground jacks: SLR-3S duplex type by Hampden Limited.
 - .3 Face plates:
 - .1 Aluminum or AISI Type 316 stainless steel.
 - .4 Arrange and pay for CSA or Ontario Hydro inspection and approval of the site wired slave patient bed service wall units at the Project Site.
 - .5 Provide associated back boxes, conduit and junction boxes, into both master and slave patient bed service wall units for the following electrical fixtures provided as part of the work of Division 26 as follows:
 - .1 Single bed nurse call station.

- .6 Provide service connection points in accordance with the layout on Drawings.
- .4 Medical gas piping system:
 - .1 Refer to Division 22 for supplementary requirements.
 - .2 Test and certify medical gas piping systems and outlets within the patient care modules, in accordance with CAN/CSA Z318.6.
 - .3 Medical gas piping: Provide type "K" hard copper, factory washed and capped piping and fittings conforming to CAN/CSA Z7396.1.
 - .1 Piping sizes:
 - .1 Oxygen: 12 mm diameter.
 - .2 Vacuum: 19 mm diameter.
 - .4 Acceptable gas fitting manufacturers:
 - .1 Canadian Liquid Air.
 - .2 Ohmeda.
 - .3 Puritan-Bennet Corporation.
 - .4 Or equivalent product and manufacturer acceptable to the Consultant.
 - .5 Provide following gas specific, non-interchangeable mechanical flush wall mounting terminal outlets and fittings conforming to CAN/CSA Z9170.1.
 - .1 Oxygen (D.I.S.S.)
 - .2 Vacuum (D.I.S.S.) gas specific.
 - .6 Provide each gas outlet fitting with following:
 - .1 Face plates.
 - .2 Temporary protective covers.
 - .3 150 mm length of type K hard tempered copper pipe silver brazed to valve body.
 - .4 Standing pressure test caps.
 - .7 Provide medical gases terminated at 150 mm above the patient bed service wall units for connection as part of the work of Division 22. Coordinate positioning of piping terminations with the Section 09 21 16.
 - .8 Purge piping during brazing with oil free, dry nitrogen to remove and prevent re-entry of air or oxygen. Provide cap seals. Provide piping in accordance with CAN/CSA Z7396.01.

2.7 ACCESSORIES

- .1 Ground cables: Model No. FLC-3-1010 by Isolation Systems.
 - .1 Cable: 10 gauge copper type cable.
 - .2 Length: 10,000 mm.
 - .3 Jacketing: Green neoprene.
 - .4 Ground plugs: Model No. FLP-3PR to match Hampden type ground jack by Isolation Systems.

- .5 Ground clips: Heavy duty alligator clip.
- .6 Provide 1 cable for each ground jack plug e.g. two (2) cables for double ground receptacles.
- .2 Storage baskets: Manufacturer's standard "White" colour vinyl coated steel.
 - .1 Approximate dimensions: 325 mm high x 175 mm wide x 225 mm deep.
 - .2 Installation brackets:
 - .1 Extruded aluminum or stainless steel, slide-on type.
- .3 Monitor mounts (where indicated):
 - .1 Extruded aluminum or stainless steel type.
- .4 Vacuum bottle slides:
 - .1 100 mm, one piece extruded aluminum vacuum bottle slide devices with a stop located at the bottom.
 - .2 Slide device shall accept 47 mm wide x 3 mm thick vacuum bottle bracket.
 - .3 Vacuum bottle slides shall extend 350 mm from lower surface of the patient bed services wall for use on either side of the patient bed.
 - .4 Vacuum bottle slides shall swivel upward for storage.

2.8 FABRICATION

- .1 Fabricate, fit and assemble work in shop where possible. Where shop fabrication is not possible, make trial assembly in shop.
- .2 Fabricate the metalwork of this Section plumb, straight and true in accordance with NAAMM AMP 555.
- .3 Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1 mm, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- .4 Mill joints to a tight, hairline fit. Cope or miter corner joints.
- .5 Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items, unless otherwise indicated.
- .6 Quality of metalwork workmanship shall include but not limited to the following:
 - .1 Members shall be square and straight.
 - .2 Members shall be plumb and true.
 - .3 Joints shall be accurately and tightly fitted.
 - .4 Intersecting members shall be in true, flush planes.
- .7 Fabricate the access panels consisting of MDF cores faced with plastic laminate facing sheet and backup sheet producing balanced type construction in accordance with the requirements of NAAWS Quality Standards.

- .8 Perform factory electrical pre-wiring in accordance with CSA C22.1, CSA C22.2 No. 0 and CSA Z32.
- .9 Perform factory medical gas pre-piping in accordance with CAN Z7396.01.
- .10 Protect metal finishes with removable protective film.

2.9 FINISHES

- .1 Aluminum:
 - .1 Exposed aluminum surfaces shall have Architectural Class I clear anodized coating.
 - .2 Pre-treat aluminum with caustic tech treatment prior to applying integral, clear, anodic oxide coating.
 - .3 Apply clear, anodic oxide coating in accordance with AAMA 611, 0.7 mils minimum coating thickness and also conforms to Aluminum Finish Designation AA-M12C22A41, Architectural Class I.
 - .4 Protect clear anodized coating with removable protective film.
- .2 Stainless steel:
 - .1 Stainless steel exposed in the finished work of this Section shall have "NAAMM No. 4 Directional Satin Finish" complying with NAAMM/NOMMA 500, Section 503. Refinish exposed edges after fabrication.
 - .2 Grain direction shall be horizontal, unless indicated otherwise.
 - .3 Protect finish with removable protective film.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Coordinate work of this Section with work of other Sections and in accordance with the Contractor's construction schedule.
- .2 Ensure that Division 22 provides primary connections to the medical gas systems the access areas of the patient bed service walls.
- .3 Ensure that Division 26 provides rigid type electrical conduit and wiring to mounting bracket knockout plate. Division 26 shall make final connection of building services to a pre-wired junction box as indicated on Electrical Drawings.

- .4 Ensure that Division 26 provides one (1) rigid type electrical conduit and wiring for each circuit indicated between master and slave patient bed service walls.
- .5 Supply to other Sections necessary items to be built into their work.

3.3 INSTALLATION

- .1 Install patient bed service walls flush, level and plumb in strict accordance with manufacturer's written instructions, reviewed and accepted shop drawings, and as specified herein.
- .2 Install patient bed service walls mounting brackets, remove upper service panel of the patient bed service walls and attach the patient bed service walls to the mounting brackets(s) and install bottom mounting brackets.
- .3 Use manufacturer's recommended anchoring systems.
- .4 Fit flanges of patient bed service walls snug to wall surfaces. Seal gaps between return flanges and finish wall surfaces after accessories are installed with clear silicone sealant.
- .5 Provide accessories as indicated. Securely fasten accessories, level and plumb. Where fasteners are exposed, use tamper-proof fasteners finished to match items secured.
- .6 Remote alarm stations (RAS):
 - .1 Provide flush, wall mounted remote alarm stations in the locations indicated. Verify exact locations prior to roughing-in.

3.4 INSTALLATION TOLERANCES

- .1 Install patient bed service walls level and plumb to a tolerance of plus or minus 3.2 mm (1/8 inch).
- .2 Install patient bed service walls within 3.2 mm (1/8 inch) tolerance from indicated position.

3.5 FIELD QUALITY CONTROL

- .1 Testing Agency: Owner shall engage a qualified testing agency to perform tests and inspections.
- .2 Testing: RAS, RAP and medical gas systems installation are subject to testing and inspection for compliance with requirements. Testing and inspections shall include the following:
 - .1 After entire RAS and RAP systems have been installed at the Project Site, arrange and pay for an equipment manufacturer's factory trained technician to perform following tests, inspections and demonstrations:
 - .1 Ground leakage:
 - .1 Perform a program of ground leakage testing using an Isolation Systems 8460/1 leakage detector.
 - .2 Electrical systems:

- .1 Inspect and test electrical systems installation for proper installation in accordance with the Ontario Hydro Electric Safety Code requirements, CAN/CSA Z318.5 and NFPA 99.
- .2 Arrange and pay for CSA or Ontario Hydro inspection, testing and approvals required for site wired patient bed service wall unit and associated systems electrical work.
- .3 RAS system: Inspect and test RAS system installation for proper installation and operation.
- .4 Medical gas systems: Arrange for inspection and testing and submit written test results and certification of medical gas piping systems and outlets in accordance with CAN/CSA Z318.6 and NFPA 99.
- .3 Submit testing and inspection reports on RAS, RAP and medical gas systems installations.
- .4 Manufacturer's Field Service:
 - .1 Manufacturer's representative shall inspect the work of this Section at periodic intervals during installation including but not limited to minimum 20% completion and minimum 75% completion to verify compliance with the Contract Documents.
 - .2 Manufacturer's representative shall provide on-site training or direction of installers as required.
 - .3 Prepare inspection reports.

3.6 ADJUSTING AND CLEANING

- .1 Adjust patient bed service wall(s) components for easy, non-binding operation.
- .2 Remove and dispose of protective finishes and clean exposed surfaces.

3.7 DEMONSTRATION

- .1 Arrange and provide a demonstration of the RAS, RAP and medical gas systems after inspection and testing as a series of tests for the Owner's and Consultant's verification.
- .2 Demonstrate devices and systems after inspection and testing to Owner.
- .3 Schedule training with Owner with minimum seven (7) days advance notice.

3.8 CLEANUP

- .1 Remove excess debris, equipment and materials from the Project Site.

END OF SECTION

Part 1 General

1.1 SUMMARY

1.2 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Sheet wall protection **WP1, WP2, WP4.**
 - .2 Crash rail **CR-01.**
 - .3 Corner guards **CG1, CG2.**
 - .4 Door frame guard protection **CG3.**

1.3 ACTION SUBMITTALS

- .1 Product Data: Submit product data for each type of wall and door protection including installation instructions.
- .2 Shop Drawings:
 - .1 Show locations of each type of wall and door protection in plans.
 - .2 Indicate sizes including installation lengths.
 - .3 Show seam locations where products are joined.
 - .4 Include details showing termination of sheet wall protection at integral cover bases of sheet flooring.
 - .5 Include details of sheet wall protection terminating / meeting other materials.
- .3 Samples for Verification: Submit 300 mm (12 inch) long sample or 300 mm (12 inch) square sample of each type of wall and door protection in each finish/colour.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for wall and door protection. Include a list of products that may cause damage or be detrimental to the performance of the work of this Section and corresponding repair or correction methods in the operation and maintenance instructions.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications: Sheet wall protection installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project with a minimum of 3 years experience.
- .2 Mockups: Build mockups to set quality standards for materials and execution of wall sheet protection transition to coved sheet vinyl flooring integral wall bases to review

existing conditions.

- .1 If Consultant determines mockups do not comply with requirements, reconstruct mockups until mockups are accepted.
- .2 Acceptance of mockups does not constitute acceptance of deviations from the Contract Documents contained in mockups unless Consultant specifically approves such deviations in writing.
- .3 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in accordance with product manufacturers written instructions.
- .2 Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

- .1 Maintain temperature and humidity conditions in installation areas as recommended by the product including adhesive manufacturers before, during and after installation.
- .2 Acclimatize materials in installation areas for a minimum of twenty-four (24) hours preceding installation.
- .3 Ensure that adequate ventilation is provided during installation and curing of adhesive.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MANUFACTURERS

- .1 Corner Guard Manufacturer List: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 C/S Construction Specialties Company.
 - .2 InPro Corporation.
 - .3 Pawling Corporation.

2.3 SHEET WALL PROTECTION

- .1 High Impact Rigid Vinyl Sheeting **WP1:**
 - .1 Sheet Thickness: 1.52 mm (0.060").
 - .2 Accessory Trims: Use outside corners, inside corners, panel-to-panel vertical joint strips and wainscot trim top edges.
 - .3 Colours: Pearl #934.
 - .4 Basis of Design: Acrovyn Wall Covering by CS Construction Specialties.
 - .1 Outside Corners: 25N032.
 - .2 Inside Corners: 25N035.
 - .3 Panel-to-Panel Vertical Joint Strips: 25N033.
 - .4 Wainscot Trim Top Edge/Edge Strip: 25N036.
- .2 High Impact Rigid Vinyl Sheeting **WP2:**
 - .1 Sheet Thickness: 1.52 mm (0.060").
 - .2 Accessory Trims: Use outside corners, inside corners, panel-to-panel vertical joint strips and wainscot trim top edges.
 - .3 Colours: Pearl Grey #136.
 - .4 Basis of Design: Acrovyn Wall Covering by CS Construction Specialties.
 - .1 Outside Corners: 25N032.
 - .2 Inside Corners: 25N035.
 - .3 Panel-to-Panel Vertical Joint Strips: 25N033.
 - .4 Wainscot Trim Top Edge/Edge Strip: 25N036.
- .3 Vinyl Semi-Rigid PVC Sheeting **WP4:**
 - .1 Sheet Thickness: 2.5 mm (0.10").
 - .2 Accessory Trims: Use outside corners, inside corners, panel-to-panel vertical joint strips and wainscot trim top edges, base moldings, and sealant.
 - .3 Colour: Linen 41.
 - .4 Basis of Design: Whiterock by Altro.
 - .1 Outside Corners: Thermoform panel material.
 - .2 Inside Corners: Thermoform panel material.
 - .3 Panel-to-Panel Vertical Joint Strips: A831 2-Part Joint Strip.
 - .4 Wainscot Trim Top Edge/Edge Strip: A833 Strip.
 - .5 Transition to Vinyl Sheet Safety Flooring Cove Base: Use Overlap Method.
 - .6 Integrated Shower Shelf TA-10 accessory; Welded Installation:
 - .1 A900 Shower Recessed Shelf.
 - .2 Welding Rod: PVC Weldrod.
 - .7 Sealant: Sanitary Sealant.

2.4 CORNER GUARDS

- .1 Impact Resistant Corner Guard **CG1**:
 - .1 High impact rigid vinyl finish with aluminum retainer with colour matched end caps.
 - .2 75 mm (3") leg size with 6.4 mm (1/4") radius edges.
 - .3 Concealed attachment, no exposed fasteners.
 - .4 Corner guards shall be installed full height above finished wall base.
 - .5 Colours: Pearl 394.
 - .6 Basis of Design: SM-20AN by CS Construction Specialties.
- .2 Impact Resistant Corner Guard **CG2**:
 - .1 High impact rigid vinyl finish with aluminum retainer with colour matched end caps.
 - .2 75 mm (3") leg size with 6.4 mm (1/4") radius edges.
 - .3 Concealed attachment, no exposed fasteners.
 - .4 Corner guards shall be installed full height above finished wall base.
 - .5 Colours: Pearl Grey 136.
 - .6 Basis of Design: SM-20AN by CS Construction Specialties.

2.5 DOOR FRAME GUARD PROTECTION

- .1 High Impact Rigid Vinyl Sheeting **CG3**:
 - .1 Sheet Thickness: 1.02 mm (0.040 inch).
- .2 Dimensions: Refer to Section 08 71 00 Door Hardware and Door Hardware Schedule.
- .3 Include fire rated stamp on door frame protection installed over fire rated door frames.
- .4 Colours: Charcoal 162.
- .5 Basis of Design: Acrovyn Door Frame Protection B1-DFP by CS Construction Specialties.

2.6 ACCESSORIES

- .1 Adhesive: Type as recommended by product manufacturer suitable and compatible with materials and substrates and VOC content of 70 g/L or less and suitable for dry areas.
- .2 Fasteners: Non-magnetic stainless-steel, or other non-corrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- .3 Drilled masonry anchors: Conform to CID A-A-1922A, externally threaded stud with full-length expanding sleeve. Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
- .4 Sealant as specified in Section 08 71 00 Joint Sealant.

2.7 FABRICATION

- .1 Factory assembly components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- .2 Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.8 FINISHES

- .1 Noticeable variations in same piece shall not be acceptable. Variations in appearance of adjoining components shall be acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Clean substrates to remove dirt, debris and deleterious matter that may affect or inhibit adhesive bond prior to installation of corner guards.
- .2 Ensure substrate surface to receive sheet wall protection is straight to tolerance of ± 3 mm (1/8") in 3,048 mm (10').
- .3 Test painted surfaces for adhesion where adhesives are used for installation of products in accordance with product manufacturer's written requirements.

3.3 INSTALLATION, GENERAL

- .1 Install products in accordance with product manufacturer's written requirements.
- .2 Install products on solid backing.
- .3 Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- .4 Mounting heights: Install products in locations and at mounting heights indicated on Drawings. If not indicated on Drawings, install at heights as directed on site by the Consultant.
- .5 Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.

- .6 Provide anchoring devices and suitable locations to withstand imposed loads.
- .7 Where splices occur in horizontal runs of more than 6,100 mm (20'), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 305 mm (12") apart.

3.4 HIGH IMPACT RIGID VINYL SHEET WALL PROTECTION INSTALLATION

- .1 Prime substrates where required by sheet wall protection manufacturers written instructions using primers compatible with materials.
- .2 Use largest sheet sizes available and practical to minimize joints.

3.5 CORNER GUARDS INSTALLATION

- .1 Adhere standard corner guards with continuous adhesive beads in accordance with product manufacturer's written instructions.
- .2 Install corner guards tightly fitted to wall substrate without gaps.
- .3 Visible fasteners are not permitted.
- .4 Visible fasteners shall be equally spaced along length of corner guard.

3.6 INSTALLATION TOLERANCES

- .1 Install products level and plumb to a tolerance of ± 3 mm (1/8") in 3,048 mm (10') non-accumulative.

3.7 CLEANING

- .1 Upon completion of the work of this Section or when directed by the Consultant, remove protective coverings.
- .2 Clean products and materials and remove excess adhesive with cleaning agents and using methods as recommended by product manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Toilet and bath accessories.

1.2 ACTION SUBMITTALS

- .1 Product Data:
 - .1 For each type of product indicated include the following:
 - .1 Construction details and dimensions.
 - .2 Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - .3 Material and finish descriptions.
 - .4 Features that will be included for Project.
 - .5 Manufacturer's warranty.
 - .2 Shop Drawings:
 - .1 Show dimensioned locations of accessories in plan and elevations.
 - .2 Include installation instructions including anchorage and securement systems.
 - .3 Delegated Design Submittal: For grab bars.
 - .1 Include structural design calculations indicating compliance with specified structural-performance requirements.

1.3 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: Submit maintenance instructions for any cleaning or use practices or materials which may damage accessories and technical data sheets of each accessory service and parts manual, name of local representative for field service or consultation.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in accordance with accessory product manufacturers written instructions.

1.5 FIELD CONDITIONS

- .1 Maintain temperature and humidity conditions in installation areas as recommended by the accessory product manufacturers before, during and after installation.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

- .1 Delegated Design for Structural Performance: Engineer structural steel wall reinforcement, accessories, and fasteners to comply with the following requirements:
 - .1 Grab Bars: Installed units are able to resist 1.3 kN concentrated load applied in any direction and at any point when tested according to ASTM F446.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 MATERIALS

- .1 Stainless Steel: ASTM A666, Type 304, 0.8 mm (0.031") minimum nominal thickness unless otherwise indicated.
- .2 Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.9-mm (0.036") minimum nominal thickness.
- .3 Galvanized-Steel Sheet: ASTM A653/A653M, with G60 (Z180) hot-dip zinc coating.
- .4 Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- .5 Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- .6 ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.4 WASHROOM AND SHOWER ACCESSORIES

- .1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - .1 American Specialties, Inc. (ASI)
 - .2 Bobrick Washroom Equipment, Inc.
 - .3 Bradley Corporation.
 - .4 Georgia Pacific.
 - .5 Gojo.
 - .6 Splash Lab.
 - .7 Tork.

- .2 Automatic Paper Towel Roll Dispenser **PTD**
 - .1 Basis-of-Design Product: Georgia Pacific Sofpull 9" Automatic Touchless Paper Towel Dispenser 58470.
 - .2 Description: Lever-actuated mechanism permits controlled delivery of paper rolls in preset lengths per stroke.
 - .3 Mounting: Surface mounted.
 - .4 Minimum Capacity: 229 mm (9") wide, 121 m (400') long roll.
 - .5 Material and Finish: Plastics, white.
 - .6 Electrical: D-cell battery powered.
 - .7 Lockable.
- .3 Foam Soap Dispenser **SD-1**
 - .1 Basis-of-Design Product: Gojo LTX-12 Touch-Free Dispenser 1984-04.
 - .2 Description: Designed for dispensing soap in foam form.
 - .3 Mounting: Vertically oriented, surface mounted.
 - .4 Refill Indicator: Window type
 - .5 Material and Finish: Plastics, white.
 - .6 Electrical: D-cell battery powered.
 - .7 Lockable.
- .4 Foam Soap Dispenser **SD-2**
 - .1 Basis-of-Design Product: Gojo LTX-12 Touch-Free Dispenser 1984-04 with Shield Floor and Wall Protector 1045-WHT-12.
 - .2 Description: Designed for dispensing soap in foam form.
 - .3 Mounting: Vertically oriented, surface mounted.
 - .4 Refill Indicator: Window type
 - .5 Material and Finish: Plastics, white.
 - .6 Electrical: D-cell battery powered.
 - .7 Lockable.
- .5 Toilet Tissue Dispenser - Surface Mounted **TPH**
 - .1 Basis-of-Design Product: Georgia Pacific Sofpull 2-Roll Mini Toilet Paper Dispenser White 56518.
 - .2 Description: Two-roll unit with single sheet dispensing from centre of the roll.
 - .3 Mounting: Surface mounted.
 - .4 Capacity: Two (2) 149 mm (5-7/8") roll diameter, 133 mm (5-1/4") roll width, minimum 106 (350') long roll.
 - .5 Material and Finish: Plastics, white.
 - .6 Lockable.
- .6 Grab Bar - Horizontal Straight Line **GB-1**

- .1 Basis-of-Design Product: Bradley Model 832 Straight Grab Bar.
- .2 Mounting: Flanges with concealed fasteners.
- .3 Material and Finish: Stainless steel, 1.3 mm (0.05") 18 gauge thick.
- .4 Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
- .5 Outside Diameter: 32 mm (1-1/4").
- .6 Lengths: 600 mm (24").
- .7 **Grab Bar - L-Shape GB-2**
 - .1 Basis-of-Design Product: Bradley Model 832 L-Shape Grab Bar.
 - .2 Mounting: Flanges with concealed fasteners.
 - .3 Material: Stainless steel, 1.3 mm (0.05") 18 gauge thick.
 - .4 Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 - .5 Outside Diameter: 32 mm (1-1/4").
 - .6 Width and height: 750 x 750 mm (30" x 30")
- .8 **Clothes Hook CHX1**
 - .1 Basis-of-Design Product: Bradley Model 9114.
 - .2 Description: Single-prong unit.
 - .3 Material and Finish: Stainless steel, No. 4 finish (satin).
 - .4 Mounting: Concealed wall plate.
- .9 **Utility Shelf - 5 Inch SS**
 - .1 Basis-of-Design Product: Bradley Model 755-12 Stainless Steel Shelf.
 - .2 Description: Exposed edges turned down not less than 10 mm (3/8") and supported by minimum of two (2) triangular brackets welded to shelf underside.
 - .3 Material and Finish: Not less than nominal 1.3 mm (0.05") 18 gauge stainless steel, No. 4 finish (satin).
 - .4 Mounting: Surface mounted.
 - .5 Shelf Dimension: 127 x 305 mm (5" x 12")

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work.
- .2 Ensure that rough-in dimensions, blocking or back-up meets product manufacturer's minimum requirements or installation of such shall not affect installation of accessories.
- .3 Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work

until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

- .1 Install products in accordance with product manufacturer's written installation instructions.
- .2 Provide adequate anchorage to ensure a rigid installation. Securely fasten components. Where fasteners are exposed, use tamper-proof fasteners finished to match items secured.
- .3 Provide and secure accessories rigidly in place.
 - .1 Provide steel back-plate to stud walls prior to plaster board or gypsum board installation. Provide plate with threaded studs or plugs.
 - .2 Use toggle bolts drilled into cell/wall cavity for hollow masonry units or existing gypsum board or plaster board.
 - .3 Solid masonry, marble, stone or concrete:
 - .4 Use bolt with lead expansion sleeve set into drilled hole for solid masonry, stone, or concrete.
 - .5 Use male/female through bolts for installation at manufactured toilet partitions.
- .4 Provide grab bars on built-in anchors, support or carrier recommended by bar manufacturer.
- .5 Fit flanges of accessories snug to wall surfaces. Caulk gaps between return flanges and finish wall surfaces after accessories are installed with clear silicone sealant.
- .6 Fill units with necessary supplies shortly before Substantial Performance of the Work.

3.3 INSTALLATION TOLERANCES

- .1 Install accessories level and plumb to a tolerance of plus or minus 3.2 mm (1/8 inch).
- .2 Install accessories 3.2 mm (1/8 inch) tolerance from indicated position.

3.4 ADJUSTING

- .1 Test mechanisms, hinges, locks and latches and where necessary adjust and lubricate and ensure that accessories are working as product manufacturer intended them to work.

3.5 CLEANING

- .1 Clean and polish mirrors, aluminum and stainless-steel surfaces.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the requirements of this Section in accordance with requirements of the Contract Documents
- .2 Section Includes:
 - .1 Patient Lift Systems.

1.2 COORDINATION

- .1 Coordinate anchorage installation for aluminum frames. Furnish setting drawings, templates, and directions for installing anchorages, including anchor bolts and items with integral anchors that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- .1 Product Data: Manufacturer's data sheets on each product to be used, including:
 - .1 Source quality certificates.
 - .2 Certificate of Compliance: ISO 10535.
 - .3 Pre-Installation Manual: Preparation instructions and recommendations.
 - .4 Installation Manual: Storage and handling requirements and recommendations.
 - .5 Installation Manual: Installation methods.
 - .6 Service Manual: Maintenance and operations data.
- .2 Shop Drawings:
 - .1 Include system components, utility requirements and connections, relationship with adjacent construction. Include required clearances and access for servicing.
 - .2 Indicate general arrangement of lift equipment.
 - .3 Electrical requirements.
 - .4 Space requirements.
 - .5 Finishes of components.
 - .6 Provide installation template for work performed by others.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: For patient lift systems to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each type of patient lift systems indicated from a single manufacturer.

- .2 Manufacturer Qualifications:
 - .1 Company specializing in manufacturing the products specified in this section with minimum ten (10) years documented experience.
- .3 Installer's Qualifications:
 - .1 Subcontractor with minimum ten (1) years continuous experience in installation of patient lift systems of similar scope and extent to that indicated for this Project and whose work has a record of successful completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation
- .2 Comply with manufacturer's recommendations for storage. Handle materials to avoid damage

1.7 FIELD CONDITIONS

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not store or install products under environmental conditions outside manufacturer's recommended limits

Part 2 PRODUCTS

2.1 DESIGN AND PERFORMANCE REQUIREMENTS

- .1 Products shall meet requirements of AHJ. As a minimum, patient lift systems shall comply with the following:
 - .1 UL 60601-1
 - .2 CAN/CSA C22.2
 - .3 ISO 9999
- .6 Flammability of finishes: conforming to requirements of authorities having jurisdiction. Provide plastic finishes complying with UL 94.

2.2 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.3 SYSTEM DESCRIPTION

- .1 Provide patient lift systems conforming to ISO 10535 and/or CAN/CSA Z10535 and complying with performance requirements specified.
- .2 Design patient lift systems to provide full room coverage (X-Y axis) as indicated on Drawings.
- .3 Provide patient lift systems designed to provide continuous charging along the straight portions of the rails. Charging occurs constantly while the lift is idle anywhere in the X-Y track system.
- .4 Lifting Requirements: Provide patient lift components and operators capable of operating for not less than twenty-thousands (20,000) lifts.
- .5 Manufacture lift case from impact-resistant and fire-retardant plastic material, designed such that it is removable anywhere along the rail and accessible for maintenance on both sides.
- .6 Patient lift systems shall be designed to withstand anticipated live and dead loads determined for this Project without exceeding deflection criteria specified in ISO 10535 and/or CAN/CSA Z10535.

2.4 MATERIALS

- .1 Aluminum: ASTM B221 (B221M), Alloy 6063-T6.
- .2 Steel Plates, Shapes, and Bars: ASTM A36/A36M.

2.5 PATIENT LIFT SYSTEMS

- .1 Ceiling Rail:
 - .1 Manufacturer's standard high strength extruded aluminum rails. Provide anchor supports as recommended by manufacturer to support loads indicated.
 - .2 Straight-tracks shall extend the entire width of the room while traverse-tracks (H-Tracks) shall provide entire room coverage
 - .3 Track support system shall be designed to withstand forces and weight up to 454 kg (1,000 lbs). All lift tracks in the facility shall be capable of supporting 454 kg to allow for future flexibility.
- .2 Lift Unit: Provide lift systems with the following characteristics:
 - .1 Lifting capacity (safe working load): 283kg (625 lbs).
 - .2 Operation: Hand control.
 - .3 Safety Functions:
 - .1 Mechanical and electrical emergency stop
 - .2 Emergency lowering device
 - .3 Control of lifting strap
 - .4 Safety device that stops the motor to lift when batteries are low.
 - .5 Cut-off angle: 45° along rail, 10° across rail

- .4 Automatic on and off feature with electronic soft-start and soft-stop motor control.
- .5 Overload Protection: Provide current limiter for circuit protection in case of overload.
- .6 Strap: Minimum length to 2134 mm.
- .7 Cover: UL 94 fire-retardant plastic complete with access panels for service and maintenance on both sides.
- .8 Basis of Design Product: C-625 Ceiling Lift by Waverley Glen
- .3 Bariatric Lift Unit: Provide lift systems with the following characteristics:
 - .1 Lifting capacity (safe working load): 454 kg (1000 lbs).
 - .2 Operation: Hand control.
 - .3 Safety Functions:
 - .1 Mechanical and electrical emergency stop
 - .2 Emergency lowering device
 - .3 Control of lifting strap
 - .4 Safety device that stops the motor to lift when batteries are low.
 - .5 Cut-off angle: 45° along rail, 10° across rail
 - .4 Automatic on and off feature with electronic soft-start and soft-stop motor control.
 - .5 Overload Protection: Provide current limiter for circuit protection in case of overload.
 - .6 Strap: Minimum length to 2134 mm.
 - .7 Cover: UL 94 fire-retardant plastic complete with access panels for service and maintenance on both sides.
 - .8 Basis of Design Product: C-1000 Bariatric Lift by Waverley Glen
- .4 Electrical:
 - .1 Operator: CAN/CSA C22.2 compliant operator assembly of size and capacity recommended and provided by manufacturer for patient lift system specified, with electric motor and factory-prewired controls and accessories required for proper operation.
 - .1 Power supply: 24 VDC
 - .2 Supply voltage transformer: 100-240 V AC
 - .3 Protection Classification: Conforming to ANSI/IEC 60529 – IP20
 - .2 Battery: Rechargeable 12 VDC, 5Ah battery. Provide two (2) batteries housed in a single enclosure.
 - .1 Maximum charging time: 2 hours per battery
 - .2 Provide system capable of carrying minimum of fifty-five (55) lifts while loaded at 84 kg (185 lbs) for a vertical distance of 1016 mm prior to exhaustion
 - .3 Protection features: Design lift system with orange "low battery" voltage indicator when voltage falls below 22V. Design lift system to stop in the event battery voltage falls below 20V.

- .3 Hand control: Provide hand control designed to operate unit and connected directly to lift motor through a standard relief.
 - .1 Protection Classification: Conforming to ANSI/IEC 60529 – IP44
- .4 Continuous Charging: Integrated in rail design to provide continuous charging to the lift, throughout the track system. Low voltage AC current transmitted along straight portions of rail, so that the lift can charge in all locations.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- .2 Verify that wall thickness does not exceed standard tolerances allowed by throat size of indicated aluminum frame.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Install per manufacturer's written instructions and in proper relationship with adjacent construction.
 - .1 Installers shall be certified by the equipment manufacturer and follow all manufacturer's instructions.
 - .2 Provide temporary hoisting facilities as required for the placement and installation of equipment.
 - .3 Anchor equipment securely, at locations indicated using approved expansion anchors, steel bolts, steel strut members, steel screws or other structural elements per manufacturer's instructions, construction drawings or design documents. Friction connections, threaded inserts, plastic elements or wood elements are not acceptable as part of the substructure.
 - .4 Installation construction per manufacturer's instructions, construction documents, design drawings and regulations per local, state and federal laws and jurisdiction.
- .2 Testing: Test per manufacturer's written instructions. All overhead patient lift systems must be load tested with weights at or above the minimum rated bearing capacity of the systems. Repair or replace equipment which does not perform in accordance with manufacturer's requirements. Test concrete expansion anchors per manufacturer's instructions. Submit log of test records to the Owner

3.3 CLEANING AND PROTECTION

- .1 Protect from damage during construction operations. Promptly repair any damaged surfaces. Remove and replace work which cannot be satisfactorily repaired.
- .2 Clean products, prior to Substantial Completion, using materials recommended by the manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Manually operated sun shade roller window shades **RB-01**.

1.2 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for each type of roller shade product.
 - .2 Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
 - .3 Highlight applicable model number and options proposed.
- .2 Shop Drawings:
 - .1 Show installation details for roller shades including shade bottom bar materials, orientation of shade cloth to rollers, operation requirements and installation instructions.
 - .2 Identify attachment details to supporting structure.
 - .3 For blackout shades indicate method of venting of air space between shades and exterior window glass.
- .3 Coordination drawings:
 - .1 Coordination drawings shall consist of reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - .2 Ceiling suspension system members and attachment to building structure.
 - .3 Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical panel ceilings and gypsum board ceilings with adjoining construction.
 - .4 Roller fabric shade mounting assemblies and attachment.
 - .5 Sizes and locations of access to roller fabric shade operator, and adjustable components.
- .4 Samples for Initial Section:
 - .1 Submit samples minimum 75 mm (3-inches) square of sun shade cloth.
- .5 Samples for Verification:
 - .1 Submit samples minimum 75 mm (3-inches) square of sun shade cloth.

- .2 Submit sample of metal finish.

1.3 INFORMATIONAL SUBMITTALS

- .1 Product Test Reports: Submit fire resistance rating test listings for shade cloth.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data:
 - .1 Submit maintenance instructions which include specific warnings of any maintenance practice or materials which may damage or disfigure the roll down motorized shades.
 - .2 Include operating instructions.

1.5 QUALITY ASSURANCE

- .1 Source Limitations: Obtain roller shades through one source from a single manufacturer.
- .2 Manufacturer Qualification: Company specializing in manufacturing Products specified in this section with minimum ten (10) years documented experience.
- .3 Installer Qualifications: Installers shall be trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this Section. Employ only qualified installers with proven experience in this type of work
- .4 Mock-ups:
 - .1 Install one full size mockup of each type manual operated roller shade where indicated, where manual operated roller shades are indicated in selected areas where indicated for the Contractor's, Consultant's and product manufacturer's technical representatives review of installation and quality of workmanship.
 - .2 Mockups shall be a complete full size manual operated roller shade units. Coordinate the work required for mockups with all work of other Sections.
 - .3 Make all adjustments as directed by the Consultant.
 - .4 Do not proceed with the work of this Section until mockups have been reviewed and accepted by the Consultant.
 - .5 Reviewed and accepted mockups shall be retained and shall serve as minimum acceptable standard for the work of this Section.
 - .6 Mockups shall be incorporated into the finished work of this Section if so accepted by Consultant.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Before delivery to the place of the Work, check each shade for operation; remove finger marks and smudges.
- .2 Tightly wrap products in polyethylene or other protective covering and leave in open position until directed.

- .3 Package products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

1.7 FIELD CONDITIONS

- .1 Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- .2 Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on shop drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Consultant of discrepancies.

1.8 WARRANTY

- .1 Submit a written warranty for the roller fabric shade hardware, chain and shade cloth work of this Section for five (5) years from the date of Substantial Performance of the Work, issued in the name of the Owner and signed by this Subcontractor.
- .2 Submit a written warranty for the roller fabric shade installation work of this Section for two (2) years from the date of Substantial Performance of the Work, issued in the name of the Owner and signed by this Subcontractor.
- .3 Warranty shall be in a form acceptable to both the Owner and the Consultant.
- .4 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to deformation of members, mechanical failure, and failure of system to operate as designed or faulty or poor quality of work.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MANUFACTURERS

- .1 Roller window shade manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
 - .1 Elite Pro Shading Systems

- .2 Legrand Solarfective Products Ltd.
 - .3 Light Harvesting Shading Solutions
 - .4 MechoShade Systems.
 - .5 Sunglow Window Covering Products.
- .2 Basis of Design: V80 by Elite Pro Shading Systems.

2.3 MANUALLY OPERATED ROLLER SHADES

- .1 Manual Operation:
- .1 Easy-lift action, chainless operated, with infinite positioning. Banding as applicable to suit place of the Works condition.
 - .2 Drive assembly:
 - .1 Allows fingertip control. Shade shall allow user to pull down or roll up with hem bar.
 - .2 Allows shades to be pulled down with hem-bar without damage to drive mechanism.
 - .3 Auto stop mechanism shall stop the shade when rolling up.
 - .4 Factory set for the size and travel of the shades.
 - .5 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.
 - .2 Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service
 - .1 Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 - .3 Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
 - .4 Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
 - .5 Installation Accessories:
 - .1 Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - .1 Shape: L-shaped.
 - .2 Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 88 mm (3.5").
 - .2 Endcap Covers: To cover exposed endcaps.
 - .3 Bottom Bar:

- .1 Extruded aluminum with matching end caps.
- .2 Exposed with endcaps and integral light seal where bottom (sill) channels are indicated.
- .6 Installation Accessories Color and Finish: White

2.4 SHADE CLOTH

- .1 Flammability of Shade Cloth: Certified by an independent laboratory to pass CAN/ULC-S109 Small-Scale Vertical Burn or Large Scale test or to Consultant's discretion the NFPA 701 Small Scale Test.
- .2 Sun Shade Cloth:
 - .1 Woven fabric, stain and fade resistant.
 - .2 Type: 100% thermoplastic olefin.
 - .3 Bacteria and Fungal Resistance to ASTM E 2180 and ASTM G21.
 - .4 Shade cloth shall be certified to Greenguard Gold.
 - .5 Weave: Basketweave.
 - .6 Thickness: 0.76 mm (0.03").
 - .7 Weight: 434 g/sq. m (12.82 oz./sq. yd).
 - .8 Openness Factor: 5%.
 - .9 Color: As selected by Consultant from manufacturer's full range.

2.5 FABRICATION

- .1 Provide fully factory assembled roller window shades.
- .2 Each roller window shade unit shall consist of two end brackets, shade roller tube, extruded aluminum front, side, or interior installations, hembar and shade fabric.
- .3 Fabricate shadebands without battens or seams.
- .4 The top of the fabric is retained in recessed spline of the shade roller and the bottom of the fabric is retained by the hem bar.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of this Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

- .1 Install roller window shades in accordance with roller window shade manufacturer's written instructions.
- .2 Ensure shade cloth hangs flat, without buckling or distortion.

3.3 INSTALLATION TOLERANCES

- .1 Roller window shades shall be installed to the following maximum tolerances:
 - .1 Plumb and Level: 3 mm (1/8 inch)
 - .2 Fabric shall hang flat, without buckling or distortion. Cut fabric edges, shall hang true and straight, without shifting sideways more than 3 mm (1/8 inch) due to warp distortion or weave design.

3.4 ADJUSTING

- .1 Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- .2 Refinished damaged metal finishes that have been scratched or otherwise marred so that no variation in surface appearance is discernable.

3.5 CLEANING

- .1 Clean roller-shade surfaces after installation, according to product manufacturer's written instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes:
 - .1 Stainless steel countertops **MTL-01**.

1.2 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for sink tables not covered in Shop Drawings or for manufactured off the shelf products.
 - .2 Submit product data sheets for plumbing fixtures.
- .2 Shop Drawings:
 - .1 Include plans, sections, details, and attachments to supports and other work. Detail fabrication and installation, including location of field joints.
 - .2 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, electrical switches and outlets, and other items installed in metal countertops.

1.3 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for fabricator.
- .2 Product Certificates: Submit product certificates for sound deadening material.

1.4 QUALITY ASSURANCE

- .1 Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver metal countertops only after casework has been completed in installation areas.
- .2 Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MATERIALS

- .1 Stainless Steel Materials **MTL-01**:
 - .1 Conforming to ASTM A167-99, ASTM A269/A269M, and ASTM A240/A240M.
 - .2 Material and Finish: Type 304 stainless steel, #4 brushed satin finish.
 - .3 Provide highest architectural quality in various forms, straight and true.
 - .4 Ensure there are no scratches, scars, creases, buckles, ripples or chatter marks. Provide finish surfaces suitable for polishing where required.
 - .5 Ensure finished surfaces exposed to view are free of pitting, seam marks, roller marks, oil-canning, stains, discolourations or other imperfections.
- .2 Stainless Steel Welding Materials: ANSI/AWS D1.6/D1.6M.
- .3 Fasteners: Type 304 stainless steel.
- .4 Sound Deadening Material: Non-absorbent, hard drying, sound deadening compound for permanent adhesion to metal that does not chip, flake, or blister.

2.3 FABRICATIONS

- .1 Verify actual dimensions of construction to receive metal countertops by field measurements before fabrication.
- .2 Refer to Drawings for overall depth and length of casework and countertops.
- .3 Fabrications shall be free of scratches, pitting, seam roller marks, stains, roughness, marring, discolouration, and other imperfections with the quality of workmanship conforming to the workmanship classifications of Class 1 as defined in NAAMM AMP 555, paragraph 8.3 of Section 8, Quality Control or Assurance and as follows:
 - .1 Exposed surfaces are finished smooth with pits, mill marks, nicks and scratches filled or ground off. Defects shall not show when painted or polished. Remove sharp corners and edges.
 - .2 Distortions shall not be visible.
 - .3 Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
 - .4 Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the work.
 - .5 Cut, drill, and punch metals cleanly. Remove burrs and ease edges to a radius of approximately 1 mm (0.040"). Remove sharp or rough areas on exposed

surfaces.

- .4 Shop Assembly: Preassemble metal countertops in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- .5 Fabricate from 1.6 mm (0.062 inch) thick, stainless-steel sheet. Provide smooth, clean exposed tops and edges in uniform plane, free of defects.
- .6 Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness specified for stretcher-leveled sheet metal and sufficient strength for indicated use.
 - .1 Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
- .7 Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.
- .8 Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install formed-metal fabrications.
- .9 Fabricate countertops and backsplashes and side splashes with top surface of joints flush.
- .10 Where welding is required, shop weld joints and seams continuously. Grind, fill, and dress to produce smooth, flush, exposed surfaces in which joints are not visible after finishing is completed.
 - .1 Use welding procedures that will blend with and not cause discoloration of metal being joined.
 - .2 Weld shop-made joints, and grind and polish surfaces to produce uniform, directionally textured finish, free of cross scratches. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - .3 Where field-made joints are required, provide hairline butt-joints mechanically bolted through continuous channels welded to underside at edges of joined ends. Keep field jointing to a minimum.
- .11 Sound deaden the undersurface with heavy-build mastic coating.
- .12 Fabricate countertops to overhang fronts and ends of cabinets except where countertop butts against cabinet or wall. Dimension of overhang shall be as indicated on drawings.
- .13 Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- .14 Fabricate stainless steel countertops with stainless steel sheet bonded to moisture resistant MDF with contact adhesive. Seal underside of core with waterproof sealing coat. Buildup out edges of countertops with solid wood strips to a thickness of 32 mm.
- .15 When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

- .16 Grain direction shall be horizontal, unless indicated otherwise.
- .17 Protect finish with removable protective film.

2.4 FABRICATION, COUNTERTOPS WITH INTEGRAL SINKS

- .1 Fabricate from 1.587 mm (0.0625 inch) thick (16 gauge), stainless-steel sheet. Provide smooth, clean exposed tops and edges in uniform plane, free of defects.
- .2 Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness specified for stretcher-leveled sheet metal and sufficient strength for indicated use.
 - .1 Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
 - .2 Marine grade plywood support is not acceptable.
- .3 Fabricate countertops and backsplashes and side splashes with top surface of joints flush.
- .4 Countertop shall include a sloped surface formed into the stainless-steel top and sloped to the sink basin to act as a drainboard.
- .5 Round exposed corners with minimum 6.4 mm (1/4 inch) to maximum 19 mm (3/4-inch) diameter, sharp corners at exposed edges are not acceptable.
- .6 Sinks:
 - .1 Sinks shall be fabricated integral with countertop surface.
 - .2 Locate sinks as close to the backsplash as possible.
 - .3 Sink size shall be approximately 28 inches (711 mm) square and minimum 10 inches (254 mm) deep but no deeper than 12 inches (304 mm).
 - .4 Sinks shall have 5/8-inch (16 mm) radius corners and basket-type waste drains.
- .7 Provide minimum 6 inch (152 mm) high backsplash and side splash integral with countertop and minimum 1.25 inch (25.4 mm) 45-degree angle return to wall complete with seamless sanitary cove or radius. Backsplash height shall be high enough to install a faucet mounted to the backsplash.
- .8 Provide approximately 1.5 inch (32 mm) high box marine countertop edge.
- .9 Provide holes in countertop and sink basin surface to coordinate with specified plumbing products.
- .10 Sound deaden the undersurface with sound deadening material.
- .11 Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of metal countertops.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Field Cutting: Do not cut or trim metal countertops in field. If metal countertops or splashes require dimensional adjustments, return to fabrication shop for adjustment.
- .2 Secure tops to cabinets with concealed fasteners.
- .3 Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.
- .4 Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant in accordance with Section 07 92 00 "Joint Sealants".

3.3 INSTALLATION TOLERANCES

- .1 Install metal countertops level, plumb, and true; shim as required, using concealed shims.
- .2 Install to a tolerance of 3 mm (1/8 inch) in 2440 mm (96 inches) with no variations in flushness of adjoining surfaces.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide the work of this Section in accordance with requirements of the Contract Documents.
- .2 Section Includes: Solid surface countertops.

1.2 ACTION SUBMITTALS

- .1 Product Data:
 - .1 Submit product data for solid surface, wood glues, adhesives, and waterproof sealing.
 - .2 Include sample warranty form for solid surface countertops, fabrication and installation instructions, and maintenance instructions.
- .2 Shop Drawings:
 - .1 Include plans, sections, details, and attachments to supports and other work. Detail fabrication, thermoforming, and installation, including location of field joints.
 - .2 Show locations and sizes of furring, blocking, and reinforcement.
 - .3 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, electrical switches and outlets, and other items installed in solid surface countertops.
- .3 Samples for Verification: For solid surface countertop, minimum 6 inch (150 mm) square.

1.3 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: Submit qualification data for fabricator prepared by the solid surfacing manufacturer.

1.4 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: For solid surface countertops to include in maintenance manuals. Include product data for simulated stone-care products used or recommended by fabricator and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- .1 Fabricator:
 - .1 Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - .2 Fabricator shall be solid surface manufacturer's certified fabricator.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver solid surface countertops only after casework has been completed in installation areas.
- .2 Keep finished surfaces covered with other protective covering during handling and installation.

Part 2 Products

2.1 SUBSTITUTION LIMITATIONS

- .1 Products specified establish performance and quality required and are not intended to restrict submission by other manufacturers.
- .2 Approved substitutions for specified Products and listed manufacturers shall be considered in accordance with requirements of Section 01 60 00 "Product Requirements".
- .3 Submittals which do not include adequate data for the product evaluation shall not be considered.

2.2 MANUFACTURERS

- .1 Solid Surface Manufacturers/Products List: The following manufacturers are acceptable subject to conformance to requirements of Contract Documents and subject to submitting a product substitution to Consultant for approval.
 - .1 Avonite Surfaces.
 - .2 Corian by DuPont.
 - .3 Formica Corporation.
 - .4 Wilsonart.
- .2 Basis of Design: Corian by DuPont

2.3 MATERIALS

- .1 Solid Surface Materials **SSM-01**:
 - .1 Homogeneous composite of resin and filler material formed into panels meeting minimum properties in accordance with NAAWS. Provide eased edges.
 - .2 Solid surface polymer composite materials shall have excellent resistance to hand sanitizer/disinfectant when applied to the surface of the material. No damage shall occur to the material including cracking, swelling, staining, delaminating, and other deterioration.
 - .3 Thickness: Minimum 12 mm (1/2 inch) unless otherwise indicated on Drawings.
 - .4 Colour: Glacier White by Corian.
- .2 Plywood: Marine grade plywood, 3/4 inch (19 mm) thick to CSA O121, sanded both sides.

- .3 Adhesives:
 - .1 Shall be used for intended purpose and manufacturer materials applications and installation, applied in accordance with manufacturer's written requirements and shall comply with the "adhesive usage guidelines" recommendations of North American Architectural Woodwork Standards 4.0.
 - .2 Solid surface manufacturer's standard joint adhesive shall be used to create inconspicuous joints without voids.
- .4 Sealant for Countertops: Mildew resistant joint sealant. Refer to Section 07 92 00 "Joint Sealants".

2.4 FABRICATIONS

- .1 Verify actual dimensions of construction to receive solid surface countertops by field measurements before fabrication.
- .2 Fabricate solid surface countertops to Premium Grade in accordance with North American Architectural Woodwork Standards (NAAWS) 4.0.
- .3 Solid surface countertops to be fabricated from minimum 13 mm thickness unless otherwise indicated.
- .4 Shop Assembly: Preassemble solid surface countertops in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- .5 Minimize number of joints in installation.
- .6 Fabricate countertops and backsplashes and side splashes with top surface of joints flush.
- .7 Fabricate countertops to overhang fronts and ends of cabinets except where countertop butts against cabinet or wall. Dimension of overhang shall be as indicated on drawings.
- .8 Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- .9 Fabricate solid surface countertops with solid surface bonded to plywood with adhesive. Seal underside of core with waterproof sealing coat.
- .10 Provide framing and blocking to support solid surfacing within tolerance of 1.6 mm in 3000 mm and in accordance with product manufacturer's instructions.
- .11 Cutouts:
 - .1 Templates for cutouts required for installation of items installed on or through solid surfacing shall be prepared by those requiring the cutouts and given to the solid surfacing fabricator.
 - .2 Cutouts shall have a minimum inside corner radius of 10 mm.
 - .3 Where the remaining material outside a cutout is less than 76 mm wide, reinforce the area by laminating a strip of solid surfacing to it.

- .12 Allow for 1.5 mm in 1,500 mm expansion.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of solid surface countertops.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Install solid surface countertops to Premium Grade in accordance with North American Architectural Woodwork Standards (NAAWS) 4.0.
- .2 Secure tops to cabinets with concealed fasteners.
- .3 Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.
- .4 Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant in accordance with Section 07 92 00 "Joint Sealants".

3.3 INSTALLATION TOLERANCES

- .1 Install solid surface countertops level, plumb, and true; shim as required, using concealed shims.
- .2 Install to a tolerance of 3 mm (1/8 inch) in 2440 mm (96 inches) with no variations in flushness of adjoining surfaces.

END OF SECTION