

PROJECT MANUAL – VOLUME 1

Architectural Specifications

Issued for Tender

Satellite Imaging Renovation
3050 Lawrence Avenue East, Toronto Ontario

Stantec Architecture
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Toronto, Ontario, Canada
M5V 1E7

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Project No. 140023034

April 7, 2025

Document Responsibility and Project Directory

1.1 Document Responsibility

- .1 Refer to Project Manual, Section 00 01 10 - Table of Contents, for indication of document responsibility (DR). Abbreviations for entity responsible for document preparation are as follows:
 - .1 A - Denotes documents prepared by Architect.
 - .2 E - Denotes documents prepared by Electrical Engineer.
 - .3 M - Denotes documents prepared by Mechanical Engineer.
 - .4 O - Denotes documents prepared by Owner.
 - .5 S - Denotes documents prepared by Structural Engineer.
- .2 Professional seals if applied next to company names in the project directory (below) govern only those specification sections and schedules identified by the corresponding document responsibility (DR) abbreviation in Section 00 01 10.

1.2 Project Directory

- .1 Owner:
Scarborough Health Network
3030 Lawrence Avenue East, Suite 314
Scarborough, Ontario
M1P 2T7
- .2 Architect (the *Consultant*):
Stantec Architecture Ltd.
200 – 835 Paramount Drive
Stoney Creek, Ontario
L8J 0B4

Tel: 416-596-6686
- .3 Structural Engineer:
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Document Responsibility and Project Directory

.4 Mechanical Engineer:

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.5 Electrical Engineer:

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Scarborough Health Network, Construction and Renovation Work Permit application	O	2	

END OF SECTION

Information Available for Review

1.1 Information Available for Review

- .1 The following documents are made available for review in Volume 3:
 - .1 Hazardous materials/designated substances report:
 - .1 "Reassessment of Asbestos-Containing Materials 2023, Scarborough and Rouge Hospital – General Site, 3050 Lawrence Avenue East, Toronto, Ontario, M1P 2V5", dated July 17, 2023, prepared by Safetech Environmental Ltd.
 - .2 Owner's guidelines and policies:
 - .1 Scarborough Health Network, Contractors Manual(General Conditions), dated April 2024.
 - .2 Scarborough Health Network, Planned Shutdown Policy, dated May 2, 2022.
 - .3 Scarborough Health Network, Photo ID Badge/Access Card, Building and Parking Access Request Form, version 20, dated 2020-11-18.
 - .4 Scarborough Health Network, Construction and Renovation Work Permit application.
- .2 The accuracy of the information contained in the above listed documents has not been independently verified by the *Consultant*.

END OF SECTION

Summary of Work

PART 1- GENERAL

1.1 Section Includes

- .1 *Contract Documents* conventions.
- .2 Law, notices, permits and fees.
- .3 Use of premises and the *Place of the Work*.
- .4 Items supplied by *Owner*.
- .5 Electronic files.
- .6 Seismic design requirements.

1.2 *Contract Documents* Conventions

- .1 The *Contract Documents* have been arranged into various divisions, sections, drawings, and schedules for the purpose of presenting the *Work* in a logical and organized form and to enable ease of reference and interpretation, and are not intended to be an arrangement of precise and independent *Subcontractors*, or jurisdiction of responsibility for the various parts of the *Work*.
 - .1 The *Contractor* shall be solely responsible for coordinating the execution of the *Work* of this *Contract* in accordance with the requirements of the *Contract Documents*.
 - .2 The *Consultant* and *Owner* shall not be required to decide on questions arising with regard to agreements or contracts between the *Contractor* and *Subcontractors* or *Suppliers*, nor to the extent of the parts of the *Work* assigned thereto, nor to establish subcontract limits between Sections or Divisions of the *Work*.
 - .3 No extra will be allowed as a result of the failure to coordinate and allocate the *Work* such that the *Work* is provided in accordance with the *Contract Documents*.
- .2 The *Specifications* are written in the imperative mood and in streamlined form. The imperative language is directed to *Contractor*, unless stated otherwise.
- .3 Complete sentences by reading "shall", "*Contractor* shall", "shall be", and similar phrases by inference. Where a colon (:) is used within sentences and phrases, read the words "shall be" by inference.
- .4 Fulfill and perform indicated requirements whether stated imperatively or otherwise.
- .5 When used in the context of a *Product*, read the word "provide" to mean "supply and install to result in a complete installation ready for its intended use".

Summary of Work

- .6 Named *Products* alternates or equals, indicated by the phrases "or approved alternate by XYZ Manufacturing" or "or approved equal by XYZ Manufacturing", shall be interpreted to mean that named *Product* alternate or equal, if selected for use in lieu of indicated or specified *Product*, meets or exceeds performance, appearance, general arrangement, dimensions, availability, code and standards compliance, and colour of specified *Product*. Be responsible for costs and modifications associated with the inclusion of named *Product* alternate or equal at no additional cost to the *Owner*.
- .7 The use within the *Contract Documents* of the words "include" or "including" or variations thereof is not limiting.
- .8 The use within the *Contract Documents* of the words "specified", "scheduled", or "indicated", or any combination thereof, shall mean "specified by the *Contract Documents*", "scheduled by the *Contract Documents*", and "indicated by the *Contract Documents*", respectively, unless the context clearly and explicitly means otherwise.
- .9 The use within the *Contract Documents* of the words "make good" or "making good" shall mean that, when a finish or material has been altered, the material or finish shall be repaired or replaced, and refinished to match existing quality and appearance to acceptance of *Consultant*, and that repaired or replaced and refinished *Work* shall not be discernible from existing materials or finishes when judged by the *Consultant* from a viewing distance of 1830 mm (6'), and that such work is included in the *Contract Price*.
- .10 Where a component, device, item, or part of materials or equipment is referred to in the singular number, such reference shall require the provision of as many components, devices, items, or parts of material or equipment necessary to complete the *Work*.
- .11 Reference standards:
 - .1 "Reference standards" means consensus standards, trade association standards, guides, and other publications expressly referenced in *Contract Documents*.
 - .2 Where an edition or version date is not specified, referenced standards shall be deemed to be the latest edition or revision issued by the publisher at the time of bid closing, except as follows:
 - .1 If a particular edition or revision date of a specified standard is referenced in an applicable code or other regulatory requirement, the edition or version referenced in the applicable code or other regulatory requirement shall apply.
 - .3 The *Contract Documents* may specify, indicate, or schedule requirements that exceed the requirements of the building code, other applicable codes, requirements of authorities having jurisdiction, and standards cited in the *Contract Documents*. In such cases, the requirements specified, indicated, or scheduled in the *Contract Documents* shall govern.
 - .4 If compliance with two or more reference standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to *Consultant* for clarification.

1.3 *Contract Documents* for Construction Purposes

- .1 *Owner* shall supply *Contractor* with a complete set of *Contract Documents* in electronic form before commencement of the *Work*.

Summary of Work

1.4 Laws, Notices, Permits, and Fees

- .1 The building code - Ontario Regulation 332/12, including amendments, shall govern the *Work*.
- .2 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*.
- .3 *Owner* shall apply and pay for the building permit. The *Contractor* shall pick up building permit from the municipal department having jurisdiction at the *Place of the Work*. Obtain and pay for all other permits, licenses, deposits and certificates of inspection as part of the *Work*.
- .4 Arrange for inspection, testing and acceptance of the *Work* required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.
- .5 Obtain permits required to execute work on municipal rights of way. Obtain damage deposits for sidewalks, roads and services, unless otherwise indicated.
- .6 It is the responsibility of the *Contractor* to schedule notifications and inspections required by authorities having jurisdiction such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the *Work*. The *Contractor*, at no additional cost to the *Owner*, shall be solely responsible for any delay in the *Work* caused by failure to properly schedule required notifications and inspections.
- .7 The *Contractor* shall provide to the chief building official or the registered code agency, where a registered code agency is appointed under the Ontario Building Code Act in respect of the construction to which the notice relates, the required notices set out in Division C – Part 1 Sentence 1.3.5.1(2) and Sentence 1.3.5.2 of the building code. The *Contractor* shall be present at each site inspection by an inspector or registered code agency as applicable under Division C – Part 1 Sentence 1.3.5.2 of the building code.
 - .1 It is the responsibility of the *Contractor* to schedule notifications to the chief building official or the registered code agency such that the inspection pertaining to the notifications can be made within the time frame as required under Division C – Part 1 Sentence 1.3.5.3 of the building code, without causing a delay in the *Work*. The *Contractor*, at no additional cost to the *Owner*, shall be solely responsible for any delay in the *Work* caused by failure to properly schedule required notifications and inspections.

1.5 Documents at the *Place of the Work*

- .1 Maintain at the *Place of the Work*, one hard copy of each of following:
 - .1 *Contract Documents* including drawings, specifications, addenda, and other modifications to the *Contract*.
 - .2 'Reviewed' or 'Reviewed as Noted' submittals.
 - .3 Construction and submittal schedules.
 - .4 *Supplemental Instructions*, proposed *Change Orders*, *Change Orders*, and *Change Directives*.
 - .5 RFI responses and RFI log.

Summary of Work

- .6 Field test reports and independent testing reports.
- .7 *Consultant's* field review reports and deficiency reports.
- .8 Manufacturer's field review reports.
- .9 Reports by authorities having jurisdiction.
- .10 Building and other applicable permits, and related permit documents.
- .11 Daily log including:
 - .1 Number of workers actively working at the *Place of the Work* by each subcontract.
 - .2 *Subcontractors* working at the *Place of the Work*.
 - .3 Parts of the *Work* being worked on.
 - .4 Working hours worked at the *Place of the Work*.
 - .5 Activities with intermittent progress.
 - .6 Time lost and explanation for such time lost.
 - .7 Difficulties (work scheduled to start but did not with the reason why, delays, labour inefficiencies, labour shortage).
 - .8 *Products* and materials delivered.
 - .9 Equipment mobilized and/or demobilized.
 - .10 Demolition conditions.
 - .11 Start and finish date of each part of the *Work*.
- .12 As-built drawings recording as-built conditions, instructions, changes for structure, equipment, wiring, plumbing, and the like, as called for in Section 01 77 00 and Divisions 21, 22, and 23 and Divisions 26, 27, and 28, prior to being concealed.
- .2 Make above material available to *Consultant* upon request.

1.6 Use of Premises and the *Place of the Work*

- .1 Except as otherwise specified, *Contractor* has unrestricted use of *Place of the Work* from time of *Contract* award until *Substantial Performance of the Work*.
- .2 Confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and all other construction operations to limits required by laws, ordinances, permits, and *Contract Documents*, whichever is most restrictive. Do not unreasonably encumber *Place of the Work*.

1.7 Not In Contract Items and Items Supplied by Owner

- .1 NIC (Not In *Contract*) shall be used to designate various items of equipment that require coordination for installation although are not provided as part of the *Work*.
- .2 SBO (Supplied by Owner) shall be used to designate various items of equipment that will be supplied by the *Owner* for installation by the *Contractor* as part of the *Work*.

Summary of Work

.1 Owner Responsibilities:

- .1 Order and pay for items supplied by *Owner* not already in *Owner's* possession.
- .2 Arrange and pay for delivery of items supplied by *Owner* F.O.B. the *Place of the Work*, within time frames required by *Contractor's* progress schedule. If delivered sooner than required by *Contractor's* latest progress schedule submitted to *Owner*, arrange and pay for delivery to a temporary storage location and subsequent delivery to the *Place of the Work*.
- .3 Advise *Contractor* in writing of the value of items supplied by *Owner* for *Contractor's* insurance purposes.
- .4 Arrange and pay for delivery to *Contractor* of reviewed *Shop Drawings*, *Product* data, samples, and manufacturer's installation instructions.
- .5 Inspect deliveries jointly with *Contractor*.
- .6 Submit claims for transportation damage.
- .7 Arrange for replacement of damaged, defective or missing items identified at time of delivery.
- .8 Arrange for manufacturer's field services.
- .9 Arrange for delivery of manufacturer's warranties to *Contractor* for inclusion in operation and maintenance manual.

.2 Contractor Responsibilities:

- .1 Designate in progress schedule, time frames for delivery of items supplied by *Owner* to the *Place of the Work* and for receipt of related submittals. If the *Place of the Work* is not ready to receive delivery of items supplied by *Owner* within the time frame indicated in the latest progress schedule submitted to *Owner*, arrange and pay for delivery to a temporary storage location and subsequent delivery to the *Place of the Work*.
- .2 Review all required submittals and notify *Consultant* of any observed discrepancies or anticipated problems.
- .3 Ensure that course of construction insurance is adequate to cover items supplied by *Owner*.
- .4 Receive and unload items supplied by *Owner* at the *Place of the Work*.
- .5 Inspect deliveries jointly with *Owner*. Record and notify *Owner* and *Consultant* of shortages and visibly damaged or defective items.
- .6 Handle items supplied by *Owner* at the *Place of the Work*, including uncrating and storage. Dispose of waste materials and debris.
- .7 Take appropriate precautions to protect items supplied by *Owner* from loss or damage.
- .8 Repair or replace items damaged at the *Place of the Work*.
- .9 Assemble, install, connect, adjust, and finish items supplied by *Owner* as specified.

Summary of Work

- .10 Arrange for inspections required by authorities having jurisdiction as specified.
- .11 Arrange for or perform testing as specified.
- .12 Workmanship warranty for installation.

1.8 Electronic Files

- .1 In the event that the *Contractor*, a *Subcontractor*, or a *Supplier* requests AutoCAD files from the *Consultant*, the *Consultant* will be allowed to use their discretion whether or not they will provide them. The *Consultant* may charge a fee for providing the electronic files and/or require a copyright waiver to be signed, also at the *Consultant's* discretion.

1.9 Seismic Design and Requirements

- .1 Design building components, assemblies and systems of the *Work*, as applicable, to meet seismic requirements pertinent to the location of the *Place of the Work* in accordance with the building code, and comply with requirements of jurisdictional authorities.
- .2 Post-Disaster Building: Conform to building code requirements for building classification, 'Post-Disaster Building'. Elements of structures, non-structural components and equipment shall be designed in accordance with building code requirements for seismic design, connections, and seismic restraint for 'Post-Disaster Buildings'.
- .3 Vibrating equipment shall receive seismically designed vibration isolation. Only non-vibrating equipment are permitted to be secured to the structure. Structural connection shall be by means of direct connection to the structure by bolting, using rigid seismic restraints, or taught cable restraints. Connection to structure shall occur only at locations capable of withstanding the forces applied.
- .4 The proposed connections and general design of *Products*, equipment and systems shall be described in shop drawing format with identification and location of forces imposed on the structure. The *Shop Drawings* shall be stamped by a Professional Engineer licensed to practice in the *Place of the Work* and have the appropriate understanding of the issues at hand. The *Shop Drawings* shall be submitted for review to the *Consultant* prior to putting the work in hand. The *Consultant* shall review these *Shop Drawings* for loads imposed on the structure.
- .5 Professional Engineer responsible for preparation of seismic engineered submittal shall review the *Work* and shall submit letters of general conformity for those parts of the *Work* in accordance with engineered submittal requirements of Section 01 33 00.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Allowances

PART 1 - GENERAL

1.1 Section Includes

- .1 Cash allowances.

1.2 Cash Allowances

- .1 Expenditure of cash allowances:
 - .1 The *Owner*, through the *Consultant*, will provide the *Contractor* with documentation required to permit pricing of a cash allowance item.
 - .2 The *Owner*, through the *Consultant*, may request the *Contractor* to identify potential *Suppliers* or *Subcontractors*, as applicable, and to obtain at least three competitive prices for each cash allowance item.
 - .3 The *Owner*, through the *Consultant*, may request the *Contractor* to disclose originals of all bids, quotations, and other price-related information received from potential *Suppliers* or *Subcontractors*.
 - .4 The *Owner*, through the *Consultant*, will determine by whom each cash allowance item will be performed and for what amount. Obtain *Owner's* prior written approval in the form of a *Change Order* before entering into a subcontract, amending an existing subcontract, or before performing by own forces, work that is covered by a cash allowance. Upon issuance of the *Change Order*, the *Contractor's* responsibilities for a cash allowance item shall be the same as for other work of the *Contract*.
- .2 Cash allowances are for supply and installation unless otherwise specified.
- .3 Amount of each cash allowance does not include *Contractor's* overhead and profit, and other related costs, which shall be included in the *Contract Price* and not in the cash allowance.
- .4 Cash allowances for supply only:
 - .1 Amount of each cash allowance includes:
 - .1 Cost of *Products* as invoiced by the *Supplier*, including delivery and applicable taxes but excluding Value Added Taxes.
 - .2 Amount of each cash allowance does not include costs of the following items, which costs shall be included in the *Contract Price* and not in the cash allowance:
 - .1 Unloading, handling and storage at the *Place of the Work*.
 - .2 Installation and all other related costs.
- .5 Cash allowances for install only:
 - .1 Amount of each cash allowance includes:
 - .1 Unloading, storing, handling of *Products* at the *Place of the Work*.

Allowances

- .2 Installation, finishing, and commissioning of *Products*.
- .3 Applicable taxes and duties (excluding Value Added Taxes).
- .2 Amount of each cash allowance does not include costs of the following items, which costs shall be included in the *Contract Price* and not in the cash allowance:
 - .1 Net cost of *Products*.
 - .2 Delivery to the *Place of the Work*.
- .6 Cash allowances for supply and install:
 - .1 Amount of each cash allowance includes:
 - .1 All costs to provide the specified *Products*, including supply, installation, and related costs, excluding Value Added Taxes.
 - .2 *Subcontractor's* and sub-*Subcontractor's* overheads and profits related to the cash allowance.
- .7 Cash allowances for services:
 - .1 Amount of each cash allowance includes:
 - .1 All costs related to the services, excluding Value Added Taxes.
 - .2 *Subcontractor's* and sub-*Subcontractor's* overheads and profits related to the cash allowance.
- .8 List of cash allowances
 - .1 The *Contract Price* includes a total cash allowance as indicated in below table:

Cash Allowances	
<i>Independent Inspection and Testing in accordance with 01 45 00, and including but not limited to: Air Quality Monitoring as part of CSA Z317.13 – Benchmarked before the commencement of Work and during construction Inspection and testing during abatement Medical Gas Inspections</i>	\$75,000.00
<i>Final coordination to suit Owner's supplied equipment</i>	\$5,000.00
<i>Inspection of Lead Lining (XRCT)</i>	\$15,000.00
<i>Unforeseeable asbestos and mold abatement</i>	\$30,000.00
<i>Final coordination of hardware and related life safety and electrical services.</i>	\$5,000.00
<i>Wireless Survey</i>	\$5,000.00
<i>Pipe Freezing/Isolation Valves</i>	\$10,000.00
Total Allowances	\$145,000.00

PART 2- PRODUCTS

Not applicable.

Allowances

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Substitution Procedures

PART 1 – GENERAL

1.1 Section Includes

- .1 Substitution procedures.
- .2 Submission requirements for proposed substitutions.

1.2 Definition

- .1 In this Section "Substitution" means a *Product*, a manufacturer, or both, not originally specified in *Contract Documents* by proprietary name but proposed for use by *Contractor* in place of a *Product*, a manufacturer, or both, specified by proprietary name.

1.3 Substitution Procedures

- .1 Proposals for substitutions of *Products* and materials must be submitted in accordance with procedures specified in this section.
- .2 *Contractor* may propose a Substitution wherever specifications include the phrases "or equal", "or approved equal", "Substitutions: in accordance with Section 01 25 00", or words conveying this intent. Where specifications do not include such language, *Contractor* proposed substitutions shall not be permitted.
- .3 Do not order or install any substitution without a *Supplemental Instruction* or *Change Order*.
- .4 Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements For Proposed Substitutions, *Consultant* may review submissions, if directed by *Owner*, but in any case with the understanding that the *Contract Time* will not be altered due to the time required by the *Consultant* to review the submission and by the *Contractor* to implement the substitution in the *Work*.
- .5 *Consultant* may recommend to *Owner* acceptance of a Substitution proposed by *Contractor* if satisfied that:
 - .1 The proposed substitute *Product* is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified *Product*.
 - .2 The proposed substitute manufacturer has capabilities comparable to the specified manufacturer.
 - .3 The Substitution provides a benefit to *Owner*.
- .6 Failure to order a specified *Product* or to order a *Product* by a specified manufacturer in adequate time to meet construction progress schedule shall not be considered a valid reason to propose a Substitution. Refer to Section 01 60 00, paragraph 1.2 "Availability of Products".
- .7 If *Owner* accepts a Substitution, the change in the *Work* will be documented in the form of either a *Supplemental Instruction* or *Change Order* as specified in Section 01 26 00.

Substitution Procedures

- .8 If a Substitution is accepted in the form of a *Supplemental Instruction* or *Change Order*, *Contractor* shall not revert to an originally specified *Product* or manufacturer without *Consultant's* prior written acceptance.

1.4 Submission Requirements for Proposed Substitutions

- .1 Include with each proposed Substitution the following information:
- .1 Identification of the Substitution, including *Product* name and manufacturer's name, address, telephone numbers, and web site.
 - .2 Reason(s) for proposing the Substitution.
 - .3 A statement verifying that the Substitution will not affect the *Contract Price* and *Contract Time* or, if applicable, the amount and extent of a proposed increase or decrease in *Contract Price* and *Contract Time* on account of the Substitution.
 - .4 A statement verifying that the Substitution will not affect the performance or warranty of other parts of the *Work*.
 - .5 Manufacturer's *Product* literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.
 - .6 *Product* samples as applicable.
 - .7 A detailed comparison of the physical properties and performance characteristics of the specified *Product* and the Substitution, with any significant variations clearly highlighted.
 - .8 Availability of maintenance services and sources of replacement materials and parts for the Substitution, as applicable, including associated costs and time frames.
 - .9 If applicable, estimated life cycle cost savings resulting from the Substitution.
 - .10 Details of other projects and applications where the Substitution has been used.
 - .11 Identification of any consequential changes in the *Work* to accommodate the Substitution and any consequential effects on the performance of the *Work* as a whole. A later claim for an increase to the *Contract Price* or *Contract Time* for other changes in the *Work* attributable to the Substitution will not be considered.
 - .12 Confirmation of proposed substitution delivery, in writing by *Product* manufacturer.
 - .13 Compliance with the building codes and requirements of authorities having jurisdiction.
 - .14 Copy of manufacturer's warranty for any *Product* or system for which an extended warranty has been specified, along with copy of manufacturer's warranty for specified *Product* or system with differences highlighted.
- .2 Substitutions submitted on *Shop Drawings* without following requirements of this section prior to submission of the affected *Shop Drawings* will cause the *Shop Drawings* to be rejected.

Substitution Procedures

- .3 Proposed substitutions shall include costs associated with modifications necessary to other adjacent and connecting portions of the *Work*.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Contract Modification Procedures

PART 1 - GENERAL

1.1 Section Includes

- .1 Method of *Contract Price* adjustment - *Change Orders*.
- .2 *Change Order* procedures.
- .3 Method of *Contract Price* adjustment - *Change Directives*.
- .4 *Change Directive* procedures.
- .5 *Supplemental Instructions*.

1.2 Method of Contract Price Adjustment - *Change Orders*

- .1 Unless otherwise agreed, the adjustment of the *Contract Price* on account of a proposed change in the *Work* shall be based on a quotation for a fixed price increase or decrease to the *Contract Price* regardless of the *Contractor's* actual expenditures and savings.

1.3 *Change Order* Procedures

- .1 Upon issuance by the *Consultant* to the *Contractor* of a proposed change in the *Work*, and unless otherwise requested in the proposed change or unless otherwise agreed:
 - .1 Submit to the *Consultant* a fixed price quotation for the proposed change in the *Work* within 5 *Working Days* after receipt of the proposed change in the *Work*.
 - .2 Provide a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:
 - .1 Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.
 - .2 Estimated *Product* costs, including *Supplier* quotations, estimated quantities and unit prices.
 - .3 Estimated *Construction Equipment* costs.
 - .4 Enumeration of all other estimated costs included in the price quotation.
 - .5 Estimated credit amounts for labour and *Products* not required on account of the proposed change.
 - .6 Fees, not exceeding the applicable percentages for overhead and profit.
 - .7 Where applicable, *Subcontractor* quotations, also including a detailed breakdown of all of the above.
 - .3 Include in the quotation the increase or decrease to the *Contract Time*, if any, for the proposed change, stated in number of days.
 - .4 Include in the quotation the number of days for which the quotation is valid.

Contract Modification Procedures

- .5 The quotation will be evaluated by the *Consultant* and the *Owner* and, if accepted by the *Owner*, be documented in the form of a signed *Change Order*.

1.4 Method of Contract Price Adjustment - *Change Directives*

- .1 Unless the *Owner* and the *Contractor* reach an earlier agreement on the adjustment to the *Contract Price* by means of a *Change Order* that cancels the *Change Directive*, the adjustment in the *Contract Price* for change carried out by way of a *Change Directive* shall be determined as specified in the General Conditions of *Contract* after the change in the *Work* is completed.

1.5 *Change Directive* Procedures

- .1 If a *Change Directive* is issued for a change in the *Work* for which a proposed change was previously issued, but no *Change Order* has yet been signed, the *Change Directive* shall cancel the proposed change and any *Contractor* quotations related to that change in the *Work*.
- .2 When proceeding with a change in the *Work* under a *Change Directive*, keep accurate records of daily time sheets for labour and *Construction Equipment*, and invoices for *Product* and *Construction Equipment* costs. Submit such records to the *Consultant* weekly, until the *Change Order* superseding the *Change Directive* is issued.

1.6 Supplemental Instructions

- .1 The *Consultant* may issue *Supplemental Instructions* to provide clarifications to the *Contract Documents*, provide additional information, or make minor variations in the *Work* not involving adjustment in the *Contract Price* or *Contract Time*.
- .2 If the *Contractor* considers a *Supplemental Instruction* to require an adjustment in *Contract Price* or *Contract Time*, the *Contractor* shall promptly notify the *Consultant* and the *Owner* in writing and shall not proceed with any work related to the *Supplemental Instruction* pending receipt of a *Change Order*, a *Change Directive*, or, in accordance with the dispute resolution provisions of the General Conditions of *Contract*, a Notice in Writing of a dispute and instructions to proceed.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Payment Procedures

PART 1 - GENERAL

1.1 Section Includes

- .1 Schedule of values.
- .2 Cash flow projection.
- .3 Workers' compensation clearance.
- .4 Payment for *Products* stored off site.

1.2 Schedule of Values

- .1 Prior to the first application for payment, submit for *Consultant's* review an initial schedule of values. Modify the initial schedule of values if and as requested by *Consultant*. Obtain *Consultant's* written acceptance of the initial schedule of values prior to the first application for payment.
- .2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and *Products* delivered to *Place of the Work*.
- .3 Provide the schedule of values in an electronic spreadsheet format based on the format provided and content described in latest edition of CCDC 24 – A Guide to Model Forms and Support Documents.
 - .1 Identifying information including title and location of the *Work*, name of *Contractor*, number and date of application for payment, and period covered by the application for payment.
 - .2 A work breakdown structure based on *Contractor*, *Subcontractor*, and sub-*Subcontractor* work, systems description, Specification sections, or material and labour breakdown, as appropriate.
 - .3 Provisions for approved unit price work, assignable contracts, *Change Orders*, and allowances, so that the breakdown amounts indicated in the schedule of values aggregate to the current total *Contract Price*. Also provide for indicating the estimated value of *Change Directives* within the schedule of values, separately from the current total *Contract Price*.
 - .4 Line items identifying full costs for the following:
 - .1 Preparation and submission of closeout submittals in accordance with the requirements of Section 01 78 00, with a value not less than 0.5% of the *Contract Price* or \$10,000.00, whichever is greater.
 - .2 Preparation and submission of the deficiency list in accordance with the requirements of Section 01 77 00.
 - .5 For each item in the work breakdown structure, provide as a minimum the following information, under headings as indicated:

Payment Procedures

- .1 Breakdown Amount: A dollar amount, including an appropriate pro rata portion of *Contractor's* overhead and profit.
- .2 Performed to Date: The value of *Work* performed and *Products* delivered to *Place of the Work* up to the date of the application for payment, stated as a percentage of the *Contract Price* and in dollars.
- .3 Previously Performed: The value of *Work* performed and *Products* delivered to the *Place of the Work* for which payment has been previously certified, stated in dollars.
- .4 Current Period: The value of *Work* performed and *Products* delivered to *Place of the Work* for which *Contractor* is currently applying for payment, stated in dollars.
- .5 Balance to Complete: The value of *Work* not yet performed and *Products* not yet delivered to *Place of the Work*, stated in dollars.

1.3 Cash Flow Projection

- .1 Prior to the first application for payment submit, for *Consultant's* review, a forecast of approximate monthly progress payments for each month of the *Contract Time*.
- .2 Submit revised cash flow forecasts monthly. Submit additional revised cash flow forecasts when there are significant changes in rate of progress of the *Work* or significant changes in the *Contract Price* as determined by the *Consultant*. Submit additional revised cash flow forecasts when requested by *Consultant*.

1.4 Workers' Compensation Clearance

- .1 Submit Certificate of Clearance from the Workplace Safety and Insurance Board (WSIB) with each application for payment.

1.5 Payment for Products Stored Off Site

- .1 *Owner* may, due to extraordinary circumstances and at *Owner's* sole discretion, make payments for *Products* delivered to and stored at a location other than *Place of the Work*, subject to:
 - .1 A request submitted by *Contractor* in writing, with appropriate justification.
 - .2 Whatever conditions *Owner* or *Consultant* may establish for such payments, as required to protect *Owner's* interests.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Project Management and Coordination

PART 1 - GENERAL

1.1 Section Includes

- .1 Building dimension, templates, built-ins, and coordination.
- .2 Project manager and superintendent.
- .3 Discrepancies and clarifications.
- .4 Request for interpretation (RFI) procedures.

1.2 Building Dimension, Templates, Built-ins, and Coordination

- .1 Take necessary dimensions for the proper execution of the *Work*. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.
- .2 Verify dimensions at the *Place of the Work* before commencing *Shop Drawings*. Before fabrication commences report discrepancies to *Consultant* in writing. Incorporate accepted variances on shop drawings and as-built records.
- .3 Supply forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the *Work* and set in place or instruct separate *Subcontractors* as to their location.
- .4 Supply items to be built in, as and when required together with templates, measurements, shop drawings and other related information and assistance.
- .5 Pay the cost of extra work and make up time lost as a result of failure to provide necessary information and items to be built in.
- .6 Verify that the *Work*, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the *Contract Documents*, and ensure that work installed in error is rectified before construction resumes.
- .7 Check and verify dimensions referring to interfacing of services. Verify such dimensions with interconnected portions of the *Work*.
- .8 Do not scale directly from drawings. Obtain clarification from *Consultant* if there is ambiguity or lack of information.
- .9 Details and measurements of any work which is to fit or to conform with work installed shall be taken at the *Place of the Work*.
- .10 Prepare and submit setting drawings, templates and other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels.
- .11 *Subcontractors* shall direct related *Subcontractors* on site of specific locations required for sleeves and openings.

Project Management and Coordination

1.3 Project Manager and Superintendent

- .1 Provide project manager, superintendent, and necessary supporting staff personnel who shall be in attendance at the *Place of the Work* while *Work* is being performed, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
- .2 The *Contractor* shall appoint project manager and superintendent at the *Place of the Work* who shall have overall authority at the *Place of the Work* and shall speak for the *Contractor* and represent the *Contractor's* interest and responsibilities at meetings at the *Place of the Work* and in dealings with the *Consultant* and the *Owner*.
 - .1 The project manager shall fulfill the role of supervisor in accordance with GC 3.5.

1.4 Discrepancies and Clarifications

- .1 Advise *Consultant* of discrepancies discovered in requirements of the *Contract Documents* and request clarification in written form.
- .2 Advise *Consultant* when clarifications are required pertaining to meaning or intent of requirements of *Contract Documents* and request clarification from *Consultant* in written form.
- .3 Do not proceed with related work until written clarification is provided by *Consultant*.
- .4 Failure to notify *Consultant* shall result in *Contractor* incurring responsibility for resulting deficiencies and expense at no additional cost to the *Owner*.
- .5 Written requirements issued by *Consultant* for the purpose of clarification, implicitly supersede applicable and relevant aspects of the *Contract Documents* irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification requirements.

1.5 Request for Interpretation - RFI

- .1 A request for interpretation (RFI) is a formal process used during the *Work* to obtain an interpretation of the *Contract Documents* pursuant to GC 2.2.6 through GC 2.2.9 (inclusive).
 - .1 An RFI shall not constitute notice of claim for a delay.
- .2 Submittal procedures:
 - .1 RFI form:
 - .1 Submit RFI on "Request for Interpretation" in form acceptable to the *Consultant*, an example of which is appended to this section. The *Consultant* shall not respond to an RFI except as submitted on this form.
 - .2 Where RFI form does not provide sufficient space for complete information to be provided thereon, attach additional sheets as required.
 - .3 Submit with RFI form necessary supporting documentation.
 - .2 Submit RFI form as follows:

Project Management and Coordination

- .1 Submit RFIs sufficiently in advance of affected parts of the *Work* so as not to cause delay in the performance of the *Work*. Costs resulting from failure to do this will not be paid by the *Owner*.
 - .2 RFIs shall be submitted only to the *Consultant*.
 - .3 RFIs shall be submitted only by *Contractor*. RFIs submitted by *Subcontractors* or *Suppliers* shall not be accepted.
 - .4 Number RFIs consecutively in one sequence in order submitted.
 - .5 Submit one distinct RFI per RFI form.
- .3 RFI log:
 - .1 Maintain log of RFIs sent to and responses received from the *Consultant*, complete with corresponding dates.
 - .2 Submit updated log of RFIs with each progress draw submittal.
- .4 *Consultant* shall review RFIs from the *Contractor* submitted in accordance with this section, with the following understandings:
 - .1 *Consultant's* response shall not be considered as a *Change Order* or *Change Directive*, nor does it authorize changes in the *Contract Price* or *Contract Time* or changes in the *Work*.
 - .2 Only the *Consultant* shall respond to RFIs. Responses to RFIs received from entities other than the *Consultant* shall not be considered.
- .5 Allow 5 *Working Days* for review of each RFI by the *Consultant*.
 - .1 *Consultant's* review of RFI commences on date of receipt by the *Consultant* of RFI submittal and extends to date RFI returned by *Consultant*.
 - .2 When the RFI submittal is received by *Consultant* before noon, review period commences that day; when RFI submittal is received by *Consultant* after noon, review period begins on the next *Working Day*.
 - .3 If, at any time, the *Contractor* submits a large enough number of RFIs such that the *Consultant* cannot process these RFIs within 5 *Working Days*, the *Consultant*, will confer with the *Contractor* within 1 *Working Day* of receipt of such RFIs, and the *Consultant* and the *Contractor* will jointly prepare an estimate of the time necessary for processing the RFIs and determine the order of priority between the RFIs submitted. The *Contractor* shall accommodate such necessary time at no increase in the *Contract Time* and at no additional cost to the *Owner*.
- .6 Undertake a review of the *Contract Documents* to determine that the matter in question relating to the interpretation of the *Contract Documents* cannot be resolved by direct reference to the *Contract Documents*. Describe this review in detail on the RFI form. RFI submittals that lack a detailed review description, or where the detail provided is insufficient, in the sole opinion of the *Consultant*, shall not be reviewed by the *Consultant* and shall be rejected.

Project Management and Coordination

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Contractor's Request for Interpretation

Consultant's Supplemental Instructions

Date	# of Pages
To	From
Co.	Co.
Phone #	Phone #
Fax #	Fax #
Email	Email

Project:

Owner:

To:

(Consultant's
Representative)

Project No.:

**Consultant's Fax
No.:**

RFI No.:

Date of

Request:

Contractor:

**Contractor's
Representative:**

Fax No.:

Interpretation Requested: (Description of request for interpretation and references to relevant portions of *Contract Documents*)

Attachments:

Requested by:

Consultant's Supplemental Instruction:

Attachments:

Reply By:

The work shall be carried out in accordance with these *Supplemental Instructions* issued in accordance with the *Contract Documents* without change in *Contract Price* or *Contract Time*. Prior to proceeding with these instructions, indicate acceptance of these instructions as being consistent with the *Contract Documents* by returning a signed copy to the *Consultant*.

Supplemental Instruction Issued:

By:

Supplemental Instruction Accepted:

By:

Consultant

Date

Contractor

Date

Cc: ☐ Owner ☐ Consultant ☐ Contractor ☐ Field ☐ Other:

Project Meetings

PART 1 - GENERAL

1.1 Section Includes

- .1 Project meeting requirements.

1.2 Administrative

- .1 The *Contractor* shall schedule meetings as specified herein.
 - .1 Such scheduling shall be in consultation both with the *Owner* and with the *Consultant*.
- .2 The *Contractor* shall prepare agendas for meetings specified herein.
 - .1 Agendas shall include, as a minimum, the agenda items specified in the *Contract Documents*.
- .3 The *Contractor* shall distribute written notice of each meeting specified herein, complete with meeting agenda, 5 *Working Days* in advance of meeting date to the *Consultant* and the *Owner* and other affected parties.
- .4 The *Contractor* shall chair and record the minutes of meetings specified herein.
 - .1 *Contractor* shall distribute copies of minutes to the *Owner*, the *Consultant*, and all others in attendance within 3 *Working Days* after date of meeting.
- .5 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent.
- .6 *Subcontractors* and *Suppliers* shall attend meetings only when directed by the *Consultant*, or when specifically called for in the *Contract Documents*.
- .7 The *Contractor* shall prepare, and distribute to the *Consultant* and the *Owner* 4 days in advance of next progress meeting date, the following:
 - .1 Monthly progress reports containing updated construction schedule, submittal logs, requests for interpretation logs, and budget.

1.3 Contract Start-Up Meeting

- .1 Within 5 days after award of *Contract*, request a meeting of parties in *Contract* to discuss and resolve administrative procedures and responsibilities prior to the commencement of the *Work*.
- .2 Attendees at *Contract* start-up meeting shall include the following:
 - .1 *Contractor*.
 - .2 *Contractor's* site superintendent(s).
 - .3 *Contractor's* waste management coordinator.
 - .4 *Consultant*.

Project Meetings

- .5 Owner.
- .6 Integrated testing coordinator.
- .7 Independent inspection and testing company.
- .3 Agenda to include the following:
 - .1 Code-of-conduct for workers at the *Place of the Work*.
 - .2 Owner's guidelines and policies.
 - .3 Appointment of official representative of participants in the *Project*.
 - .4 Status of permits, fees and requirement of authorities having jurisdiction. Action required.
 - .5 Establishing a schedule for progress meetings.
 - .6 Requirements for *Contract* modification and interpretation procedures, including, but not limited to: requests for interpretation, contemplated change orders, *Change Orders*, *Change Directives*, *Supplemental Instructions*, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .7 Submittal requirements and procedures.
 - .8 Schedule of submission of samples, colour chips, and items for *Owner's* and/or *Consultant's* consideration.
 - .9 Construction schedule and progress scheduling.
 - .10 Delivery schedule of specified equipment.
 - .11 Requirements for infection prevention and control.
 - .12 Appointment of independent inspection and testing agencies or firms.
 - .13 Requirements for notification for reviews. Allow a minimum of 48 hours' notice to *Consultant* for review of the *Work*.
 - .14 Requirements for *Temporary Work*.
 - .15 Requirements for firestopping coordination and preparation of firestopping manual (refer to Section 01 33 00).
 - .16 Security requirements at and for the *Place of the Work*.
 - .17 Owner supplied *Products*.
 - .18 Integrated fire protection and life safety systems testing requirements and procedures (refer to Section 01 91 26).
 - .19 As-built documents.
 - .20 Operation and maintenance manuals.
 - .21 Take-over procedures, acceptance, warranties.
 - .22 Publication to be used for publishing certificate of substantial performance.
 - .23 Progress claims, administrative procedures, holdbacks.

Project Meetings

- .24 Insurances, transcripts of policies.
- .25 *Contractor's* safety procedures.
- .26 Certificate of Clearance from the Workplace Safety and Insurance Board (WSIB).

1.4 Pre-Installation Meetings

- .1 During the course of the *Work* prior to *Substantial Performance of the Work*, schedule pre-installation meetings as required by the *Contract Documents* and coordinated with the *Consultant*.
- .2 As far as possible, pre-installation meetings shall be scheduled to take place on the same day as regularly scheduled progress meetings.
- .3 Attendees at pre-installation meetings shall include the following:
 - .1 *Contractor*.
 - .2 *Subcontractors* affected by the work for which the pre-installation meeting is being conducted.
 - .3 *Consultant*.
 - .4 Infection control representative.
 - .5 Manufacturer's representatives, as applicable.
 - .6 Independent inspection and testing company, as applicable.
- .4 Agenda to include the following:
 - .1 Code-of-conduct for workers at the *Place of the Work*.
 - .2 *Owner's* guidelines and policies.
 - .3 Appointment of official representatives of participants in the *Project*.
 - .4 Review of existing conditions and affected work, and testing thereof as required.
 - .5 Review of installation procedures and requirements.
 - .6 Review of environmental and site condition requirements.
 - .7 Review of infection prevention and control procedures.
 - .8 Schedule of the applicable portions of the *Work*.
 - .9 Schedule of submission of submittals, samples, and items for *Consultant's* consideration.
 - .10 Requirements for *Temporary Work*.
 - .11 Requirements for notification for reviews. Allow a minimum of 48 hours' notice to *Consultant* for review of the *Work*.
 - .12 Requirements for inspections and tests, as applicable. Schedule and undertake inspections and tests.
 - .13 Delivery schedule of specified equipment.
 - .14 Special safety requirements and procedures.

Project Meetings

- .15 Publication to be used for publishing certificate of substantial performance.

1.5 Progress Meetings

- .1 During the course of the *Work* prior to *Substantial Performance of the Work*, schedule regular progress meetings to occur every other week.
- .2 Attendees at progress meetings shall include the following:
 - .1 *Contractor*.
 - .2 *Contractor's* site superintendent(s).
 - .3 *Consultant*.
 - .4 *Owner*.
- .3 Agenda to include the following:
 - .1 Code-of-conduct for workers at the *Place of the Work*.
 - .2 *Owner's* guidelines and policies.
 - .3 Review, approval of proceedings of previous meeting.
 - .4 Review of items arising from proceedings.
 - .5 Review of progress of the *Work* since previous meeting and *Contractor's* monthly progress report.
 - .6 Field observations, problems, conflicts.
 - .7 Update construction schedule.
 - .8 Problems that impede compliance with construction schedule.
 - .9 Review of off-site fabrication delivery schedules.
 - .10 Review material and equipment delivery dates/schedule.
 - .11 Corrective measures and procedures to regain construction schedule.
 - .12 Revisions to construction schedule.
 - .13 Progress, schedule, during subsequent period of the *Work*.
 - .14 Review submittal schedules.
 - .15 Review status of submittals.
 - .16 Review of infection prevention and control procedures.
 - .17 Maintenance of quality standards.
 - .18 Pending changes and substitutions.
 - .19 Review of *Contract* modifications and interpretations including, but not limited to: requests for interpretation and log, contemplated change orders, *Change Orders*, *Change Directives*, and *Supplemental Instructions* for effect on construction schedule and on *Contract Time*.
 - .20 Review of status of as-built documents.

Project Meetings

- .21 Other business.

1.6 Pre-Takeover Meeting

- .1 60 days prior to application for *Substantial Performance of the Work*, schedule a pre-takeover meeting.
- .2 Agenda to include the following:
 - .1 Review, approval of proceedings of previous meeting.
 - .2 Review of items arising from proceedings.
 - .3 Review of procedures for *Substantial Performance of the Work*, completion of the *Contract*, and handover of the *Work*.
 - .4 Field observations, problems, conflicts.
 - .5 Review of outstanding *Contract* modifications and interpretations including, but not limited to: requests for interpretation and log, contemplated change orders, *Change Orders*, *Change Directives*, and *Supplemental Instructions* for effect on construction schedule and on *Contract Time*.
 - .6 Problems which impede *Substantial Performance of the Work*.
 - .7 Review of procedures for deficiency review. Corrective measures required.
 - .8 Review of arrangements for hydro, heating, and other services.
 - .9 Review of integrated fire protection and life safety systems testing requirements and procedures (refer to Section 01 91 26).
 - .10 Progress, schedule, during succeeding period of the *Work*.
 - .11 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for *Substantial Performance of the Work*.
 - .12 Review of keying and hardware requirements.
 - .13 Review of status of as-built documents and record drawings.
 - .14 Status of commissioning and training.
 - .15 Review *Contractor's* deficiency list and status.
 - .16 Cleaning for occupancy.
 - .17 Other business.

1.7 Post-Construction Meeting

- .1 Prior to application for completion of *Contract*, schedule a post-construction meeting. 5 *Working Days* prior to date for meeting, *Consultant* shall confirm a date for meeting based on evaluation of completion requirements.
- .2 Agenda to include the following:
 - .1 Review, approval of proceedings of previous meeting.
 - .2 Confirmation that no business is arising from proceedings.

Project Meetings

- .3 Confirmation of completion of the *Contract*, and handover of reviewed documentation from the *Consultant* to the *Owner*.
- .4 Confirmation of completion of contemplated change orders, *Change Orders*, *Change Directives*, and *Supplemental Instructions*.
- .5 Problems that impede *Contract* completion.
- .6 Identify unresolved issues or potential warranty problems.
- .7 Confirmation of completion of deficiencies.
- .8 Corrective measures required.
- .9 Confirmation of arrangements for hydro, heating and other services.
- .10 Confirm submittal requirements for warranties, manuals, and demonstrations and documentation for *Contract* completion are in order.
- .11 Review of procedures for communication during post-construction period.
- .12 Handover of reviewed record documents by the *Contractor* to the *Owner*.
- .13 Submission of final application for payment.
- .14 Review and finalize outstanding claims, pricing, and allowance amounts.
- .15 Status of commissioning and training.
- .16 Demobilization and the *Place of the Work* restoration.
- .17 Review of requests for interpretation log.
- .18 Other business.

1.8 Special Meetings

- .1 *Owner* and/or *Consultant* reserves the right to require special meetings which may be held on short notice and at which attendance by *Contractor* and representatives of affected *Subcontractors* and *Suppliers* is mandatory. *Contractor* shall keep detailed and accurate meeting notes and distribute copies within 3 *Working Days* to all in attendance and those affected by agreements made at such meetings.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Construction Progress Documentation

PART 1 - GENERAL

1.1 Section includes

- .1 Construction progress schedule.
- .2 Submittals schedule.
- .3 Inspection and testing schedule.
- .4 Schedule management.
- .5 Recording actual site conditions on as-built documents.
- .6 Digital photographs.

1.2 Summary

- .1 This Section specifies *Contractor's* responsibilities for preparation and submission of schedules and other documentation related to tracking construction progress.
- .2 The schedule shall:
 - .1 Show actual progress versus planned progress.
 - .2 Demonstrate that scheduling issues are being proactively identified and addressed in a timely manner, and that planned progress is being maintained as closely as possible.

1.3 Schedule Format

- .1 Prepare schedules in the form of a Critical Path Method (CPM) Gantt chart method utilizing either of the following software:
 - .1 Microsoft Project 2003 (or later version), or.
 - .2 Primavera Project Planner version 3.1 (or later version).
- .2 Include horizontal time scale identifying the first *Working Day* of each week.
- .3 Include a separate bar for each trade, work package, or operation.
- .4 Format for listings: The chronological order of the start of each item or part of the *Work*.
- .5 Identification of listings: By systems description.

1.4 Construction Progress Schedule

- .1 Format and content:
 - .1 Include the complete sequence of construction activities, including provision for climate and weather.

Construction Progress Documentation

- .2 Provide a work breakdown structure identifying key activities, work packages, and major milestones at a sufficient level of detail to effectively manage construction progress, including:
 - .1 Long delivery *Products*.
 - .2 Dates for the commencement and completion of inspection and testing.
 - .3 *Owner* decisions for cash allowances.
 - .4 Shutdown or closure activities.
 - .5 Delivery of items supplied by *Owner*.
 - .6 *Owner* performed work.
 - .7 Demonstration and training activities.
 - .8 Dates for the commencement and completion of each major element of the *Work* parallel to the sections of the specifications.
 - .9 Dates for *Ready-for-Takeover* and *Substantial Performance of the Work*.
 - .10 Dates for delivery of *Products*, equipment, finish items, factory-finished manufactured items. Show last dates for order, shipment, and delivery in order to meet construction schedule.
- .3 Show projected percentage of completion for each item as of the first *Working Day* of each week.
- .2 Submission:
 - .1 Submit initial schedule to *Owner* and *Consultant* within 10 *Working Days* after *Contract* award.
 - .2 Submit schedule in pdf format to *Consultant* using the *Consultant's* document management system.
 - .3 *Consultant* will review format and content of initial schedule and request necessary changes, if any, within 10 *Working Days* after receipt.
 - .4 If changes are required, resubmit finalized initial schedule within 5 *Working Days* after return of review copy.
 - .5 Submit updated progress schedule to *Owner* and *Consultant* at each regularly scheduled progress meeting in accordance with Section 01 31 19. In addition to requirements specified in Section 01 32 00 for each submission of construction schedule, include a written report on the activities completed in the week preceding the progress meeting, and a summary indicating the activities planned to be undertaken in the 2 weeks subsequent to the progress meeting, including human resource loading.
 - .6 Submit updated progress schedule to *Owner* and *Consultant* with each application for progress payment, indicating actual and projected start and finish dates with report date line and progress. Submit more frequently if requested by *Owner* or *Consultant*.

Construction Progress Documentation

- .7 At each date of submission of construction schedule, indicate progress of each activity.
 - .1 Show changes occurring since previous submission of the construction schedule:
 - .1 Major changes in scope.
 - .2 *Change Orders* and *Change Directives*.
 - .3 Activities modified since previous submission.
 - .4 Revised projections of progress and completion.
 - .5 Other identifiable changes.
 - .2 Include a narrative report to define:
 - .1 Problem areas, anticipated delays, and the impact on the schedule.
 - .2 Corrective action recommended and its impact on the schedule.
 - .3 Include cash flow projection with minimum look ahead as directed by the *Consultant*.

1.5 Submittals Schedule

- .1 Format and content:
 - .1 Prepare a detailed schedule of submittals required by the *Contract Documents*, including samples required for testing, and including those for items supplied by *Owner*.
 - .2 Provide a separate line for each required submittal, organized by *Specifications* section names and numbers, and further broken down by individual *Products* and systems as required.
 - .3 Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting construction schedule.
 - .4 Schedule submissions of submittals well in advance of scheduled dates for installation, to provide lead time for reviews and possible resubmissions and for placing orders and securing delivery so as to avoid delays in the *Work*.
 - .5 Make provisions in schedule for at least 10 *Working Days* for *Consultant's* review of submittals. When submittals have to be reviewed by one or more of *Consultant's* subconsultants, add 5 more *Working Days* for a total 15 *Working Days* review period.
 - .6 If the *Consultant* requires resubmission of submittals, allow for an additional 10 *Working Days* review for each resubmission.
 - .7 If, at any time, the *Contractor* submits a large enough number of submittals such that the *Consultant* cannot process these submittals within 10 *Working Days*, the *Consultant*, in consultation with the *Contractor* within 3 *Working Days* of receipt of such submittal, will provide the *Contractor* with an estimate of the time necessary for processing same. The *Contractor* shall accommodate such necessary time at no increase in the *Contract Time* and at no additional cost to the *Owner*.

Construction Progress Documentation

- .8 Changes in the construction schedule shall maintain the minimum review periods for the *Consultant's* review specified above.
- .2 Submission:
 - .1 Submit initial schedule to *Consultant* within 15 *Working Days* after *Contract* award.
 - .2 Submit schedule in pdf format to *Consultant* using the *Consultant's* document management system.
 - .3 *Consultant* will review format and content of initial schedule and request necessary changes, if any, within 10 *Working Days* after receipt.
 - .4 *Consultant* will review submittal schedule and advise *Contractor* if volume and timing of submittals will permit review of and response to submittals within timeframes specified under Section 01 32 00. *Consultant* may require modifications to submittals schedule in order to allow adequate time for review of submittals. Adjust submittals schedule and construction schedule as required to comply with *Consultant's* needs.
 - .5 If changes are required, resubmit finalized schedule within 5 *Working Days* after return of review copy.
 - .6 Submit updated submittals schedule monthly to the *Consultant* or more frequently as directed by the *Consultant*.
 - .7 Schedule shall be accompanied by a checklist, correlated to each of the schedule of submittals, the construction schedule, and the schedule of inspections and tests, listing the following:
 - .1 *Shop Drawings*.
 - .2 *Samples*.
 - .3 *Reviews, tests and inspections by:*
 - .1 *Manufacturers*.
 - .2 *Authorities having jurisdiction*.
 - .3 *The Owner*.
 - .4 *The Consultant*.
 - .5 *Independent inspection and testing companies*.
 - .4 *Demonstration and training*.

1.6 Inspection and Testing Schedule

- .1 Prepare schedule for inspection and testing by advance discussion with the selected independent inspection and testing company to determine the time required for the independent inspection and testing company to perform its tests and to issue each of its findings, and allow for required time in the construction schedule.
- .2 Refer to Section 01 45 00 for additional requirements for inspection and testing scheduling.

Construction Progress Documentation

1.7 Schedule Management

- .1 A schedule submitted as specified and accepted by *Consultant* shall become the baseline schedule and shall be used as the baseline for updates.
- .2 At each regular progress meeting, review and discuss current construction progress and submittals schedules with *Consultant* and *Owner*, including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.
- .3 Activities considered behind schedule are those with start or completion dates later than the dates shown on the baseline schedule.

1.8 Recording Actual Site Conditions on As-Built Documents

- .1 *Owner* will provide 1 set of *Contract Documents* to the *Contractor* for as-built documentation purposes. Record information and maintain as-built documents in clean, dry and legible condition.
- .2 Clearly label each drawing as "AS-BUILT DRAWING" and each specification "AS-BUILT SPECIFICATION" and each schedule "AS-BUILT SCHEDULE". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Accurately document as-built conditions and deviations from *Contract Documents* as the *Work* progresses.
- .4 Mark changes in red ink.
- .5 Document actual construction including:
 - .1 Field changes of dimensions/details.
 - .2 Changes by *Change Orders*, *Change Directives*, and *Supplemental Instructions*.
 - .3 References to *Shop Drawings*, where *Shop Drawings* show more detail.
 - .4 Locations of interior mechanical and electrical equipment and distribution.
 - .5 In specification as-builts: Document as-built *Products*, including manufacturer, manufacturer's model or system number.
- .6 Do not use as-built drawings for construction purposes.

1.9 Digital Photographs

- .1 Provide photographic documentation in digital format and in accordance with procedures and submission requirements specified in this section.
 - .1 No other photographs of the *Place of the Work* or of any portion of the *Work* will be permitted without written approval of the *Owner*.
- .2 Equipment: Provide photographs using minimum 10 megapixel digital camera.
- .3 Submit the required photographs to the *Consultant* and to the *Owner*.
- .4 Output: Supply date stamped maximum resolution colour photos to *Consultant* in JPEG format, on USB Flash Drive or via file transfer.

Construction Progress Documentation

- .5 Number of photos required:
- .1 Prior to construction: Provide necessary number of photographs, as required to document existing conditions and verify damage to adjacent streets and property that may have existed prior to construction or demolition work: Minimum 50 photos.
 - .2 Each Progress draw: Provide 24 construction photographs each month to accompany each application for progress draw to document the stage of the *Work* from points selected by the *Consultant* showing as much as possible of the *Work* installed during the previous month.
 - .3 Provide minimum of 8 photographs on each meeting report and for each progress meeting.
 - .4 Completion: When the *Work* is completed, arrange to take final photographs of the *Work* from a minimum of 8 points of view.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Submittal Procedures

PART 1 - GENERAL

1.1 Section Includes

- .1 Administrative requirements.
- .2 Submission procedures.
- .3 *Product* data sheets.
- .4 *Shop Drawings*.
- .5 Engineered Judgements.
- .6 Project firestopping manual and coordination.
- .7 Samples.

1.2 Administrative Requirements

- .1 Submit submittals as requested by the *Contract Documents*, as specified herein, and in accordance with the submittals schedule prepared in accordance with Section 01 32 00.
- .2 In addition to submittals specifically requested by the *Contract Documents*, submit other submittals as may be reasonably requested by the *Consultant*, or as are required to coordinate the *Work* and to provide the *Owner* with choices available, within the scope of *Contract Documents*.
- .3 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.
- .4 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the *Work*. Be solely responsible for delays, make up time lost, and pay added costs incurred because of not making submittals in due time to permit proper review by *Consultant*.
- .5 Once submitted, a submittal shall not be re-submitted until original submission has been reviewed by *Consultant* and returned to *Contractor*.
- .6 Submittals that contain substitutions will be rejected. Substitutions are permitted only in accordance with Section 01 25 00.
- .7 Do not proceed with work affected by a submittal, including ordering of *Products*, until relevant submittal has been reviewed by *Consultant*.
- .8 Prepare submittals using SI (metric) units.
- .9 *Contractor's* responsibility for deviations in submittal from requirements of *Contract Documents* is not relieved by *Consultant's* review of submittal, unless *Consultant* gives written acceptance of specific deviations.
- .10 Keep copies of reviewed submittals at the *Place of the Work* in an organized condition. Only submittals that have been reviewed by the *Consultant* and are marked with *Consultant's* review stamp, as applicable, are permitted at the *Place of the Work*.

Submittal Procedures

- .11 The *Work* shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the *Contract Time* and at no additional cost to the *Owner*.
- .12 *Contractor's* review of submittals:
 - .1 Review submittals for conformity to *Contract Documents* before submitting to *Consultant*. Submittals shall bear stamp of *Contractor* and signature of a responsible official in *Contractor's* organization indicating in writing that such submittals have been checked and coordinated by *Contractor*. Review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the *Place of the Work* proposed for installation.
 - .2 Check and sign each submittal and make notations considered necessary before submitting to *Consultant* for review. Where submittal is substantially and obviously in conflict with requirements of *Contract Documents*, reject submittal without submitting to *Consultant* and request resubmission. Note limited number of reviews of each submittal covered under *Consultant's* services as specified below.
 - .3 Assume sole responsibility for any conflicts occurring in the *Work* that result from lack of comparison and coordination of submittals required for the *Work*.
 - .4 Assume sole responsibility for dimensions to be confirmed and correlated at the *Place of the Work* for information that pertains to fabrication processes or to techniques of construction and installation, and for coordination of the *Work*.
 - .5 Submittals that have not been reviewed, checked, and coordinated by *Contractor* prior to submission to *Consultant*, or that do not bear the stamp and signature of *Contractor* as described above, will be stamped "REVISE AND RESUBMIT" and returned.
 - .6 No changes to the *Work* or the *Contract Documents* shall be made by way of submittals.
 - .1 Changes to the *Work* shall only be made following procedures specified for changes in the *Work*.
 - .2 Submittals that include changes to the *Work* or the *Contract Documents* shall be stamped "REVISE AND RESUBMIT" and returned.
- .13 *Consultant's* review of submittals:
 - .1 Review of submittals by *Consultant* is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the *Contract Documents*. This review shall not mean that *Consultant* approves the detail design inherent in the submittals, responsibility for which shall remain with the *Contractor*. Such review shall not relieve the *Contractor* of responsibility for errors or omissions in the submittals, nor of responsibility for meeting requirements of *Contract Documents*.

Submittal Procedures

- .2 As part of their scope of work, *Consultant* shall review *Shop Drawings* no more than twice. Should three or more reviews be required due to reasons of *Contractor* omissions causing resubmission requests, then *Contractor* shall reimburse the *Consultant* for time expended in these extra reviews. Time shall be invoiced to the *Owner* (to be deducted from monies due to the *Contractor* and paid to *Consultant* by *Owner*) at rates recommended by *Consultant's* professional association and disbursements shall be invoiced at *Consultant's* cost. The *Contractor* shall cover directly costs and administration associated with courier services and the like for these extra *Shop Drawings* reviews.
 - .3 *Consultant's* review and markings on submittals do not authorize changes in the *Work* nor in the *Contract Time*, and shall be accommodated at no additional cost to the *Owner*. If, in the opinion of the *Contractor*, the *Consultant's* markings on submittals constitute a change in the *Work* or will effect a change in the *Contract Time*, then the *Contractor* shall so notify the *Consultant* in writing and request an interpretation following the procedures for requests for interpretation in accordance with Section 01 31 00. If the *Consultant* finds that the *Consultant's* markings on submittals do constitute a change in the *Work* or will effect a change in the *Contract Time*, then a *Change Order* will be prepared therefore. The time taken to process such a request for interpretation shall not, in and of itself, constitute a change in the *Work* nor an increase the *Contract Time*.
 - .4 Submittals that are not required by the *Contract Documents* or not requested by the *Consultant* will not be reviewed by the *Consultant* and will be marked 'NOT REVIEWED' by the *Consultant* and returned to the *Contractor*.
- .14 Engineered submittals:
- .1 Submittals for items required to be sealed by professional engineer (engineered) shall be duly prepared, sealed, and signed under the direct control and supervision of a qualified professional engineer licensed in the jurisdiction in which the *Place of the Work* is located, having in force professional liability insurance with minimum coverage limit of \$2,000,000 per claim and annual aggregate.
 - .2 Include with engineered submittal, proof of insurance identifying insurer, policy number, policy term, and limit of liability, on duly signed letterhead and / or certificates of insurance.
 - .3 Design includes post disaster building, seismic design, life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, authorities having jurisdiction, and design requirements of the *Contract Documents*.
 - .4 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal.

Submittal Procedures

- .5 Professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the *Consultant*, to authorities having jurisdiction as required, and in accordance with the building code.
- .6 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the *Contract Documents*, including reviewed shop drawings and design calculations.
- .7 Upon completion of the parts of the *Work* covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the *Consultant* and authorities having jurisdiction, as required, a letter of general conformity for those parts of the *Work*, certifying that they have been provided in accordance with the requirements both of the *Contract Documents* and of the authorities having jurisdiction over the *Place of the Work*.
- .8 Costs for such field reviews and field review reports and letters of general conformity are included in the *Contract Price*.

1.3 Submission Procedures

- .1 Coordinate each submittal with requirements of the *Work* and *Contract Documents*. Individual submittals shall include related information.
- .2 Distribute copies of submittals to parties whose work is affected by submittals except *Consultant* and *Owner* before final submission for review by *Consultant*.
- .3 Accompany submittals with transmittal letter containing:
 - .1 Date.
 - .2 *Project* title and number.
 - .3 *Contractor's* name and address.
 - .4 *Contractor's* review stamp.
 - .5 Identification and quantity of each submittal.
 - .6 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant *Specifications* section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 04 05 19-01-R0.
- .5 Submit original PDF documents only: scanned documents shall not be accepted.
 - .1 PDF submittals shall be bookmarked and linked to a Table of Contents or cover letter identifying the contents of the submission.
- .6 Make any changes in submittal that *Consultant* may require, consistent with *Contract Documents*, and resubmit as directed by *Consultant*.

Submittal Procedures

- .7 Notify *Consultant*, in writing, when resubmitting, of any revisions other than those requested by *Consultant*.
- .8 After *Consultant*'s review, distribute copies to affected parties.

1.4 Product Data Sheets

- .1 Submit *Product* data sheets as follows:
 - .1 1 copy digitally as a bookmarked PDF to *Consultant* using the *Consultant*'s document management system.
 - .2 Submit *Product* data sheets as called-for by the *Contract Documents* or as the *Consultant* may reasonably request where shop drawings will not be prepared due to a standardized manufacture of a *Product*. Manufacturers' catalogue cuts will be acceptable in such cases, providing that they are 213 mm x 275 mm (8-1/2" x 11") originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data, including installation instructions. Submissions showing only general information are not acceptable.
 - .1 In addition, submit written requirements for *Product* handling (handling and storage) in accordance with Section 01 60 00.
 - .3 Where requirements of *Contract Documents* are more stringent than design proposed on *Product* data sheets, the requirements of the *Contract Documents* take priority.
 - .4 Upon completion of review by *Consultant*, 1 marked set of *Product* data sheets will be returned to *Contractor* in digital format for reproduction and distribution.
 - .5 Retain 1 complete set of reviewed *Product* data sheets for issuance as part of closeout submittals in accordance with Section 01 78 00.

1.5 Shop Drawings

- .1 Submit *Shop Drawings* as follows:
 - .1 1 copy digitally as a bookmarked PDF to *Consultant* using the *Consultant*'s document management system.
 - .2 Lettering on *Shop Drawings* shall be not less than 3 mm (1/8") high.
 - .3 Reproduction of construction *Drawings* to serve as background for *Shop Drawings* is not permitted.
 - .4 Where requirements of *Contract Documents* are more stringent than design proposed on *Shop Drawings*, the requirements of the *Contract Documents* take priority.
 - .5 *Consultant* markings and resulting action required:
 - .1 *Shop Drawings* requiring no changes will be marked 'REVIEWED', and shall be submitted for as-built drawings purposes.
 - .2 *Shop Drawings* requiring several changes will be marked 'REVIEWED as NOTED' and shall be revised and submitted for as-built drawings purposes.

Submittal Procedures

- .3 *Shop Drawings* requiring substantial changes will be marked 'REVISE AND RE-SUBMIT' and shall be revised and resubmitted until *Consultant* stamps *Drawings* with 'REVIEWED' or 'REVIEWED as NOTED'.
- .6 *Shop Drawings* size shall be multiple of 213 mm and 275 mm (8-1/2" and 11") excluding 38 mm (1-1/2") binding margin and not larger than 838 mm x 1117 mm (33" x 44"). Leave minimum 150 mm x 100 mm (6" x 4") clear space for *Consultant's* comments.
- .7 Upon completion of review by *Consultant*, 1 marked set of *Shop Drawings* will be returned to *Contractor* in digital format for reproduction and distribution.
- .8 Retain 1 complete set of reviewed *Shop Drawings* for issuance as part of closeout submittals in accordance with Section 01 78 00.
- .9 Submit copies of reviewed *Shop Drawings* to authorities having jurisdiction as required.
- .10 *Shop Drawings* shall include:
 - .1 Fabrication and erection dimensions.
 - .2 Plans, sections, elevations, arrangements and sufficient full size details which indicate complete construction, components, methods of assembly as well as interconnections with other parts of the *Work*.
 - .3 Design calculations for items that require design calculations.
 - .4 Clear definition of the division of responsibility for the work described thereon. No *Products*, items or equipment, or description of work, shall be indicated to be supplied, or work to be done, "By Others" or "By Purchaser". *Shop Drawings* marked with either of these phrases shall be rejected without having been reviewed by the *Consultant*.
 - .5 Location and type of exposed anchors, attachments and locations and types of fasteners, including concealed reinforcements to accept mounted fasteners.
 - .6 Adhesives, joinery methods and bonding agents.
 - .7 Kinds and grades of materials, their characteristics relative to their purpose, detailed description of finishes and other fabrication information.
 - .8 Configurations, types and sizes required; identify each unit type on drawing and on *Product*.
 - .9 Descriptive names of equipment and mechanical and electrical characteristics when applicable.
 - .10 Data verifying that superimposed loads will not affect function, appearance and safety or work shown on shop drawings, as well as other interconnected work.
 - .11 Assumed design loadings, dimensions of elements and material *Specifications* for load-bearing members.
 - .12 Proposed chases, sleeves, cuts and holes in structural members.
 - .13 Wall thicknesses of metals.
 - .14 Location and types of welds. For structural welds use AWS symbols and clearly show net weld lengths and sizes.

Submittal Procedures

- .15 Materials, gauges, and sizes being supplied including connections, attachments, reinforcement, anchorage and locations of exposed fastenings.
- .16 Installation instructions and details for *Products* to be installed by separate *Subcontractors*, including function of each part.
- .17 A list of *Products* covered by, or included on, the shop drawing. List of *Products* shall be complete and show manufacturer's name, *Product* name, generic description, standard certification where specified, manufacturer's complete installation data and precautions against wrong installation, operation and maintenance.
- .18 Refer to individual sections of the *Specifications* for more particular requirements for *Shop Drawings*.
- .19 Compatibility statement: Include with each *Shop Drawings* a statement that each *Product* and material indicated on the *Shop Drawings* is compatible with each *Product* and material with which it comes into contact.

1.6 Engineered Judgements

- .1 When an engineered judgement is required by authorities having jurisdiction, such engineered judgement shall be prepared as an engineered submittal in accordance with Section 01 33 00.

1.7 Project Firestopping Manual and Coordination

- .1 The *Contractor* shall assign a firestopping and smoke seal firestopping coordinator to coordinate the firestopping details and systems required in the *Work*. Applicator shall designate a single individual as *Project* foreperson who shall be present at the *Place of the Work* throughout the *Work*.
- .2 Firestopping manual:
 - .1 *Contractor* and firestopping and smoke seal coordinator shall prepare a preliminary fire stopping manual, inclusive of all firestopping systems in the *Work*, to be submitted to the *Consultant* prior to the installation of any firestopping and smoke seal work.
 - .2 Manual shall include:
 - .1 Project key plans of each level, with enlarged key plans at areas where required, which identify and tag each anticipated penetration and fire stopping location and type (i.e. multiple metallic pipes through gypsum board wall assembly; single metallic pipe through concrete floor assembly, and the like).
 - .2 *Product* data sheets: data and installation instructions for *Products* providing descriptions sufficient for identification at the *Place of the Work*.
 - .1 Materials list of *Products* proposed for use in the *Work*; complying with listed systems designs.
 - .2 Listing agency's detailed drawing showing joint assemblies and firestopping materials, identified with listing agency's name and number or designation, fire rating achieved, and date of listing.

Submittal Procedures

- .3 Manufacturers' installation instructions and recommendations.
- .3 *Shop Drawings*:
 - .1 Submit drawings indicating fire resistance rated assembly number, required temperature, hose stream, and flame rating, material thicknesses, installation methods and materials of firestopping and smoke seals, primers, supports, damming materials as applicable, reinforcements, anchorages, fastenings and methods of installation for each condition to be encountered.
 - .2 Designate on *Shop Drawings* static through penetrations and dynamic joint systems, relative positions, expansion and control joints in rated slabs and walls, and firestopping details.
 - .3 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 particular 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 Drawings* details prepared by a professional engineer. The engineering judgment submittal shall include both *Project* name, *Project* location, and *Subcontractor's* name who will install firestop system as described in engineering judgement *Shop Drawings*.
 - .3 Provide complete details of specific application of listed system and its modifications upon which the engineered judgement is based upon.
 - .4 For perimeter fire barrier systems:
 - .1 Submit engineered *Shop Drawings* for engineering judgements covering perimeter fire barrier systems. Identify each cladding assembly type in contact with each perimeter fire barrier system.
 - .4 Fire resistance rating test listings for firestopping and smoke seal systems.
 - .3 Firestopping manual shall be submitted within 4 weeks of *Contract* award.
 - .4 Prior to concealment of firestopping conditions above a ceiling or by another assembly or finish, the *Contractor* shall submit an updated firestopping manual including as-built drawings that identify firestopping conditions and penetrations.
- .3 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01 77 00.
 - .2 Submit the following certification documents with closeout submittals:
 - .1 Manufacturer's certification: Submit manufacturer's certification that installed firestopping and smoke seal *Products* are suitable for the use indicated and comply with specified requirements.

Submittal Procedures

- .2 Installation certification: Installer shall submit certification that all joint firestopping system installations are completed and that installations comply with listed systems designs.
- .3 As-built copy of the firestopping manual.

1.8 Samples

- .1 Except where a different amount is specified, submit a minimum of 3 samples. Otherwise submit the number of samples specified.
- .2 Deliver samples to the following location with expenses, including carrying costs, prepaid, unless otherwise instructed:
 - .1 Owner's office.
- .3 Identify samples or assemblies by *Project* number and name, name of *Consultant*, *Contractor* and *Subcontractor*, and date of submission. Identify location, specified material reference and any other pertinent information. Show construction by layered method if necessary, clearly displaying textures and patterns.
- .4 Where a required colour, pattern or texture has not been specified, submit full range of available *Products* meeting other specified requirements.
- .5 *Consultant* selection from samples is not intended to change the *Contract Price* or *Contract Time*. If a selection would affect the *Contract Price* or *Contract Time*, notify *Consultant* in writing prior to proceeding with the *Work*.
- .6 Resubmit samples until written acceptance is obtained from *Consultant*.
- .7 Reviewed and accepted samples will establish the standard against which installed *Work* will be reviewed.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Special Project Procedures for Healthcare Facilities

PART 1 - GENERAL

1.1 Section Includes

- .1 General scope and responsibility.
- .2 Temporary ventilation.
- .3 Existing facilities.
- .4 Existing services.
- .5 Dust tight partitions and enclosures.
- .6 Infection prevention and control procedures.
- .7 Protection of the existing building.
- .8 Emergency and fire protection.
- .9 Missing patient search.

1.2 General Scope and Responsibility

- .1 For the purposes of this section:
 - .1 The words "worker" or "workers" shall mean the *Contractor*, *Contractor's* staff or employees, *Subcontractors*, *Subcontractor's* staff or employees, *Suppliers*, *Supplier's* staff or employees, or anyone engaged for the *Work*, directly or indirectly, by the *Contractor*, unless specifically noted otherwise.
- .2 Conform to the *Owner's* construction procedures and safety manual. In case of conflict between the *Owner's* construction procedures and safety manual and the remainder of the *Contract Documents*, the *Owner's* construction procedures and safety manual shall govern.
- .3 Operational limitations:
 - .1 The existing building will remain in full use and occupancy throughout the *Work*, except for such parts of the building that have been vacated for the *Work*.
 - .2 *Contractor's* use of the *Place of the Work* is limited to permit regular use of *Owner's* facilities to continue with the least amount of interference possible.
 - .3 Assigned access to the *Place of the Work* and access routes through occupied areas of the existing building are as indicated in the *Contract Documents*.
- .4 Dust tight enclosure and partition doors or flaps and entrance doors to the *Place of the Work* shall remain closed.
- .5 Areas of the existing building adjacent to the *Place of the Work* or areas affected by the *Work*, including circulation and access routes, shall be maintained in a clean state equivalent to the level of cleanliness maintained in the existing building, and as follows:
 - .1 Clean and vacuum the *Place of the Work* and areas surrounding the *Place of the Work* daily or more frequently as required.

Special Project Procedures for Healthcare Facilities

- .2 Provide tack mats at access doors to the *Place of the Work* so that workers can remove dust and debris from their footwear when exiting the *Place of the Work*. Replace or clean daily, or more frequently as required.
- .3 Wet mop floor areas in vicinity of access doors to the *Place of the Work* daily, or more frequently as required.
- .4 Vacuum carpeted areas daily or more frequently as required.
- .5 Wet clean carpets in accordance with manufacturer's recommendations once work in such areas is complete.
- .6 Final cleaning shall be in accordance with Section 01 74 00.
- .6 Waste protection and removal:
 - .1 Waste management and disposal shall be in accordance with Section 01 74 00 as supplemented herein.
 - .2 Transport waste in containers with tightly fitting lids or cover waste with a wet sheet.
 - .3 Remove waste as it is created. Debris shall be contained and covered if it cannot be removed immediately.
 - .4 Do not transport waste through occupied areas of existing building.
 - .5 Remove waste at the end of each *Working Day* through construction access routes.
- .7 Document condition of the existing building in areas immediately adjacent to the *Place of the Work* by means of construction photographs in accordance with Section 01 32 00.
- .8 Workers shall remove dust from body and clothing by vacuum cleaning prior to traversing patient care areas.
- .9 In areas designated by the *Owner*, workers shall be required to wear protective clothing as directed by the *Owner*. Protective clothing shall be removed upon exiting designated areas.
- .10 Cellular phones shall not be used in the existing building.
- .11 Walkie-talkies shall not be used in the existing building without the express, written approval of the *Owner*.
- .12 Safety clearances are required before any cutting, welding, core drilling, or open flame work is done. A request in writing to the *Owner* must be made and approved a minimum of 1 *Working Day* prior to commencing such work.

1.3 Temporary Ventilation

- .1 Provide temporary ventilation in accordance with Section 01 51 00 supplemented as follows:
 - .1 Provide negative pressure air ventilation as described below.
 - .2 Ensure quality of intake air to existing building through existing intake louvers is not compromised by dust or noxious or odorous fumes.

Special Project Procedures for Healthcare Facilities

1.4 Existing Facilities

- .1 Restrict access, parking, material deliveries, execution of work, operations and procedures to designated locations and times and do not deviate from designated procedures without prior acceptance by the *Consultant* in the presence of the *Owner*.
- .2 Periodically review proposed construction operations with the *Consultant* in the presence of the *Owner* and cooperate as required to ensure that *Owner's* interests and requirements are not unduly compromised with regard to the normal operation and function of occupied areas on the existing building.
- .3 Workers shall not be permitted to use the hospital cafeteria.
- .4 While working in the existing hospital, workers shall not remain in areas in which they are working for meals and breaks. Workers shall not be permitted to have meals or take breaks in the existing hospital. Meals shall and breaks shall be taken in the site office, or away from the *Place of the Work*.
- .5 Traffic through existing occupied areas of the hospital shall be kept to a minimum. Travel within existing occupied areas of the hospital shall be via the most direct route that does not pass through patient wards or sensitive areas.
- .6 Noise, dust and debris, and odours shall be minimized to ensure hospital staff and patients in adjacent areas are disturbed as little as possible. Corrective action to cease or limit disagreeable annoyances to hospital staff and patients shall be implemented immediately upon notification by the *Consultant* or the *Owner*.
- .7 Use of existing containers and garbage bins shall not be permitted.
- .8 Use of existing elevators shall not be permitted.
- .9 Existing fire protection equipment:
 - .1 Existing fire protection equipment, such as fire extinguishers and hoses, shall only be used in an emergency situation.
 - .2 Do not remove existing fire protection equipment.
 - .3 If any existing fire protection equipment is used or interfered with in any way, the *Owner's* fire equipment inspector shall be retained to inspect, test, recharge, and otherwise repair such equipment at no additional cost to the *Owner*.
- .10 Sanitary facilities: in accordance with Section 01 52 00.

1.5 Existing Services

- .1 Service interruptions:
 - .1 Connection or disconnection of services that will interfere with the operation of the *Owner's* facilities shall not be done without the prior written acceptance of the *Consultant* in the presence of the *Owner* and during the times designated by the *Owner*. Premium charges associated with such work shall be included in the *Contract Price*.

Special Project Procedures for Healthcare Facilities

- .2 Provide at least 10 *Working Days* prior written notice to the *Consultant* and the *Owner* of requirement or intention to interrupt services, and obtain written permission of the *Consultant* in the presence of the *Owner* prior to commencing such interruption.
 - .3 In no instance shall interruptions affect the entire existing building.
 - .4 As far as possible, coordinate interruptions with the *Owner's* regular maintenance of building services and systems.
 - .5 Areas adversely affected by changes in air flows outside the construction areas as a result of a required shut-down of portions of the existing HVAC system within the construction areas are to be re-balanced to comfortable levels as advised by the *Consultant*.
- .2 Should existing services be interrupted in breach of the above, make good immediately and provide protection against further such disruptions. Costs resulting from such interruptions and for making good shall be the responsibility of the *Contractor* at no additional cost to the *Owner*.

1.6 Dust Tight Partitions and Enclosures

- .1 Dust tight partitions and enclosures shall be in accordance with Section 01 56 00 and Section 01 57 00, as supplemented herein.
- .2 Dust tight partitions:
 - .1 Provide dust tight partitions to localize dust generating activities, and for the protection of workers, hospital staff, patients, the public, and finished areas of the *Work*.
 - .2 Dust tight partitions shall be temporary, weather tight, dust, tight, and lockable partitions between occupied areas of the existing hospital and areas where the *Work* is being performed, and shall include treatment of joints, cracks, and openings in partitions to prevent dust from entering occupied areas of the hospital.
 - .3 Dust tight partitions shall be assemblies with 1 hour fire resistance rating complete with doors and frames having 3/4 hour fire resistance ratings.
 - .4 Construct dust tight partitions as follows:
 - .1 Provide 92 mm (3-5/8") steel studs at 400 mm (16") on centre, with 2 rows of bracing between studs and additional bracing for gypsum board finish. Steel studs shall be in accordance with Section 09 22 00.
 - .2 Provide fire resistance rated tarpaulins fastened to studs on the side of the partition opposite to the occupied areas of the hospital. Lap joints 100 mm (4") minimum, and seal laps and perforations dust tight with 75 mm (3") wide plastic film tape.
 - .3 Provide 1 layer of 12.7 mm (1/2") thick square edge fire resistant gypsum board over both side of partition. Seal joints with 75 mm (3") wide plastic film tape. Gypsum board and installation shall be in accordance with Section 09 29 00.
 - .4 Provide felt gaskets around perimeter of partitions.

Special Project Procedures for Healthcare Facilities

- .5 Paint sides of partitions exposed to occupied areas of the existing building in accordance with Section 09 91 00, colour as to later selection by the *Consultant*.
- .3 Dust tight enclosures:
 - .1 Where minor isolated alteration work occurs in the existing building and a dust tight partition is not feasible, provide a mobile containment system, extending floor to ceiling.
 - .2 Mobile containment system shall be fabricated of an adjustable aluminum frame, vinyl enclosure with pressure porthole, wheel base platform, and disposable plastic liner, and sized as required.
 - .3 Provide HEPA filter vacuum device and manometer and connect to pressure porthole.
 - .4 Acceptable *Product*: Kontrol Kube Topsider or Kontrol Kube Topsider Jr., as manufactured by Fiberlock Technologies Inc., or approved alternate.
- .4 Maintain and relocate dust tight partitions and enclosures until dust generating work is complete, or until directed otherwise in writing by the *Consultant* in consultation with the *Owner*.
- .5 Provide "Construction Zone" signage outside dust tight partitions and enclosures, manufactured by signage company, with minimum 75 mm (3") letters.

1.7 Infection Prevention and Control Procedures

- .1 Infection prevention and control procedures shall be in accordance with CAN/CSA Z317.13-22, and Health Canada document "Construction-Related Nosocomial Infections in Health Care Facilities".
- .2 Training:
 - .1 Provide workers with training in infection prevention and control procedures.
 - .2 Training shall be provided a specialized infection prevention and control consultant approved by the *Owner*.
 - .3 The *Contract Price* includes the cost for the required number of training sessions to adequately cover the duration of the *Project*.
 - .4 Proof of successful completion of such training shall be submitted to the *Owner* in the form of a certificate issued by the infection prevention and control consultant providing the training. Training certificate shall be submitted before a worker undertakes any work at the *Place of the Work*.

Special Project Procedures for Healthcare Facilities

- .3 The *Owner* specialized infection prevention and control consultant shall assess the risks related to the *Project* utilizing the Risk Assessment and Preventative Measures Checklist contained in Health Canada Document "Construction-Related Nosocomial Infections in Health Care Facilities". The determination of risk will guide the need for barriers and other infection prevention and control measures required in the *Work*. The *Owner* will advise the *Contractor* of the results of the assessment. The specialized infection prevention and control consultant shall advise the *Owner* and the *Contractor* of the results of the assessment.
 - .1 The *Consultant* shall have no authority or role under the *Contract* with regard to infection prevention and control procedures.
- .4 Field review of the *Work* and on-going infection prevention and control procedures shall be undertaken on a regular basis by the specialized infection prevention and control consultant in the presence of the *Contractor*. Procedures for such field reviews shall be the same as those for inspection and testing in accordance with Section 01 45 00.
- .5 At *Contract* start-up meeting, convened in accordance with Section 01 31 19, review infection prevention and control procedures. The specialized infection prevention and control consultant shall attend the *Contract* start-up meeting. Subjects to be reviewed include, but are not limited to, the following:
 - .1 General information on infection prevention and control procedures.
 - .2 Identification of patient populations that may be at risk.
 - .3 Prevention measures for essential services that may be disrupted.
 - .4 The integrity of the facility's exterior structure, spatial separations, ventilation and water supplies for any infection control problems.
 - .5 Methods for dust containment and removal of construction debris.
 - .6 Traffic patterns for construction workers and supply delivery routes to minimize risks to patients, staff and visitors.
 - .7 The need for increased filter changes during the *Work*.
 - .8 The need to close down dampers temporarily to reduce circulation of contaminated air or fumes.
 - .9 Systems that can provide the required air exchange rates and pressure relationships in critical areas near construction activity.
 - .10 Schedule of field reviews by the specialized infection prevention and control consultant.
- .6 Vacuum cleaners:
 - .1 Vacuums shall be commercial grade complete with HEPA filters.
 - .2 HEPA filter shall be changed as recommended by the manufacturer or required by use. Maintain a filter change log at the *Place of the Work*, available for review by the *Owner*.

Special Project Procedures for Healthcare Facilities

- .7 The following precautions, as a minimum, shall be taken when working on existing walls, ceilings, floor spaces, ducts and piping systems as the dust and dirt collected in these areas may contain disease causing germs:
 - .1 Prior to work being done or the removal of ceiling tiles, or opening of ceiling access hatches, erect floor to ceiling dust tight partitions and enclosures as described above to completely enclose the area where such work is being performed.
 - .2 Remove acoustical ceiling panels keeping horizontal, and vacuum clean the panels immediately prior to removal.
 - .3 Existing air ducts, conduits, and spaces above the ceiling shall be vacuum cleaned prior to the start of work in such areas.
 - .4 Remove dust tight partitions and enclosures when work is finished or prior to the start of hospital working day, and remove marks left by tape or studs, and enclose ceiling areas with no obstructions to mechanical and electrical devices in the ceiling space.
 - .5 Vacuum clean interior of dust tight partitions and enclosures prior to their removal.
 - .6 Vacuum clean area enclosed by dust tight partitions and enclosures after removal of the dust tight partitions and enclosures.
- .8 Negative pressurization
 - .1 Areas where work is being undertaken shall be isolated from occupied areas of the hospital using dust tight partitions and enclosures as described above.
 - .2 The *Place of the Work* will be maintained under negative pressure at all times in relation to the occupied areas of the existing building to prevent dust and airborne pathogens from entering the occupied areas of the existing building.
 - .3 Negative pressure shall be achieved through the use of dedicated (window or otherwise) exhaust units or, if direct access cannot be achieved, by HEPA filtered recirculation units that transfer filtered air from the *Place of the Work* into the occupied areas. Exhaust points will be reviewed with the *Owner* to ensure that the exhaust air from the *Place of the Work* is not affecting pedestrian routes and is not re-entrained back into the existing building through fresh air intakes.
 - .4 Provide construction exhaust/HEPA units and remove at the completion of the *Work*.
 - .5 Air systems serving only the *Place of the Work* will be shut down and all supply, return and exhaust openings shall be sealed to prevent dust and construction debris from entering the air system. As a further precaution, the air system will be reviewed at the end of the *Work* to determine if cleaning is required.
 - .6 Supply and return air ducts entering the *Place of the Work* are to be fitted with a pre-filter unit and sealed within the *Place of the Work* near point of entry or exit prior to the start of disruptive activity to prevent dust and construction debris from entering the air system. As a further precaution, the air system will be reviewed at the end of the *Work* to determine if cleaning is required.

Special Project Procedures for Healthcare Facilities

- .7 During construction, the seal only on the supply air duct may be removed after demolition and clean-up to permit ventilation within the construction area provided no other means is available.

1.8 Protection of the Existing Building

- .1 Protection requirements shall be in accordance with Section 01 56 00, as supplemented herein.
- .2 Keep *Place of the Work* safe and secure, denying access to unauthorized personnel.
- .3 Protect existing work from damage. Make good any damage caused. The onus is on the *Contractor* to substantiate that damage existed prior to commencement of the *Work*.
- .4 Do not overload the existing structure due to the *Work*.
- .5 Take special measures to protect existing work from damage when moving heavy loads or equipment. Protect areas used as passageways or through which materials are moved. Use resilient tired conveyances only when moving materials and equipment inside building. Provide coverings as required to protect existing work from damage.
- .6 Separate exterior access, work and storage areas from *Owner* occupied existing areas, with fencing and hoarding as specified in Section 01 56 00. Rearrange fencing/hoarding as *Work* progresses to suit extent and configuration of the *Work*.
- .7 Provide guards, barricades and other temporary protection to prevent injury to persons.
- .8 Protect existing building components and contents from damage by weather, when executing *Work* affecting integrity of the building envelope. provide temporary insulated and air tight weatherproof closures to protect openings made in existing building envelope. *Make Good* existing building components and contents damaged by weather resulting from inadequate temporary protection measures.
- .9 Protection of existing occupied areas:
 - .1 Existing exterior walls with windows of plain glazing, when exposed to the *Work*, shall be protected with 16 mm (5/8") gypsum board for interior surfaces and 9.5 mm (3/8") exterior grade plywood for exterior surfaces, mounted on suitable framing.
 - .1 Plywood: in accordance with Section 06 10 53.
 - .2 Metal framing: in accordance with Section 09 22 00.
 - .3 Gypsum board: in accordance with Section 09 29 00.
 - .2 Maintain such protection throughout the *Work*.
 - .3 Other openings in the existing exterior walls, such as doors and louvres, shall be similarly protected or replaced with doors of solid core wood or hollow steel construction.

1.9 Emergency and Fire Protection

- .1 Provide and maintain ready access to fire protection equipment, in accordance with Section 01 52 00.

Special Project Procedures for Healthcare Facilities

- .2 Immediately implement any request or instruction made by the hospital's fire marshal.
- .3 Provide temporary fire resistant closures at existing areas openings exposed to construction areas for the *Work* to maintain fire and life safety of existing building.
- .4 *Contractor* shall coordinate the work with the *Owner* in order to ensure no disruption to the existing fire detection and annunciation systems. Failure to provide such coordination shall result in the *Contractor* incurring the responsibilities and expenses associated with disruption to the existing fire detection and annunciation systems at no additional cost to the *Owner*.
 - .1 Provide fire watch when existing fire detection and annunciation systems are not operational or on bypass.
 - .2 Whenever a changeover time occurs, which is an outage time of at least a portion of the fire alarm system, the municipal fire department shall be notified of the temporary shutdown and alternative measures shall be devised.
- .5 *Contractor* shall coordinate the work with the *Consultant* in the presence of the *Owner* in order to prevent unapproved disruptions to the existing sprinkler system, standpipe system, or other fire protection systems.
 - .1 Where temporary shut-down is necessitated, such shut down shall be in accordance with the requirements of authorities having jurisdiction and the building code.
- .6 Obtain 'Hot Work Permit' from *Owner* prior to hot work operation, which may cause the building's fire alarm system to be activated or create an unwarranted fire risk condition. The prevention of fires and false fire alarms caused by hot work operations is the primary goal of this procedure. Gas hoses, backflow preventers, fire resistive tarpaulins, curtains and other cutting and welding equipment must be in good repair before the permit is issued.
 - .1 'Hot Work' is defined as work using open flames or sources of heat that could ignite materials in the work area.
- .7 Fire separations:
 - .1 Maintain the integrity of fire separations, fire protection systems, and fire rated assemblies.
 - .2 Make good fire separations, fire protection, and fire rated assemblies compromised as a result of the *Work*.
- .8 Maintaining existing building exit facilities:
 - .1 Maintain exit facilities serving the existing building.
 - .2 Where an exit is blocked-off or deleted as a result of the *Work*, an alternative exit shall be provided that is acceptable to the *Consultant*, the *Owner*, and authorities having jurisdiction.
 - .3 Where it is necessary for access to be gained to an exit through the *Place of the Work*, the access shall be clearly defined and protected so that it is separated from construction areas by a smoke tight fire separation equivalent to a minimum of 1 hour fire resistance rating, unless otherwise indicated.

Special Project Procedures for Healthcare Facilities

.9 Intersecting corridors:

- .1 Provide temporary fire separations between existing corridors on occupied floor areas and new corridors under construction.
- .2 Construct temporary fire separations out of steel studs and gypsum board to provide a construction equivalent to a minimum of 1 hour fire resistance rating, unless otherwise indicated.
 - .1 Firestopping and smoke sealant: in accordance with Section 07 84 00.
 - .2 Steel studs: in accordance with Section 09 22 00.
 - .3 Gypsum board: in accordance with Section 09 29 00.
- .3 Where access is required, the doorway shall be protected by a door of solid core wood or hollow steel construction.
- .4 Finish hardware equivalent to a minimum of 1 hour fire resistance rating, unless otherwise indicated.

.10 Fire department access:

- .1 Do not obstruct access route designated for fire department equipment.
- .2 If it is necessary that existing access routes be obstructed or deleted, alternative access routes acceptable to the fire department and in accordance with the requirements of the *Contract Documents* and authorities having jurisdiction shall be provided prior to commencement of work that will obstruct or delete existing access.

.11 Combustible materials:

- .1 Stockpiling of combustible materials adjacent to or inside the existing building shall not be acceptable.

.12 Temporary protection of openings in fire separations:

- .1 Openings in existing floor assemblies and vertical fire rated assemblies required by the *Work*, shall be temporarily protected with materials as required to maintain continuity of the required fire resistance rating for existing fire rated assembly.

1.10 Missing Patient Search

- .1 In the event that the *Owner* is required to undertake a missing patient search, undertake a detailed search of the *Place of the Work*, under the direction of the *Owner*.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Quality Requirements

PART 1 - GENERAL

1.1 Section Includes

- .1 *Contractor's* quality assurance program.
- .2 *Contractor's* field quality control.
- .3 Subcontractor Qualification Statements
- .4 Independent inspection and testing – *Owner's* Quality Assurance.
- .5 Inspection and testing schedule.
- .6 Reports and documents.
- .7 Manufacturer's field review.

1.2 *Contractor's* Quality Assurance Program

- .1 Submit to the *Owner* and the *Consultant* for their information, a quality assurance program (the "Quality Assurance Program").
- .2 The Quality Assurance Program shall meet the requirements of Canadian Standards Association CSA CAN3-Z299.3 or such other requirements as set out in the *Contract Documents*.
 - .1 The Quality Assurance Program shall be designed so that quality requirements are obtained by progressive implementation of the controls and inspection functions stated in the Quality Assurance Program.
 - .2 Make any modifications to the Quality Assurance Program as reasonably requested by the *Owner* and/or the *Consultant*.
 - .3 The Quality Assurance Program shall include, but shall not be limited to, the following:
 - .1 A system by which changes to the *Contract Documents* and correspondence with *Subcontractor* and other correspondence is handled in a controlled manner.
 - .2 A system for purchased or manufactured materials to be identified, inspected to the specified standard, and covered by a material test report.
 - .3 A system by which measuring and testing equipment is properly stored, handled, and calibrated to a known standard.
 - .4 A system by which incoming materials are: inspected to the specified standard; accepted; allocated safe storage; and properly recorded.
 - .5 A system by which process inspection requirements shall be clearly stated for operations and carried out by qualified personnel.

Quality Requirements

- .6 A system by which final inspections will be carried out and accepted by authorized personnel prior to release for shipping or major assembly.
 - .7 A system by which non-conformance to requirements of the *Contract Documents* shall be recorded and solutions proposed by the *Owner* or the *Consultant* are also recorded.
 - .8 A system by which instructions for handling and storage of equipment shall be given.
 - .9 A system by which SBO items can be inspected and received in a manner which allows replacement or correction.
 - .10 A system by which a record of quality inspections, tests, and actions shall be kept, including field quality control.
 - .11 A system by which the *Owner* and the *Consultant* shall be afforded access to manufacturing areas and quality records and issued with copies of pertinent drawings and manufacturing schedules.
- .3 Provide the *Owner* and the *Consultant* with regular Quality Assurance Reports for their information according to an agreed schedule.

1.3 Contractor's Field Quality Control

- .1 Provide and be responsible for field quality control throughout the *Work*, including quality control of *Subcontractors* and major *Suppliers*.
- .2 Ensure that the only specified or approved *Products* and materials are used.
- .3 Provide and maintain an effective quality control program, in accordance with the Quality Assurance Program, and perform inspections and tests to ensure compliance with *Contract Documents*.
- .4 Furnish appropriate facilities, instruments, and testing devices required for performance of the quality control function.
- .5 Deliver inspection testing reports or approvals in accordance with the requirements of Section 01 45 00.
- .6 Develop a field quality control manual covering field installation. The form of the manual shall be acceptable to the *Owner* and the *Consultant*. This manual will document field quality control practices of the *Contractor*, *Subcontractors*, and major *Suppliers*. The manual shall include, but not be limited to:
 - .1 Concrete slab moisture and pH testing and surface preparation, including flatness and levelness.
 - .2 Surface preparation.
 - .3 Fastener and anchor installation.
 - .4 Material compatibility testing.
 - .5 On line fabrication quality control practices.
 - .6 Shipping.

Quality Requirements

- .7 Field installation.
- .8 Field inspection and testing by *Contractor*.
- .9 Field inspection and testing independent.
- .7 Inspection and testing shall be performed by company qualified to perform the inspections or tests specified or required by the building code, regulations, by-laws, or authorities having jurisdiction.
- .8 Retain and pay for inspection and testing that is for *Contractor's* own quality control or is required by regulatory requirements
- .9 Maintain a logbook (copies to be provided to the *Consultant* at completion of fabrication) documenting date, time, results, and significance of in-plant testing carried out, where applicable, linked to daily production. The form of this logbook shall be acceptable to the *Owner* and the *Consultant*.

1.4 Subcontractor Qualification Statements

- .1 Submit list of Subcontractors and Suppliers as required to complete the Work, for review by Consultant, immediately after award of Contract.
- .2 Upon request by the *Consultant*, submit proof, in the form of CCDC 11 - Contractor's Qualification Statement, of qualifications of *Subcontractors* to verify *Subcontractor's* qualifications and experience meet or exceed the requirements of the *Contract Documents*.
 - .1 If, upon review of the Contractor's Qualification Statement, it is found that the *Subcontractor* does not meet the qualification requirements specified in the *Contract Documents* pertaining to the parts of the *Work* for which the *Subcontractor* has been retained, the *Contractor* shall replace the unqualified *Subcontractor* with a qualified *Subcontractor*, satisfactory to the *Contractor* and the *Owner*, at no additional cost to the *Owner* and at no increase in the *Contract Time*.

1.5 Independent inspection and Testing – Owner's Quality Assurance

- .1 Independent inspection and testing services are used by the *Owner* to verify compliance with requirements of the *Contract Documents*.
- .2 Employment of inspection and testing agencies by *Contractor* or *Owner* does not relieve *Contractor* from responsibility to perform the *Work* in accordance with *Contract Documents*.
 - .1 Independent inspection and testing services do not relieve the *Contractor* of responsibility for normal shop and site inspection, and quality control of manufacturing and installation.
 - .2 Specified tests, inspections, and related actions do not limit the *Contractor's* other quality assurance and control procedures that facilitate compliance with the *Contract Documents* requirements.
 - .3 Requirements for the *Contractor* to provide quality control services required by the *Contract Documents*, *Consultant*, *Owner*, or authorities having jurisdiction are not limited by *Owner's* independent inspection and testing services.

Quality Requirements

- .4 Inspections and tests specified or required that are not specified as independent inspection and testing are the responsibility of the *Contractor* and are not covered under the *Owner's* quality assurance requirements.
- .3 The *Consultant* will, on behalf of *Owner*, appoint independent inspection and testing companies, representing, reporting and responsible to the *Owner* through the *Consultant*.
 - .1 Cost of independent inspection and testing company services will be authorized as a disbursement from Cash Allowance as specified in Section 01 21 00. Independent inspection and testing company shall submit monthly invoice original to *Contractor* for review, relating invoices to tests and inspection reports. Provide original receipts for disbursements. Invoices for inspection and testing services shall be forwarded by *Contractor* to *Consultant* for inclusion in progress payment application.
- .4 Additional inspection and testing required because of changes in materials proposed by *Contractor* or *Subcontractors*, by lack of proper notice for inspection and testing specified, or required as a result of failure of such materials to meet requirements of the *Contract Documents* when originally tested, shall be carried out at no additional cost to the *Owner*.
- .5 Inspection and testing required by codes or ordinances, or by an authority having jurisdiction, and made by a legally constituted authority, shall be the responsibility of the *Contractor* and shall be paid for by the *Contractor*, is not part of the *Owner's* quality assurance requirements, and shall not be paid by *Owner*, unless otherwise specified in the *Contract Documents*.
- .6 Inspection or testing performed exclusively for *Contractor's* convenience shall be sole responsibility of *Contractor*, is not part of the *Owner's* quality assurance requirements, and shall not be paid by *Owner*.
- .7 Independent inspection and testing shall be performed by company qualified to perform the inspections or tests specified or required.
- .8 Requirements of regulatory companies:
 - .1 Testing shall be conducted in accordance with requirements of the building code.
 - .2 Obtain certification where required by the building code and standards.
- .9 Cooperation with independent inspection and testing companies:
 - .1 Provide independent inspection and testing companies with materials and installation information as required and/or requested.
 - .2 Submit test samples required for testing.
 - .3 Cooperate with independent inspection and testing companies and give adequate notification of any changes in source of supply, additional work shifts, and other proposed changes.
 - .4 Provide access to the *Work* for independent inspection and testing companies wherever the *Work* is in progress, or wherever *Products*, materials, or equipment are stored prior to shipping.
 - .5 Provide labour, *Construction Equipment*, and temporary facilities required to assist independent inspection and testing companies in sampling and making tests.

Quality Requirements

.10 Inspection and test specimens:

- .1 Inspection and testing will, generally, consist of procedures listed in the following paragraphs, but additional tests may be performed as required to verify conformance to *Contract Documents*.
 - .2 Specimens and samples for testing, unless otherwise specified in the *Contract Documents*, shall be taken by the independent inspection and testing company; sampling equipment and personnel shall be provided by the independent inspection and testing company; and deliveries of specimens and samples to the testing company shall be performed by the testing company unless otherwise specified.
 - .3 Independent inspection and testing company shall take samples necessary to verify quality as specified. Taking of samples shall not endanger the structure or life safety, and shall be taken so as to best represent the *Work* as a whole.
 - .4 Samples shall be handled, packaged, stored and delivered in accordance with specified tests. Sample handling where required shall duplicate conditions at the *Place of the Work* (such as site-cured concrete cylinders).
- .11 Where evidence exists that defective workmanship may have occurred, or that the *Work* may have been carried out incorporating defective materials, or where tests demonstrate that installed conditions do not comply with the requirements of the *Contract Documents*, the *Consultant* reserves the right to have additional inspections, tests, analysis, and surveys performed in order to help determine the extent of defect and whether such work must be replaced. Inspections, tests, and surveys carried out under these circumstances will be made at the *Contractor's* expense, and will not be paid by *Owner*, unless the results indicate that the work so tested, inspected or surveyed is not defective or that, in *Consultant's* opinion, the work so tested, inspected, or surveyed may be accepted, in which case tests, inspections or surveys will be paid by *Owner*.
- .12 Repair work damaged as a result of independent inspection and testing work.

1.6 Inspection and Testing Schedule

- .1 Prepare schedule for inspection and testing company services in accordance with Section 01 32 00 and as follows:
 - .1 Establishing schedule:
 - .1 By advance discussion with the selected independent inspection or testing company, determine the appropriate time necessary to perform the required services and to issue related reports.
 - .2 Allow for required time within construction schedule.
 - .2 Adherence to schedule:
 - .1 *Contractor* shall advise independent inspection and testing companies in advance when inspection and testing of the *Work* is required.
 - .1 Amount of advance notice shall be as required by the independent inspection and testing company, but shall be no less than 2 *Working Days*.

Quality Requirements

- .2 When independent inspection and testing company is ready to perform inspection and testing according to predetermined schedule, but is prevented from inspection and testing or taking specimens due to incompleteness of the parts of the *Work* scheduled for inspection and testing, extra costs for inspection and testing attributable to the delay shall be at the *Contractor's* expense and at no additional cost to the *Owner*.
- .3 Notify independent inspection and testing company at least 3 *Working Days* before work required to be inspected commences, and arrange for a meeting at the *Place of the Work*, to be held 1 *Working Day* before the work starts with the following present:
 - .1 The *Contractor*, and the *Subcontractor* responsible for the work to inspected and/or tested, the inspection and testing company representatives, the product manufacturer's representative when required, and the *Consultant*.
- .4 For inspection and testing required by *Contract Documents* or by authorities having jurisdiction, provide *Consultant* and inspection and testing agencies with timely notification in advance of required inspection and testing.
- .5 Give 2 *Working Days'* prior notice to independent inspection and testing company of the commencement of each phase of the *Work* requiring inspection, and provide independent inspection and testing company with materials and installation information.

1.7 Reports and Documents

- .1 Inspection and testing company, whether for *Owner's* quality assurance or for *Contractor's* quality assurance, shall submit shop inspection and site inspection reports within 5 *Working Days* of each inspection.
- .2 Distribute reports digitally as follows:
 - .1 *Owner*.
 - .2 *Consultant*.
 - .3 *Contractor*.
 - .4 Consulting engineers, as applicable.
- .3 Inspection and testing companies, whether for *Owner's* quality assurance or for *Contractor's* quality assurance, shall submit a written report for each inspection or test, including pertinent data such as conditions at the *Place of the Work*, dates, test references, locations of tested materials, actual *Product* identification, testing methodology, procedures, and descriptions, site instructions given, recommendations and/or any other information required by standard applicable to reporting of tests and inspections.
 - .1 Report shall clearly indicate failure of *Product* or procedures to meet applicable standards, give recommendations for retesting or correction. Inspector shall contact *Contractor* and *Consultant* immediately when *Product* or assembly fails to meet requirements of the *Contract Documents*.

Quality Requirements

- .4 Upon completion of portions of the *Work* subject to inspection and testing, whether for *Owner's* quality assurance or for *Contractor's* quality assurance, submit to the *Consultant* duplicate certificates of acceptance of the installation issued by the inspection and testing company.

1.8 Manufacturer's Field Review

- .1 Where manufacturer's field review is specified, manufacturer's representative shall review the relevant parts of the *Work* at the *Place of the Work*, or wherever such affected work is in progress, to verify that the relevant parts of the *Work* are being executed in accordance with manufacturer's written requirements and verify their product is fit for the purpose intended.
- .2 Manufacturer's field review is to verify that the *Products* specified are being used in the *Work* and are being applied on surfaces prepared in accordance with manufacturer's written requirements and the requirements of the *Contract Documents*.
- .3 Unless otherwise indicated, manufacturer's representative shall undertake a minimum of 3 field reviews, with additional reviews as required by the manufacturer, to verify that the relevant parts of the *Work* are in accordance with the manufacturer's written requirements.
- .4 Manufacturer's representative shall submit a type-written report on manufacturer's letterhead after each field review following procedures for reports and documents specified in Section 01 45 00. Report shall document manufacturer's representative's field observations and recommendations.

PART 2- PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Temporary Utilities

PART 1 - GENERAL

1.1 Section Includes

- .1 Temporary utilities - general.
- .2 Temporary electrical services.
- .3 Temporary water supply.
- .4 Temporary heating and ventilation.

1.2 Temporary Utilities - General

- .1 Provide temporary utilities as specified and as otherwise necessary to perform the *Work* expeditiously.
- .2 Arrange and pay for required temporary services, unless otherwise specified.
- .3 Provide connection and disconnection of temporary services and facilities required in the *Work*, including connection to existing services made available by the *Owner*.
- .4 Remove temporary utilities after use.
- .5 Existing services:
 - .1 Do not use any existing services and facilities during construction unless specific written permission is provided by *Owner*.
 - .2 Where existing services are made available by the *Owner*, provide meters for measuring usage, the costs for which usage and meters shall be the responsibility of the *Contractor*.
 - .3 Protect and maintain without interruption, existing water, heating, drainage, and other services within the *Place of the Work* to existing buildings not within the scope of the *Work* of this *Contract*. Obtain written permission of the *Owner* for services required to be temporarily shut off, at least 2 full *Working Days* in advance.
 - .4 Do not use permanent mechanical, or electrical systems during the course of the *Work* unless specific written permission is provided by the *Consultant*. Use of permanent services for temporary construction service shall not prejudice warranties.

1.3 Temporary Electrical Services

- .1 Provide and maintain an adequate temporary electrical service for performance of the *Work* including, but not limited to, operation of electric pumps, motors, vibrators and other power tools, hoisting and related construction and general illumination during the *Work*.
 - .1 Use existing power, where available, subject to *Owner's* approval. Pay for usage at rates stipulated by the *Owner*.
 - .2 Use existing electrical service into building. *Owner* will pay electrical bills.

Temporary Utilities

- .3 Do not use new building power systems during construction without prior written authorization from *Consultant* and *Owner*.
- .2 Provide and maintain any components and equipment necessary to transform supply power to necessary temporary power voltage.

1.4 Temporary Water Supply

- .1 Provide and maintain a temporary supply of water for use in the *Work*.
 - .1 Use existing water supply, where available, subject to *Owner's* approval. Pay for usage at rates stipulated by the *Owner*.
 - .2 Use existing water supply. *Owner* will pay water bills.
- .2 Extend supply pipe or pipes from nearest available sources and maintain in good condition until permanent system is installed and ready for use.

1.5 Temporary Heating and Ventilation

- .1 Provide and pay for temporary heating, cooling and ventilating required for the *Work*, including attendance, maintenance and fuel.
- .2 Provide temporary heat and ventilation as required to:
 - .1 Facilitate continuous uninterrupted progress of the *Work*.
 - .2 Protect the *Work* and *Products* against damage and defacement caused by weather, harmful levels of temperature, humidity, and moisture.
 - .3 Protect the *Work* against dampness and cold.
 - .4 Prevent moisture condensation on surfaces, freezing, or other damage to finishes or stored *Products*.
 - .5 Provide ambient temperatures and humidity levels for proper storage, installation and curing of materials, in accordance with specified standards and manufacturer's requirements.
 - .6 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Prior to enclosing building, maintain work areas at not less than 7°C. After enclosing, keep premises heated to at least 13°C using temporary heating devices that do not cause moisture and humidity build-up within the facility. Increase temperatures in isolated areas to 20°C as required by various sections of the *Specifications* or by *Product* manufacturers.
- .4 Provide temporary heat or adequate protection by means of straw or other coverings to floor slabs, footings, or any part of building not specifically designed to withstand frost penetration.
- .5 Furnish other temporary heating as required by various sections of the *Specifications* or by *Product* manufacturers.
- .6 Ventilate to the exterior of the building work areas as required when toxic materials are being utilized or cured.

Temporary Utilities

- .7 Replace with new, any work damaged due to failure to provide adequate heat at no cost to *Owner*.

PART 2 - PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

Temporary Facilities

PART 1 - GENERAL

1.1 Section Includes

- .1 General scope and responsibility.
- .2 Parking.
- .3 Temporary sanitary facilities.
- .4 Fire protection.
- .5 Elevators.
- .6 Temporary site storage.
- .7 Traffic control and road maintenance.

1.2 General Scope and Responsibility

- .1 Temporary facilities specified in this section shall be supplemented as applicable in accordance with Section 01 35 13.
- .2 Arrange, obtain and pay cost for permits required for temporary facilities and controls.
- .3 Provide and maintain temporary facilities for the *Work* and remove them from the *Work* upon issuance of certificate of *Substantial Performance of the Work*.
- .4 Do not use permanent facilities, except standpipe for firefighting, during the course of the *Work* unless specific written permission is provided by the *Consultant*. Where use of permanent facilities is granted for temporary construction service, such use of permanent facilities shall not prejudice warranties.

1.3 Construction Parking

- .1 Parking for workers will be permitted at the *Place of the Work* upon request to Owner.
 - .1 Submit a list of vehicles for which permits are required to the *Owner*. The list shall include the make, model, year, and licence plate number for each vehicle. The list shall be updated at least once a month, or more frequently as required.
 - .2 There is no reserved parking. Parking is on a first-come-first-served basis however, occupants of and visitors to the existing building shall have priority over workers. It may be necessary for workers to park off-site.
- .2 Do not interfere with the operation of existing premises. Keep existing parking areas and road system remain free and clear of obstructions resulting from the *Work*.
- .3 Illegally parked vehicles that are ticketed and/or towed shall be the sole responsibility of the vehicle owner.

Temporary Facilities

1.4 Temporary Sanitary Facilities

- .1 Provide and maintain temporary sanitary facilities for use by workers, including separate, stand-alone, dedicated washrooms for women only. The use of new and existing building's sanitary facilities by workers shall be prohibited.

1.5 Internet Connection

- .1 Contractors may use Owner's Wi-Fi, but must provide their own if service is insufficient.

1.6 Fire Protection

- .1 Provide and maintain temporary fire protection systems and equipment during construction.

1.7 Elevators

- .1 Do not use permanent elevators for construction purposes.

1.8 Temporary Site Storage

- .1 Handle and store materials so as to prevent damage or defacement to the *Work* and surrounding property.
- .2 Construct weather-tight storage sheds for storage of materials that may be damaged or defaced by weather. Provide floors raised 150 mm (6") clear of ground for storage of *Products*.
- .3 *Owner* is not responsible for securing *Products* or materials at the *Place of the Work*.

1.9 Traffic Control and Road Maintenance

- .1 Provide and maintain adequate access to *Place of the Work*.
- .2 Do not block roads or impede traffic. Keep construction traffic to designated roads only. Provide flagperson to direct traffic as required.
- .3 Provide a hard surface area at the *Place of the Work* for cleaning down trucks prior to entry onto municipal roads or private roads outside of the *Place of the Work*.
- .4 Keep public and private roads free of dust, mud and debris resulting from truck, machinery and vehicular traffic related specifically to this *Project*, for the duration of *Work*.
- .5 Clean roads regularly, public or private. Wash down and scrape flush roads at least daily when earth moving operations take place. Maintain public property in accordance with requirements of authorities having jurisdiction.

PART 2- PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

Temporary Barriers and Enclosures

PART 1 - GENERAL

1.1 Section Includes

- .1 General scope and responsibility.
- .2 Temporary enclosures and protection.
- .3 Protection of the public.
- .4 Protection of the *Work*.

1.2 General Scope and Responsibility

- .1 Temporary facilities and controls specified in this section shall be supplemented as applicable in accordance with Section 01 35 13.
- .2 Provide and maintain signs, hoardings, guard-rails, barriers, warning lights and other protection as required by authorities having jurisdiction for safety of the *Place of the Work*. Be responsible for adequacy of protection.
- .3 Plant, Machinery and Scaffolding:
 - .1 Provide formwork, scaffolding, equipment, tools, machinery and incidental appurtenances necessary for the proper execution of the *Work*.
 - .2 Erect plant, machinery and scaffolding to permit access to building and the *Work*.
 - .3 Use scaffolds in such manner as to interfere as little as possible with other trades' operations.
 - .4 Support scaffolds from finished surfaces only after taking precautions to prevent damage. No supports, clips, brackets, or similar devices shall be welded, bolted, or otherwise affixed to any finished member or surface without prior permission.
- .4 Maintain temporary barriers and enclosures in good condition for the duration of the *Work*.
- .5 Remove temporary barriers and enclosures from *Place of the Work* when no longer required.

1.3 Temporary Enclosures and Protection

- .1 Provide temporary enclosures and protection of adequate construction to prevent dispersion of dust and dirt into other areas of existing building and to prevent dispersion of dust and dirt beyond the *Place of the Work*.
- .2 Provide temporary weather-tight enclosures and protection for exterior openings in building as soon as walls, floors and roofs are built so as to protect the *Work* from weather and vandalism. Provide doors in enclosures as necessary to maintain fire exits.
- .3 Erect, maintain, and relocate enclosures as required to facilitate construction operations and *Owner's* operational requirements.
- .4 Temporary enclosure and protection shall be of finished appearance and painted to colour approved by *Owner*.

Temporary Barriers and Enclosures

- .5 Provide dust seal and sound resistant enclosures to protect existing building and operations as indicated. Include temporary doors, fastenings and keys.
- .6 Insulate and airseal exterior enclosures to prevent condensation and drafts.

1.4 Protection of the Public

- .1 Provide fencing, barricades, hoarding, notices and warning boards and maintain lights and signals for protection of workers engaged on the *Work*, for protection of adjoining property and for protection of the public.
- .2 Where any special hazard exists from which it is not possible to protect the public safety by other means, watchpersons shall be employed to preserve public safety until the area of special hazard no longer poses a risk to public safety.

1.5 Fire Routes

- .1 Maintain fire access routes, including overhead clearances, for use by emergency response vehicles.

1.6 Protection of the *Work*

- .1 Protect the *Work* from damage, discolouring, and defacement. Maintain protection until the *Work* is complete.
- .2 Provide necessary temporary barriers and enclosures to protect existing surfaces from damage during performance of the *Work*.
- .3 Have damaged or defaced work corrected by workers meeting qualification requirements of the *Contract Documents*.
- .4 Provide plywood protection to precast stair treads, until *Ready-for-Takeover*.

PART 2 - PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

Temporary Controls

PART 1 - GENERAL

1.1 Section Includes

- .1 General scope and responsibility.
- .2 Security.
- .3 Pest control.
- .4 Dust, debris and noise control.
- .5 Pollution control.

1.2 General Scope and Responsibility

- .1 Temporary controls specified in this section shall be supplemented as applicable in accordance with Section 01 35 13.
- .2 Arrange, obtain and pay cost for permits required for temporary controls.
- .3 Provide temporary controls as necessary for performance of the *Work* and in compliance with applicable regulatory requirements.
- .4 Maintain temporary controls in good condition for the duration of the *Work*.
- .5 Remove temporary controls and *Construction Equipment* used to provide temporary controls from *Place of the Work* when no longer required.

1.3 Security

- .1 The *Contractor* shall be solely responsible for securing the *Place of the Work* and the *Work*, and for securing areas used for the storage of *Products* or construction machinery and equipment. The *Owner* shall have no responsibility in this regard.
 - .1 Provide and maintain security lighting.
 - .2 Provide and maintain temporary locks. Premises to be locked after working hours.
- .2 Provide security for the *Place of the Work* by methods compatible with the security system for the existing building.
 - .1 *Contractor* shall coordinate the work carefully with the *Owner* in order to ensure no disruption to the existing building's security system.
 - .2 Where existing building's security system is breached due to *Contractor's* negligence, be responsible for any damage or theft of property, regardless if area where damage or theft occurred is under *Contractor's* control or not.

1.4 Pest Control

- .1 Provide rodent control and other pest control programs during the *Work* in accordance with the requirements of authorities having jurisdiction.

Temporary Controls

1.5 Dust, Debris and Noise Control

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .2 Control dust and dirt produced during the *Work* to prevent dispersion beyond the immediate work areas.
- .3 Prevent materials from contaminating air beyond application area, by providing temporary enclosures and ventilation/filtration.
- .4 Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.
- .5 Execute *Work* by methods that minimize dust from construction operations and spreading of dust on site or to adjacent properties.
- .6 Provide temporary enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.
- .7 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .8 Use appropriate covers on trucks hauling fine, dusty, or loose materials.
- .9 Limit noise levels in accordance with requirements of authorities having jurisdiction and the *Owner*.
- .10 Prevent abrasive-blasting, pressure-washing spray, and other extraneous materials from contaminating air beyond application area.

1.6 Pollution Control

- .1 Prevent contamination of soil, water, and atmosphere through uncontrolled discharge of noxious or toxic substances and other pollutants, potentially causing environmental damage.
- .2 Be prepared, by maintaining appropriate materials, equipment, and trained personnel on site, to intercept, clean up, and dispose of spills or releases that may occur. Promptly report spills and releases that may occur to:
 - .1 Authority having jurisdiction.
 - .2 Person causing or having control of pollution source, if known.
 - .3 *Owner* and *Consultant*.
- .4 Take immediate action to contain and mitigate harmful effects of the spill or release.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Product Requirements

PART 1 - GENERAL

1.1 Section Includes

- .1 Availability of *Products*.
- .2 *Product* handling.
- .3 *Product* requirements and quality.

1.2 Availability of Products

- .1 Promptly upon *Contract* award and periodically during construction, review and confirm *Product* availability and delivery times. Order *Products* in sufficient time to meet the construction progress schedule and the *Contract Time*.
 - .1 Failure to order a specified *Product* or to order a *Product* by a specified manufacturer in adequate time to meet construction progress schedule shall not be considered a valid reason for a *Product* substitution in accordance with Section 01 25 00.
 - .2 In the event of delays in supply of *Products* as a result of failure to order a specified *Product* or order a *Product* by a specified manufacturer in adequate time to meet construction progress schedule, and should it appear that the *Work* may be delayed for such reason, *Consultant* reserves the right to substitute more readily available *Products* of similar character, at no additional cost to the *Owner*.
- .2 If a specified *Product* is no longer available, promptly notify the *Consultant*. The *Consultant* shall take action as required.

1.3 Product Handling

- .1 Handle and store *Products* in accordance with manufacturer's and *Supplier's* written requirements to prevent damage, adulteration, deterioration, and soiling and to preserve their quality and fitness for the *Work*.
 - .1 Submit manufacturer's and *Supplier's* written requirements for handling and storage of their *Products*.
 - .2 Where manufacturer or *Supplier* does not have written handling and storage requirements already published, submit written requirements for handling and storage of their *Products* prepared for the *Work* by the *Product* manufacturer or *Supplier*, as applicable.
 - .3 Submit following procedures for submittal of *Product* data sheets in accordance with Section 01 33 00.
- .2 Protect stored *Products* from vandalism and theft.
- .3 Store packaged or bundled *Products* in original and undamaged condition with manufacturer's seals and labels intact, facing to outside. Do not remove from packaging or bundling until required in the *Work*.

Product Requirements

- .4 Store materials susceptible to environmental damage in a weathertight enclosure raised clear of ground so that they are protected from weather, dampness, and deterioration. Do not use materials which have been damaged by exposure to moisture.
- .5 Keep sand, when used as ingredients for grout, mortar, or similar mixed materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber, and other similar *Products* on flat, solid supports and keep clear of ground or slab. Slope to shed moisture.
- .7 Handle materials to prevent damage to existing surfaces and work of others.
- .8 Remove damaged *Products* and replace with new undamaged *Products*.
- .9 Transportation:
 - .1 Pay cost of transportation of *Products* required in performance of *Work*.
 - .2 Transportation cost of *Products* supplied by *Owner* will be paid for by *Owner*. Unload, handle and store such *Products* at the *Place of the Work*.
 - .3 Reject *Products* damaged during transport.
 - .4 Transportation of *Products* shall be undertaken to suit construction schedule.

PART 2 - PRODUCTS

2.1 Product Requirements and Quality

- .1 Compatibility of options: If given option of selecting between two or more *Products*, select *Product* compatible with products previously selected, even if previously selected products were also options.
 - .1 Unless otherwise indicated in the *Contract Documents*, maintain uniformity of *Product* and manufacturer for any like item, material, equipment or assembly for the duration of the *Work*.
- .2 *Products* used for temporary facilities may have been previously used, providing they are sound in structural qualities.
- .3 *Products* and *Product* installation shall be in compliance with building code, regulations and requirements of authorities having jurisdiction.
- .4 Specified options: The *Work* is based on materials, *Products* and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive *Specifications* and by performance *Specifications*.
 - .1 Wherever a *Product* or manufacturer is specified by a single proprietary name, provide the named *Product* only.
 - .2 Wherever more than one *Product* or manufacturer is specified by proprietary name for a single application, provide any one of the named *Product*.

Product Requirements

- .3 Wherever a *Product* is specified by reference to a standard only, provide any *Product* that meets or exceeds the specified standard. If requested by *Consultant*, submit information verifying that the proposed *Product* meets or exceeds the specified standard.
- .4 Wherever a *Product* is specified by descriptive or performance requirements only, provide any *Product* that meets or exceeds the specified requirements. If requested by *Consultant*, submit information verifying that the proposed *Product* meets or exceeds the specified requirements.
- .5 The onus is on the *Contractor* to prove compliance with governing published standards, prescriptive *Specifications* and with performance *Specifications*.
- .6 Visual selection *Specifications*:
 - .1 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* will select colour, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- .7 Visual matching *Specifications*:
 - .1 Where *Specifications* require "match *Consultant's* sample", provide a product that complies with requirements and matches *Consultant's* sample. *Consultant's* decision will be final on whether a proposed product matches.
- .5 Provide *Products* that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by *Consultant*, furnish evidence as to type, source and quality of *Products* provided.
 - .1 Defective *Products*, whenever identified prior to completion of the *Work*, will be rejected, regardless of previous reviews. Review of the *Work* by the *Consultant* or independent inspection and testing companies does not relieve the *Contractor* of the responsibility for executing the *Work* in accordance with the requirements of the *Contract Documents*, but is a precaution against oversight or error.
- .6 Basis of design:
 - .1 Where *Contract Documents* list "basis of design", this indicates the *Product* or system that was used in the preparation of the design included in the *Contract Documents*, and which shall be an acceptable *Product*.
 - .2 The basis of design establishes the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products from other manufacturers.
 - .3 The term "basis of design" does not preclude the use of other *Products* or systems in the *Work*, provided the proposed *Product* or system complies with the design and performance requirements contained in the *Contract Documents*.
 - .4 Proposals for use of *Products* or systems in the *Work* that are not the named "basis of design" must be submitted in accordance with the following procedures:

Product Requirements

- .1 Do not order or install any proposed *Products* or systems without a Supplemental Instruction.
- .2 Provided a proposal includes the information specified in Section 01 60 00, *Consultant* will review submission, but in any case with the understanding that neither the *Contract Time* nor the *Contract Price* will be altered due to the time required by the *Consultant* to review the submission and by the *Contractor* to incorporate the proposed *Products* or systems in the Work.
- .3 The proposed *Products* or systems shall be accepted by the *Consultant* if:
 - .1 The proposed *Products* or systems are the same type as, are capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified *Product* or system.
 - .2 The manufacturer of the proposed *Products* or systems has capabilities comparable to the specified manufacturer.
- .4 If the proposed *Products* or systems are accepted, the change in the *Work* will be documented in the form of a *Supplemental Instruction*.
- .5 If the proposed *Products* or systems are accepted, *Contractor* shall not revert to an originally specified *Product* or manufacturer without *Consultant's* prior written acceptance.
- .6 Proposed *Product* or system submitted on *Shop Drawings* without following requirements of this section prior to submission of the affected *Shop Drawings* will cause the *Shop Drawings* to be rejected.
- .7 Include with each proposal the following information:
 - .1 Identification of the proposed *Product* or system, including *Product* name and manufacturer's name, address, telephone numbers, and web site.
 - .2 A statement verifying that the proposed *Product* or system will affect neither the *Contract Price* nor the *Contract Time*.
 - .3 A statement verifying that the proposed *Product* or system will not affect the performance or warranty of other parts of the *Work*.
 - .4 Manufacturer's *Product* literature for the proposed *Product* or system, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.
 - .5 *Product* samples as applicable.
 - .6 A detailed comparison of the physical properties and performance characteristics of the basis of design *Product* or system and the proposed *Product* or system, with any significant variations clearly highlighted.
 - .7 Availability of maintenance services and sources of replacement materials and parts for the proposed *Product* or system, as applicable, including associated costs and time frames.

Product Requirements

- .8 Details of other projects and applications where the proposed *Product* or system has been used.
- .9 Identification of any consequential changes in the *Work* to accommodate the proposed *Product* or system and any consequential effects on the performance of the *Work* as a whole. A later claim for an increase to the either the *Contract Price* or the *Contract Time* for other changes in the *Work* attributable to the proposed *Product* or system will not be considered.
- .10 Confirmation of delivery schedule of the proposed *Product* or system, in writing by *Product* manufacturer.
- .11 Compliance with the building codes and requirements of authorities having jurisdiction.
- .12 Copy of manufacturer's warranty for any *Product* or system for which an extended warranty has been specified, along with copy of manufacturer's warranty for specified *Product* or system with differences highlighted.
- .7 Where *Contract Documents* require design of a *Product* or system, and minimum material requirements are specified, the design of such *Product* or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.
- .8 Should dispute arise as to quality or fitness of *Products*, the decision rests strictly with *Consultant* based upon the requirements of the *Contract Documents*.
- .9 *Products* exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.
- .10 *Owner* retains right to select from choices available within specified *Products* for colours, patterns, finishes or other options normally made available. Submit full range of *Product* options in accordance with Section 01 33 00 for such selection.
- .11 Exposed to weather: *Products* and materials in environments not protected by the building's HVAC and/or climate control systems shall be considered exposed to weather.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

Examination and Preparation

PART 1 - GENERAL

1.1 Section Includes

- .1 Examination of the *Place of the Work*, documents, surfaces and conditions.
- .2 Public utilities and services.

1.2 Examination of the *Place of the Work*, Documents, Surfaces and Conditions

- .1 Examine the *Place of the Work* and investigate matters relating to the nature of the *Work*, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during the execution of the *Work*, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of the *Work*, documents related to existing building or buildings, as applicable and when available, and other consideration which may affect performance of the *Work*.
- .2 Examine the extent of work to be performed and matters which are referred to in the *Contract Documents* prior to start of the *Work*.
- .3 Examine work to which work is to be applied, anchored or connected, and relevant as-built conditions.
- .4 Each work operation following on a previous work operation of a differing *Subcontractor*, shall include a thorough examination of the condition of the previous work to verify that work is complete and in a condition suitable to receive the subsequent work. Conditions found unacceptable, either for the commencement of the new work or its satisfactory completion, shall be reported in writing to the *Consultant*.
- .5 Verify that ambient conditions are suitable before commencing the work of any Section and will remain suitable for as long as required for proper setting, curing, or drying of *Products* used.
 - .1 Do not commence installation of interior finishes until after building is enclosed, with windows and exterior doors in place and glazed, and roof watertight.
- .6 Ensure that substrate surfaces are clean, dimensionally stable, cured and free of contaminants.
- .7 Do not commence work until unsatisfactory conditions are corrected. Commencement of work shall mean acceptance of surfaces, tolerances, and conditions, and existing conditions will not be accepted as a contributing factor to subsequent failure or unacceptability of the *Work*.

1.3 Setting Out the *Work*

- .1 Assume full responsibility for and execute complete layout of the *Work* to required locations, lines and elevations.
- .2 Arrange meeting with *Consultant* to discuss critical setting out assumptions for the *Work* and establish limiting conditions for setting out the *Work*. *Consultant* shall chair and prepare minutes of the meeting, and prepare and submit sketches recording understanding of key setting out principles.

Examination and Preparation

.3 Provide devices needed to lay out and construct the *Work*.

PART 2 - PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

Execution

PART 1 - GENERAL

1.1 Section Includes

- .1 Inserts, anchors, and fasteners.
- .2 Penetrations.
- .3 Concealed services.
- .4 Trademarks and labels.
- .5 Interferences.
- .6 Publicity releases and photographs.
- .7 Manufacturer's instructions.
- .8 Galvanic/dissimilar metal corrosion.
- .9 Workmanship.
- .10 General construction tolerances.

1.2 Inserts, Anchors, and Fasteners

- .1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for load to be carried.
- .2 Where inserts cannot be placed, use factory made expansion shields for light weights only.
- .3 Supply and locate inserts, holes, anchor bolts and sleeves during placement or fabrication of structural elements.
- .4 Fasteners stressed in withdrawal are not acceptable, except where otherwise indicated.
- .5 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to prevent direct contact.
- .6 Use non-corrosive fasteners and anchors for securing exterior work and in spaces where high humidity levels are anticipated.
- .7 Space anchors within individual load limit or shear capacity and install such that they provide positive permanent anchorage.
- .8 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .9 Fastenings for prefinished materials shall be of concealed type unless otherwise indicated, and when exposed finish is required, of matching prefinishing materials.
- .10 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.
- .11 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

Execution

- .12 Bolts shall not project more than one diameter beyond nuts.
- .13 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials being fastened.
- .14 Power actuated fasteners:
 - .1 Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E1190-21 conducted by a qualified independent testing agency.
 - .2 Do not use power actuated fasteners which are stressed in withdrawal in finished work.
 - .3 Do not use power actuated fasteners within 100 mm (4") of the edge of concrete or masonry, unless otherwise accepted in writing by *Consultant*.
 - .4 Do not use power actuated fasteners in post-tensioned concrete.

1.3 Penetrations

- .1 Holes or voids created in assemblies or partitions for penetrating mechanical, electrical, or sprinkler service items, shall be of sufficient size to accommodate the penetrating item as well as additional required fill materials, such as sealants, firestopping and smoke sealants, insulation, and the like, without exceeding the maximum opening allowable by the manufacturer of the additional required fill material.
- .2 When penetrating fire rated walls, ceiling, or floor assemblies, completely seal voids with firestopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

1.4 Concealed Services

- .1 Unless otherwise indicated, conceal pipes, ducts, and wiring in floors, walls, and ceilings in finished areas. Do not conceal until after:
 - .1 Review by *Consultant* and authority having jurisdiction.
 - .2 Recording actual locations on as-built drawings where locations differ from those shown on *Drawings*.
- .2 Provide incidental furring or other enclosures as required.
- .3 Notify *Consultant* in writing of interferences before installation.

1.5 Trademark and Labels

- .1 Trademarks and labels, including applied labels, shall not be visible in finished work in finished areas, unless otherwise accepted or indicated by *Consultant*, and except for trademarks and labels:
 - .1 That are essential to identify materials, systems, assemblies, and equipment for maintenance and replacement purposes.
 - .2 That are essential for life safety, fire resistance, and temperature rise ratings.

Execution

1.6 Interferences

- .1 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces provided prior to commencement of the *Work*.
- .2 Take complete responsibility for remedial work that results from failure to coordinate aspects of work prior to its fabrication/installation.
- .3 Maintain accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment in layout of equipment and services, Notify *Consultant* if indicated clearances are in conflict.

1.7 Publicity Releases and Photographs

- .1 No press or publicity releases, including photographs of the *Place of the Work*, will be permitted without prior written approval of the *Owner*.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

- .1 Install, erect, or apply *Products* in accordance with manufacturer's written requirements. Do not rely on labels or enclosures supplied with *Products*. Obtain written requirements directly from manufacturers.
- .2 Notify *Consultant*, in writing, of conflicts between *Contract Documents* and manufacturer's instructions where, in *Contractor's* opinion, conformance with *Contract Documents* instead of the manufacturer's instructions may be detrimental to the *Work* or may jeopardize the manufacturer's warranty.
- .3 Improper installation or erection of *Products*, due to failure in complying with these requirements, shall result in removal and re-installation of such *Products* as part of the *Work* at no additional cost to the *Owner*.
- .4 Provide manufacturer's representatives with access to the *Work* at all times. Render assistance and facilities for such access so that manufacturer's representatives may properly perform their responsibilities.

3.2 Galvanic/Dissimilar Metal Corrosion

- .1 Insulate dissimilar metals from each other and from cementitious materials by suitable plastic strips, washers or sleeves, or other method in accordance with manufacturer's written requirements to prevent galvanic corrosion where conductive liquid or electrolyte exists or may reasonably be expected to exist.

3.3 Workmanship

- .1 General:
 - .1 Execute the *Work* using workers experienced and skilled in the respective duties for which they are employed.

Execution

- .2 Do not employ an unfit person or anyone unskilled in their required duties.
- .3 Remove *Products* or materials that have been broken, chipped, cracked, discoloured, abraded, or damaged during construction period and provide undamaged *Products* or materials meeting the requirements of the *Contract Documents*.
- .2 Coordination:
 - .1 Ensure cooperation of workers in layout of the *Work*. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Backer plates:
 - .1 Provide backer plates to support and provide anchorage base to carry loads from surface or recessed applied materials.
- .4 Cutting and remedial work:
 - .1 Perform cutting and remedial work required to make parts of the *Work* come together. Coordinate the *Work* to ensure this requirement is maintained. Comply with requirements of Section 01 73 29.
 - .2 Notify *Consultant* of, and perform remedial work required to, repair or replace defective or unacceptable work in accordance with requirements of applicable section of the Specifications. Ensure that properly qualified workers perform remedial work. Coordinate adjacent affected work as required.
- .5 Location of fixtures:
 - .1 Locations of fixtures, access panels, outlets, and mechanical and electrical items indicated on *Drawings* are approximate only.
 - .2 Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements. Architectural drawings will relate these items to known dimensions, such as ceiling tile grid or wall locations and the like.
 - .3 Obtain *Consultant's* acceptance for precise locations of fixtures, access panels, outlets, mechanical, and electrical items.
 - .4 *Consultant* reserves the right to relocate electrical outlets and mechanical fixtures at a later date, but prior to installation, without cost, provided that the relocation per outlet does not exceed 3050 mm (10') from the original location.
 - .5 Promptly notify *Consultant* in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.
- .6 Protection of work in progress:
 - .1 Provide protection required by authorities having jurisdiction.

Execution

- .2 Protect parts of the *Work* completed or in progress from soiling, abrasion, punctures, damage, and defacement, and maintain protection until the surrounding or overhead work is complete.
- .3 Remove and replace materials damaged or defaced as a result of failure to provide adequate protection.
- .4 Do not cut, drill, or sleeve any load bearing structural member without written permission of *Consultant*. Comply with requirements of Section 01 73 29.
- .5 Do not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety or integrity of the *Work*.
- .6 Protect finished flooring from damage. Take special measures when moving heavy loads or equipment on them.
- .7 Keep surfaces free of oils, grease or other materials that may damage or deface them or affect bond of applied *Products*.
- .8 Protect existing buildings, curbs, roads and lanes. If, during the *Work*, any buildings, curbs, roads or lanes are damaged, bear costs for repairs.
- .7 Protection of mechanical and electrical *Products* or materials:
 - .1 Wrap in protective plastic and seal mechanical and electrical items and equipment prior to and during shipment, storage at the *Place of the Work* and after installation.
 - .2 Remove protective coverings only to the extent required for installation of the items. Re-install protection immediately following installation.
 - .3 Remove protective coverings in stages, as work areas are completed, or when directed by *Consultant*.
- .8 Operational requirements:
 - .1 Operable *Products* shall be provided fully operational and ready for intended use.
 - .2 Adjust operating hardware and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts for smooth squeak-free function, in accordance with manufacturer's requirements.
- .9 Alterations:
 - .1 Restore new or existing work which is altered as a result of the *Work* and *Make Good*.
 - .2 Materials and workmanship shall match existing materials and workmanship. Exposed materials shall match and blend in with the appearance of the existing undamaged surfaces in all respects including colours, textures, layout, jointing, and material types so as to not vary in appearance when compared to adjacent materials from a viewing distance of 1830 mm (6').

END OF SECTION

Cutting and Patching

PART 1 - GENERAL

1.1 Section Includes

- .1 Cutting, patching and remedial work.

1.2 Request for Cutting, Patching and Remedial Work

- .1 Submittal Items:
 - .1 Comply with administrative requirements of Section 01 33 00.
 - .2 Submit written request in advance of cutting, coring, and alteration that affects or is likely to affect:
 - .1 Structural integrity of any element of *Work*.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 *Owner* or work of other contractors.
 - .6 Warranty of *Products* affected.
 - .3 Include in request:
 - .1 Identification of *Project*.
 - .2 Location and description of affected work, including drawings or sketches as required.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed work, and *Products* to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on *Owner* or work of other contractors.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be performed.
 - .9 Non-destructive structural survey: Location of reinforcement in concrete structure confirmed by non-destructive, positive method other than X-ray.
- .4 Do not commence cutting, patching, or remedial work until request has been reviewed by *Consultant*.

Cutting and Patching

PART 2 - PRODUCTS

2.1 Materials

- .1 Unless otherwise specified, when replacing existing or previously installed *Products* in the course of cutting and patching work, use replacement *Products* of the same character and quality as those being replaced.
- .2 If an existing or previously installed *Product* must be replaced with a different *Product*, submit request for substitution in accordance with Section 01 25 00.

PART 3 - EXECUTION

3.1 Preparation

- .1 Inspect existing conditions in accordance with Section 01 71 00, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of the *Work*.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to maintain structural integrity of surroundings. Provide devices and methods to protect other portions of the *Work* from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work.
- .6 Where uncovering of area exposes local deterioration, cracking, evidence of water infiltration, structural settlement, previous modifications, or other unexpected conditions, advise *Consultant* immediately in writing and leave conditions exposed until receipt of *Consultant's* written instructions. If area is exposed to the exterior, provide temporary protection from inclement weather.

3.2 Existing Services and Utilities

- .1 Protect, relocate, or maintain existing active services or utilities except where breaking into or connecting to them. When inactive services are encountered, cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service. Record location of services, including depth, on as-built drawings.
- .2 When breaking into or connecting to existing active services or utilities, execute the *Work* at times approved by *Owner*, with a minimum of disturbance to *Owner's* ongoing operations, the *Work*, and traffic. Give notice to authorities having jurisdiction as required by such authorities.
- .3 Keep duration of interruptions to a minimum.
- .4 Carry out interruptions outside regular working hours of occupants unless *Owner's* prior written approval is obtained.
- .5 Construct or erect barriers in accordance with Section 01 56 00 as required to protect pedestrian and vehicular traffic.

3.3 Cutting and Patching

- .1 Coordinate and perform the *Work* so that cutting and patching work is kept to a minimum.

Cutting and Patching

- .2 Execute cutting, fitting, and patching to complete the *Work*. Under no circumstances will overcutting of corners of opening be accepted. Ensure corners of openings to be cut are predrilled or sawed.
- .3 Remove and replace defective and non-conforming work.
- .4 Remove samples of installed work for testing if directed by *Consultant*.
- .5 Provide openings in non-structural elements of the *Work* for penetrations of mechanical and electrical work.
- .6 Perform work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ qualified installer with at least 3 years of relevant experience to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Perform cutting, patching, and remedial work using competent and qualified specialists familiar with the *Products* affected, in a manner that neither damages nor endangers the *Work*.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed to be used anywhere within existing buildings unless approved by *Consultant*.
- .10 Restore work with new *Products* in accordance with requirements of *Contract Documents*.
- .11 Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and with suitable allowance for deflection, expansion, contraction, and firestopping.
- .12 Enclose pipes, ducts, conduit and wires passing through floors at areas where faucets occur in a 100 mm (4") high metal sleeve and make air and watertight with water resistant firestopping.
- .13 Completely seal voids of penetrations of fire rated wall, ceiling, and floor constructions with firestopping and smoke seals.
- .14 Execute cutting, patching, and remedial work in manner that does not jeopardize manufacturers' warranties.
- .15 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish entire assembly units.

END OF SECTION

Cleaning and Waste Management

PART 1 - GENERAL

1.1 Section Includes

- .1 Waste management.
- .2 Storage, handling, and protection.
- .3 Coordination.
- .4 Cleaning.
- .5 Disposal of waste.

1.2 Waste Management

- .1 Comply with requirements of authorities having jurisdiction.
- .2 Remove waste material from the *Place of the Work* daily. If waste is collected in bins, bins to be removed from site once full.
- .3 Arrange and pay for removal of debris and waste from the *Place of the Work*.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. Pay fees.

1.3 Storage, Handling and Protection

- .1 Store, materials to be reused, recycled and salvaged in locations to prevent contamination of materials being diverted from landfill.
- .2 Prevent contamination of materials to be salvaged and recycled, and handle such materials, in accordance with requirements for acceptance by designated facilities.

1.4 Coordination

- .1 Coordinate waste management and disposal procedures and requirements with other activities at the *Place of the Work* so that there is no delay in the *Work*, and at no increase in either the *Contract Time* or the *Contract Price*.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Cleaning

- .1 General cleaning requirements:
 - .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - .2 Store volatile wastes in covered metal containers, and remove from *Place of the Work* daily.

Cleaning and Waste Management

- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances. Do not rely on building ventilation systems for this purpose.
- .5 Prevent cross-contamination during the cleaning process.
- .6 Notify the *Consultant* of the need for cleaning caused by *Owner* or other contractors.
- .2 Materials:
 - .1 Use only cleaning materials in accordance with written requirements of manufacturer of surface to be cleaned and in accordance with written requirements of cleaning material manufacturer.
- .3 Cleaning during construction/progressive cleaning:
 - .1 Clean-up the *Place of the Work* daily. Maintain clean and clear egress routes at all times.
 - .2 Maintain *Place of the Work*, grounds and public properties free from accumulations of waste materials and rubbish.
 - .3 Provide appropriate, clearly marked containers at the *Place of the Work* for collection of waste materials and rubbish. Remove waste materials and rubbish from the *Place of the Work* when containers become full.
 - .4 Clean interior building areas prior to start of finish work and maintain free of dust and other contaminants during finishing operations.
 - .5 Vacuum and clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until *Substantial Performance of the Work*.
 - .6 Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces nor contaminate building systems.
 - .7 Promptly as the *Work* proceeds, on a daily basis and upon completion, clean up and remove rubbish, surplus materials and equipment.
 - .8 Remove as the work of this section progresses, corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage members.
 - .9 Wash exposed surfaces with a cleaning solution approved by *Product* manufacturers.
 - .10 Debris and waste not permitted within cavities of *Work*.
- .4 Cleaning prior to *Ready-for-Takeover*:

Cleaning and Waste Management

- .1 Immediately prior to *Consultant's* review to determine if *Ready-for-Takeover* has been achieved, remove surplus *Products* and construction machinery and equipment not required for the performance of the remaining *Work* and clean in accordance with Final Cleaning paragraphs in Section 01 74 00 to the greatest extent practicable given work remaining to be completed. Cleaning shall be to a sufficient extent to permit the *Consultant's* review to be performed properly and reasonably.
- .5 Final cleaning:
 - .1 Provide professional cleaning company for final cleaning.
 - .2 Before final cleaning, arrange a meeting at *Place of the Work* to determine the acceptable standard of cleaning. Ensure that cleaning company, *Owner*, *Consultant*, and *Contractor* are in attendance.
 - .3 Remove from *Place of the Work* surplus *Products*, waste materials, recyclables, *Temporary Work*, and *Construction Equipment* not required to perform any remaining work and other than that caused by the *Owner*, and leave the *Work* clean and suitable for occupancy by *Owner*.
 - .4 Remove waste material and debris from crawlspaces and other accessible concealed spaces.
 - .5 Clean and polish prefinished and finished surfaces including: glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or otherwise damaged glass.
 - .6 Clean exterior and interior window glass and frames.
 - .7 Remove stains, spots, marks and dirt from decorative parts of the *Work*, electrical and mechanical fixtures, furniture fittings, walls, and floors.
 - .8 Vacuum clean and remove dust from building interiors, exposed wall, floor, and ceiling surfaces, behind grilles, louvres, and screens, and above suspended ceiling tiles and panels. Vacuum clean interior of electrical equipment.
 - .9 Clean floor finishes in accordance with manufacturer's written requirements.
 - .10 Remove non-permanent labels.
 - .11 Remove dirt and residue from surfaces.
 - .12 Inspect finishes, fittings and equipment and ensure specified workmanship and operation.
 - .13 Remove protective coatings, clean surfaces and remove excess compounds and sealant materials. Make good defective, scratched or damaged work.
 - .14 Clean equipment and fixtures to a sanitary condition,
 - .15 Remove seal wrap and protective coverings from mechanical and electrical *Products* and materials and clean as required.
 - .16 Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment.

Cleaning and Waste Management

- .17 Clean and/or replace lighting reflectors, lamps, light fixtures, lenses, bulbs, and other lighting surfaces, and grilles.
- .18 Clean architectural concrete to remove surface discolouration, efflorescence, and the like. Use a suitable cleaning agent which will not stain the surfaces or mar the texture.
- .19 Lock or otherwise restrict access to each room or area after completing final cleaning in that area.
- .20 Re-clean as necessary areas that have been accessed by *Contractor's* workers prior to *Owner* occupancy.

3.2 Disposal of Waste

- .1 Remove waste materials and recyclables from work areas, separate, and deposit in designated containers at end of each *Working Day*. Collect packaging materials for recycling or reuse.
- .2 Handle waste materials not reused, salvaged or recycled in accordance with appropriate regulations and codes.
- .3 Do not bury rubbish and waste materials at the *Place of the Work*.
- .4 Do not dispose of waste or volatile materials into waterways or storm or sanitary sewers.
- .5 Do not burn waste materials at the *Place of the Work*.
- .6 Comply with waste disposal requirements of authorities having jurisdiction.
- .7 Deliver to nearest appropriate depot materials accepted for recycling by region or municipality having jurisdiction over the *Place of the Work*, including but not limited to cardboard, paper, plastic, aluminum, steel, and glass. Deliver to nearest appropriate depot scrap and excess gypsum wallboard for recycling of this material. Costs for this work are included in the *Contract Price*.
- .8 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. Pay fees.

END OF SECTION

Closeout Procedures

PART 1 - GENERAL

1.1 Section Includes

- .1 General *Contract* closeout procedures.
- .2 *Substantial Performance of the Work*.
- .3 *Ready-for-Takeover*.
- .4 Inspection and review before *Ready-for-Takeover*
- .5 Early occupancy by the *Owner*.
- .6 Final inspection for completion of the *Contract*.
- .7 Warranty period.

1.2 General *Contract* Closeout Procedures

- .1 The procedures for completing *Contract* and acceptance by the *Owner* shall be in accordance with the methods described in OAA/OGCA Document 100 (July 1, 2018, and reissued January 8, 2019) and any additional requirements described below.

1.3 *Substantial Performance of the Work*

- .1 The prerequisites to, and the procedures for, attaining *Substantial Performance of the Work*, or similar such milestone as provided for in the Construction Act, shall be:
 - .1 As described in Section 01 77 00.
 - .2 Independent of those for attaining *Ready-for-Takeover* of the *Work*.
 - .3 In accordance with the Construction Act.
- .2 Deficiency review:
 - .1 Neither *Owner* nor *Consultant* will be responsible for preparation or issuance of extensive lists of deficiencies. *Contractor* assumes prime responsibility for ensuring that items shown and described in the *Contract Documents* are complete. Any reviews to approve the certificate of *Substantial Performance of the Work* will be immediately cancelled if it becomes obvious to the *Consultant* that extensive deficiencies are outstanding.
 - .2 The *Contractor* shall conduct an inspection of the *Work* to identify deficiencies and defects, which shall be repaired. When the *Contractor* considers that the *Work* is substantially performed, the *Contractor* shall prepare and submit to the *Consultant* a comprehensive list of items to be completed or corrected (the deficiency list) and apply for a review of the *Work* by the *Consultant* to determine if *Substantial Performance of the Work* has been achieved.

Closeout Procedures

- .3 The *Contractor's* request described above shall include a statement by *Contractor* that the *Work* to be reviewed by *Consultant* for deficiencies is, to the best of the *Contractor's* knowledge, in compliance with *Contract Documents*, reviewed *Shop Drawings*, and samples, and that deficiencies and defects previously noted by *Consultant* have been repaired.
- .4 No later than 10 *Working Days* after the receipt of the *Contractor's* request described above, but contingent upon the prior receipt, by the *Consultant*, of the closeout submittals in the manner and form specified in Section 01 78 00, the *Consultant* and the *Contractor* will review the *Work* to identify any defects or deficiencies. If necessary, the *Contractor* shall tabulate a list of deficiencies to be corrected prior to *Substantial Performance of the Work* being certified by the *Consultant*. During review, the *Consultant* and the *Contractor* will decide which deficiencies or defects must be rectified before *Substantial Performance of the Work* can be certified, and which defects are to be treated as warranty items.
- .5 Provide a schedule of planned deficiency review having regard to the foregoing.
- .3 Certification of *Substantial Performance of the Work*:
 - .1 When the *Consultant* considers that the deficiencies and defects have been completed and that it appears that the requirements of the *Contract Documents* have been substantially performed, the *Consultant* shall issue a certificate of *Substantial Performance of the Work* to the *Contractor*, stating the date of *Substantial Performance of the Work*.
 - .2 The certificate of *Substantial Performance of the Work* shall be prepared and issued in accordance with the Construction Act.
 - .1 Inform *Owner*, *Consultant*, *Subcontractors*, and *Suppliers* which publication is to be used for publishing certificate of substantial performance in accordance with Section 01 31 19.

1.4 **Ready-for-Takeover**

- .1 The prerequisites to attaining *Ready-for-Takeover* of the *Work* are described in the General Conditions of the *Contract*.

1.5 **Inspection and Review Before Ready-for-Takeover**

- .1 *Contractor's* Inspection: Before applying for the *Consultant's* review to establish *Ready-for-Takeover* of the *Work*:
 - .1 Ensure that the specified prerequisites to *Ready-for-Takeover* of the *Work* are completed.
 - .2 Conduct an inspection of the *Work* to identify defective, deficient, or incomplete work.
 - .3 Prepare a comprehensive and detailed list of items to be completed or corrected.
 - .4 Provide an anticipated schedule and costs for items to be completed or corrected.

Closeout Procedures

- .2 *Consultant's Review*: Upon receipt of the *Contractor's* application for review, together with the *Contractor's* list of items to be completed or corrected, the *Consultant* and the *Contractor* shall arrange a mutually satisfactory agreed date and time to jointly review the *Work*. The *Consultant* will advise the *Contractor* whether or not the *Work* is *Ready-for-Takeover*. Add additional items, if any, to the *Contractor's* list of items to be completed or corrected. Provide the *Consultant* with a copy of the revised list.
- .3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The *Contractor's* inspection and *Consultant's* review procedures specified above shall be repeated until the *Work* is *Ready-for-Takeover* and no items remain on the *Contractor's* list of items to be completed or corrected.
- .4 When the *Consultant* determines that the *Work* is *Ready-for-Takeover*, the *Consultant* will notify the *Contractor* and the *Owner* in writing to that effect.

1.6 Early Occupancy by the Owner

- .1 If early occupancy by the *Owner* is required, the provisions of this Section shall apply, to the extent applicable, to those parts of the *Work* that the *Owner* intends to occupy.

1.7 Final Inspection for Completion of the Contract

- .1 Deficiencies and defects shall be made good before the *Contractor* submits a written request for final review of the *Work* and before the *Contract* is considered complete.
- .2 When *Contractor* is satisfied that the *Work* is complete, and after the *Contractor* has reviewed the *Work* to verify its completion in accordance with the requirements of the *Contract Documents*, the *Contractor* shall submit a written request for a final review by the *Consultant*, who in turn will notify the *Owner*.
- .3 If there are any deficiencies identified as a result of this review, they shall be listed by the *Consultant* and submitted to the *Contractor*. This list shall be recognized as the final deficiency list for purposes of acceptance of the *Work* under the *Contract*.
- .4 Such deficiencies shall be corrected by a date mutually agreed upon between *Consultant* and the *Contractor*, unless a specific date is required by *Contract*, and a further review by the *Consultant* shall be called for by the *Contractor* following his own review to take place within 7 days from date of request.
- .5 *Contractor* shall thereafter submit invoice for final payment.
- .6 Money withheld for deficiency work shall be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

1.8 Warranty Period

- .1 Provide on-going review and attendance to building call-back, maintenance and repair problems during the warranty periods.

PART 2- PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

Closeout Procedures

END OF SECTION

Closeout Submittals

PART 1- GENERAL

1.1 Section Includes

- .1 As-built documents.
- .2 Operation and maintenance manuals.
- .3 Operation and maintenance book.
- .4 *Project* data book.
- .5 Shop drawing book.
- .6 Warranty book.
- .7 Posted operating instructions.
- .8 Spare parts, maintenance materials, and special tools.

1.2 Administrative Requirements

- .1 Collect reviewed submittals, and assemble required closeout submittals executed by *Subcontractors*, *Suppliers*, and manufacturers. Prior to submitting closeout submittals to the *Consultant*:
 - .1 Review maintenance manual contents (operating, maintenance instructions, as-built drawings, materials) for completeness.
 - .2 Review supply and completeness of spare parts required by *Contract Documents* and manufacturers.
 - .3 Review in relation to *Contract Price*, *Change Orders*, *Change Directives*, holdbacks and other adjustments to the *Contract Price*.
 - .4 Review inspection and testing reports to verify conformance to intent of *Contract Documents* and that changes, repairs or replacements have been completed.
 - .5 Execute transition of performance bond and labour and materials payment bond to warranty period requirements.
 - .6 Submit a final statement of accounting giving total adjusted *Contract Price*, previous payments, and monies remaining at time of application for completion of the *Contract*. *Consultant* will issue a final change order reflecting approved adjustments to *Contract Price* not previously made.
- .2 No later than 10 *Working Days* prior to submitting request for *Consultant's* review to determine if *Substantial Performance of the Work* has been achieved, submit to the *Consultant* the closeout submittals specified in this section and elsewhere in the *Contract Documents*.
- .3 For equipment put into use with *Owner's* permission during the *Work*, submit required closeout submittals within 10 *Working Days* after start-up.

Closeout Submittals

- .4 For items of the *Work* delayed materially beyond date of *Substantial Performance of the Work*, provide updated closeout submittals within 10 *Working Days* after acceptance, listing date of acceptance as start of warranty period.
- .5 Neither the *Consultant's* review to determine if *Substantial Performance of the Work* has been achieved, nor acceptance of the *Work*, will take place until receipt, by the *Consultant*, of acceptable copies of the closeout submittals required herein and by the *Contract Documents*.

1.3 As-Built Documents

- .1 Prepare as-built documents in accordance with Section 01 32 00.
- .2 Submit as-built documents as follows:
 - .1 Submit 1 set of as-built documents in hard copy.
 - .2 In addition, submit digital scanned copy as a bookmarked PDF of as-built documents. Submit using digital storage medium or transfer process acceptable to the *Consultant* and the *Owner*.

1.4 Operation and Maintenance Manuals

- .1 Prepare a comprehensive operation and maintenance manual, in the language of the *Contract*, using personnel qualified and experienced for this task.
- .2 Submit an initial draft of the operation and maintenance manual for *Consultant's* review. If required by *Consultant's* review comments, revise manual contents and resubmit for *Consultant's* review. If required, repeat this process until *Consultant* accepts the draft manual in writing.
- .3 Submit operation and maintenance manuals as follows:
 - .1 Submit 1 copy of operation and maintenance manuals in hard copy.
 - .2 In addition, submit digital copies ("PDF" files) of operation and maintenance manuals. Submit using digital storage medium or transfer process acceptable to the *Consultant* and the *Owner*.

1.5 Operation and Maintenance Manual Format

- .1 Organize operation and maintenance manuals into the following general components:
 - .1 Operation and maintenance book.
 - .2 *Project* data book.
 - .3 Shop drawing book.
 - .4 Warranty book.
- .2 Organize data in the form of an instructional manual.
- .3 Bind each general component of the operation and maintenance books in separate vinyl hard covered, 3 ring loose leaf binders.
- .4 Enclose title sheet, labelled as applicable, with project name, date and list of contents.

Closeout Submittals

- .5 Organize contents into applicable sections of work to parallel project *Specifications* breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .6 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .7 Cover: Identify each binder with typed or printed title "Operation and Maintenance Manual", name of *Project* or facility, and subject matter of contents.
- .8 Text: Manufacturer's printed data, or typewritten data.

1.6 Operation and Maintenance Book

- .1 Operation and maintenance books shall contain operating and maintenance data and information specified below for supplied *Products*.
- .2 Neatly type lists and notes. Use clear drawings, diagrams of manufacturers' literature.
- .3 Each Item of Equipment and Each System: include description of unit or system and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .4 Panel Board Circuit Directories: provide electrical service characteristics, controls, and communications.
- .5 Include installed colour coded wiring diagrams.
- .6 Description, operation and maintenance instructions for equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
- .7 Operating Procedures: include start up, break in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .8 Maintenance Requirements: include routine procedures and guide for trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .9 Provide servicing and lubrication schedule, and list of lubricants required.
- .10 Include manufacturer's printed operation and maintenance instructions.
- .11 Include sequence of operation by controls manufacturer.
- .12 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .13 Provide installed control diagrams by controls manufacturer.
- .14 Provide *Contractor's* coordination drawings, with installed colour coded piping diagrams.
- .15 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .16 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

Closeout Submittals

- .17 Include testing and balancing reports.
- .18 Include additional content as specified in technical *Specifications* sections.

1.7 Project Data Book

- .1 *Project* Data Book shall include the following information supplemented by additional required data specified elsewhere in the *Contract Documents*:
 - .1 Maintenance instructions for finished surfaces and materials.
 - .2 Copy of hardware and paint schedules.
 - .3 Names, addresses and phone numbers of *Subcontractors* and *Suppliers*, as applicable.
 - .4 Additional material used in the *Work* listed under various sections showing name of manufacturer and source of supply.
 - .5 Report recording demonstration and instruction provided to *Owner* for operation and maintenance of building systems as described in Section 01 79 00.
 - .6 Key construction photos.
 - .7 Permits and forms:
 - .1 Certificate of Clearance from the Workplace Safety and Insurance Board (WSIB).
 - .2 Certificates of approval of the *Work* by local building department (if available).
 - .3 Electrical authority certificate of inspection.
 - .4 Elevator authority certificate of approval.
 - .8 Waste management and disposal reports, prepared in accordance with Section 01 74 00.
 - .9 *Integrated fire protection and life safety systems tests* final test report prepared in accordance with Section 01 91 26.

1.8 Shop Drawing Book

- .1 Submit one copy of each final accepted *Shop Drawings* issued for the *Work* on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
- .2 Engineered *Shop Drawings* shall include copies of the certificate of insurance, the engineer's field review reports, and the engineer's letters of general conformity that were provided as part of the engineered submittal in accordance with Section 01 33 00 appended to the pertinent engineered *Shop Drawings* in the shop drawing manual.

1.9 Warranty Book

- .1 Submit copies of bonds, guarantees, warranties and extended warranties together, complete with an indexed summary list of warranties and expiration dates. Warranties to be in accordance with Section 01 78 36.

Closeout Submittals

- .2 Separate each warranty with index tab sheets keyed to Table of Contents listing.
- .3 List each warrantor with complete contact information.
- .4 Verify that documents are in proper form and contain full information. Warranties shall be for the correct duration and shall be in *Owner's* name.
- .5 Include maintenance bond(s).

1.10 Spare Parts, Maintenance Materials, and Special Tools

- .1 Provide overage, extra stock, and maintenance materials, including keys, in quantities specified in the *Contract Documents*.
- .2 Submit to *Consultant* a typed inventory list of maintenance materials prior to application for *Substantial Performance of the Work*. List all items, complete with quantities, and storage locations. Include *Consultant* reviewed inventory listing in final submission to *Owner*.
- .3 Prepare and submit a master list identifying maintenance materials and maintain a log of when materials are turned over to *Owner* and signing authority for acceptance of materials on behalf of *Owner*.
- .4 Provide tags for special tools identifying their function and associated *Product*.
- .5 Supply spare parts, maintenance materials, and special tools in quantities specified in technical *Specifications* sections.
- .6 Ensure spare parts and maintenance materials are new, not damaged nor defective, and of same quality, manufacturer, and batch or production run as installed *Products*.
 - .1 Replace incorrect or damaged maintenance materials.
- .7 Deliver to and store items at location and time directed by *Owner*. Store in original packaging with manufacturer's labels intact and in a manner to prevent damage or deterioration.
 - .1 Clearly mark cartons or packaging as to contents, project name, and *Supplier*.
 - .2 If applicable give colour and finish, room number or area where material is used.
 - .3 Include necessary information for re-ordering of materials as part of packaging of materials.
- .8 Catalogue all items and submit to *Consultant* an inventory listing organized by *Specifications* section. Include *Consultant* reviewed inventory listing in operation and maintenance manual.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Warranties

PART 1 - GENERAL

1.1 Warranties

- .1 Warranties shall be in accordance with GC 12.3, as amended.

1.2 Extended Warranties

- .1 Extended warranties shall be in accordance with GC 12.3, as amended, and as follows:
 - .1 Where specifically identified in the *Contract Documents*, extended warranties shall be furnished by individual manufacturer for particular product/system/assembly.
 - .2 Extended warranties shall include for proper performance of the portion of the *Work* as defined by the scope of the applicable *Specifications* section to the extent that the design and *Contract Documents* permit such performance.
 - .3 The *Owner* shall promptly give the warrantor notice in writing of observed defects and deficiencies which occur during the warranty period.
 - .4 Subject to GC 12.2.3.3, as amended, extended warranties shall commence at date of *Ready-for-Takeover*.
 - .5 Extended warranties specified shall be in addition to, and run concurrent with, other warranties required by the *Contract Documents*. Manufacturer's disclaimers and limitations on product warranty do not relieve *Contractor* of obligations under requirements of the *Contract Documents*.
 - .6 Submit extended warranty on warrantor's standard form specifically endorsed by the warrantor to the *Owner* and shall include the following information:
 - .1 Name and address of *Project*.
 - .2 Warranty commencement date.
 - .3 Warranty period.
 - .4 Specific warranty terms as required in applicable portion of *Contract Documents*.
 - .5 Name and title of authorized signing officer and seal of warrantor.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Demonstration and Training

PART 1 - GENERAL

1.1 Section Includes

- .1 Systems demonstration and training.

1.2 Preparation

- .1 Prior to scheduling demonstration and training:
 - .1 Review condition of equipment or systems for which demonstration and training is required and that have been used in the course of the *Work* to ensure turning over at completion in "as new condition", with warranties dated and certified from time specified.
 - .2 When partial occupancy of uncompleted project is required by *Owner*, coordinate *Owner's* uses, requirements, access, and the like, with requirements to complete the *Work*.

1.3 Submittals

- .1 Submit proposed dates, times, durations, and locations for demonstration and training of each item of equipment and each system for which demonstration and training is required. Allow sufficient time for training and demonstration for each item of equipment or system, or time as may be specified in technical *Specifications*.
 - .1 Correlate with construction schedule in accordance with Section 01 32 00.
- .2 *Consultant* and *Owner* will review submittal and advise *Contractor* of any necessary revisions.
- .3 Submit report(s) within 5 *Working Days* after completion of demonstration and training:
 - .1 Identifying time and date of each demonstration and training session.
 - .2 Summarizing the demonstration and training performed.
 - .3 Including a list of attendees.

1.4 Demonstration and Training

- .1 Perform system demonstration work no later than 15 *Working Days* prior to submitting request for *Consultant's* review to determine if *Substantial Performance of the Work* has been achieved.
 - .1 Provide *Owner* with 5 *Working Days* prior written notice of dates scheduled for demonstration and training.
- .2 Submit required certificates of approval or acceptance from authorities having jurisdiction.
- .3 Prerequisites to demonstration and training:
 - .1 Testing, adjusting, and balancing has been performed in accordance with *Contract Documents*.

Demonstration and Training

- .2 Equipment and systems are fully operational.
- .3 Copy of completed operation and maintenance manual is available for use in demonstration and training.
- .4 Conditions for demonstration and training comply with requirements specified in technical *Specifications*.
- .4 Demonstration and training:
 - .1 Demonstrate and provide training to *Owner's* personnel.
 - .2 Instruct *Owner's* personnel in operation and maintenance of equipment and systems, using operation and maintenance data provided as the basis for instructions. Arrange and coordinate instruction of *Owner's* staff in care, maintenance, and operation of building systems and finishes.
 - .3 *Contractor*, manufacturer's representatives, and responsible personnel from *Subcontractors* whose work is being demonstrated shall be present at these demonstrations, as well as *Owner's* personnel.
 - .4 *Owner* shall provide list of personnel to receive training and shall coordinate their attendance at agreed upon times.
 - .5 Demonstration shall include start up, operation, control, adjustment, troubleshooting, servicing, and maintenance of each item of equipment and system.
 - .6 Review operation and maintenance manual in detail to explain all aspects of operation and maintenance.
 - .7 Instruct *Owner's* representative on use of software required for operation and maintenance of building systems and provide a toll-free telephone number or website address for further assistance to the *Owner*.
 - .8 Prepare and insert additional data in the operation and maintenance data manuals when the need for additional data becomes apparent during demonstration or instruction.
- .5 Correct deficiencies and defects identified during demonstration, instruction, or commissioning.
- .6 Attend 'end-of-work' testing and break-in or start-up demonstration.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Integrated Fire Protection and Life Safety Systems Testing

PART 1- GENERAL

1.1 Section Includes

- .1 Procedures for verifying and documenting that interconnections between systems provided for *integrated fire protection and life safety systems* functions are installed and operating in conformance with their *design criteria* and in accordance with CAN/ULC S1001-11.
- .2 This specification is limited to testing of the interconnections between life safety and fire protection systems. Refer to separate technical specification sections for the individual testing and commissioning requirements for those systems.

1.2 Administrative Requirements

- .1 Definitions:
 - .1 Terms presented here in italic font are defined either in the Definitions of CCDC 2 – 2020, or in CAN/ULC S1001-11.
 - .2 The *Consultant* shall be considered the *design professional* for the purposes of the *Contract*.
- .2 Coordination:
 - .1 Coordinate the applicable *Subcontractors* whose equipment or systems are part of the *integrated fire protection and life safety systems test*.
- .3 Conduct a pre-installation meeting in accordance with Section 01 31 19 and as follows:
 - .1 Attendees at pre-installation meeting shall include *Subcontractors* whose equipment or systems are part of the *integrated fire protection and life safety systems test*.
 - .2 Review requirements of authorities having jurisdiction, as well as requirements of, and roles and responsibilities for, each participant in the development of the *integrated test plan* and the execution of the *integrated fire protection and life safety systems test*.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Integrated test plan*:
 - .1 Develop the *integrated test plan* in accordance with Section 5 of CAN/ULC S1001-11.
 - .2 Submit the *integrated test plan* for review by the *Consultant* at least 30 days prior to commencement of the first *integrated fire protection and life safety systems test*. The *integrated testing plan* shall comply with the requirements of CAN/ULC S1001-11 and as specified herein.
 - .3 Distribute final copy of plan digitally as follows:

Integrated Fire Protection and Life Safety Systems Testing

- .1 Authorities having jurisdiction.
 - .2 One copy to be maintained at the *Place of the Work*.
 - .3 *Owner*.
 - .4 *Consultant*.
 - .5 *Contractor*.
 - .6 Consulting engineers, as applicable.
- .3 Final test report:
- .1 Upon successful completion of the *integrated fire protection and life safety systems tests*, submit a final test report in accordance with Section 7 of CAN/ULC S1001-11.
 - .2 Distribute reports digitally as follows:
 - .1 Authorities having jurisdiction.
 - .2 One copy to be maintained at the *Place of the Work*.
 - .3 *Owner*.
 - .4 *Consultant*.
 - .5 *Contractor*.
 - .6 Consulting engineers, as applicable.

1.4 Quality Assurance

- .1 *Integrated testing coordinator* qualifications:
 - .1 The *integrated testing coordinator* services shall be provided by a firm or individual certified under the CAN/ULC-S1001 Certification of Integrated Testing Service Providers program.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Integrated Systems Testing Requirements

- .1 Conduct *integrated fire protection and life safety systems* testing in accordance with Section 6 of CAN/ULC S1001-11 and the accepted *integrated testing plan*.

3.2 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.

Integrated Fire Protection and Life Safety Systems Testing

- .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

Demolition

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Demolition and removal of selected non-structural portions of building.
 - .2 Removal of surplus materials from the *Place of the Work*.
 - .3 Related mechanical and electrical work and demolition requirements are covered under Divisions 21, 22, and 23 and Divisions 26, 27, and 28 respectively.
- .2 Section excludes:
 - .1 Demolition, removal, remediation, or abatement of designated substances or materials and toxic and hazardous substances.

1.2 Administrative Requirements

- .1 Pre-demolition meeting:
 - .1 Schedule a pre-demolition meeting following the procedures specified for pre-installation meetings in accordance with Section 01 31 19.
 - .2 Review existing conditions at the *Place of the Work* thoroughly to establish full extent of items to be removed and items to remain. Commencement of demolition work will be considered to be acceptance of existing conditions at the *Place of the Work* and removal of such items.
 - .3 Examine adjacent properties to determine extent of protection required.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Special procedures submittals:
 - .1 Existing conditions documentation:
 - .1 Document existing conditions of adjoining construction and site improvements, including pre-existing damage to finish surfaces that might be misconstrued as damage caused by demolition operations.
 - .2 Comply with Section 01 32 00.
 - .3 Submit existing conditions documentation before demolition work begins.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*:
 - .1 Shall have 5 years' specialized demolition experience, minimum.
 - .2 Shall be able to deploy adequate equipment and skilled personnel to complete work expediently in an efficient and orderly manner.

Demolition

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that utilities have been disconnected and capped.
- .2 Observe existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to *Consultant*.
- .4 Survey of existing conditions: Record existing conditions by use of photographs in accordance with Section 01 32 00.

3.2 Utility Services and Mechanical / Electrical Systems

- .1 Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28 respectively.

3.3 Selective Demolition, General

- .1 Demolish and remove existing construction only to the extent required by new construction, and as otherwise indicated. Use methods required to complete the work within limitations of governing regulations and as follows:
 - .1 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - .2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - .3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - .4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - .5 Maintain adequate ventilation when using cutting torches.
 - .6 Remove decayed, infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - .7 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .8 Dispose of demolished items and materials promptly.

Demolition

- .2 Dispose of demolished materials from *Project* site except where noted otherwise and in accordance with authorities having jurisdiction. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .3 Do not sell demolished material at the *Place of the Work*.
- .4 Clean existing surfaces specified to receive new applied finishes to assure proper adherence.

END OF SECTION

Masonry Procedures

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Masonry procedures for masonry work, including temporary bracing.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19 and as follows:
 - .1 *Subcontractors* required to attend the pre-installation meeting in addition to the *Subcontractor* for the work of this section shall include *Subcontractors* responsible for air barriers, siding/roofing, and glazing systems.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in masonry assemblies.
- .3 Shop drawings:
 - .1 Submit shop drawings for masonry unit wall assemblies indicating:
 - .1 Proposed locations of movement (control) joints.
 - .2 Types of masonry units, grade, texture, typical dimensions, colours, special shapes and shape dimensions.
 - .3 Layout/coursing for each type of masonry unit. Units are not to be cut without approval of *Consultant*. Layout using full brick masonry units.
 - .2 Submit engineered shop drawings for the following:
 - .1 Masonry reinforcement.
 - .2 Masonry ties and connectors.
 - .3 Seismic design, connections and restraint of wall assemblies.
- .4 Samples:
 - .1 submit 2 of each type of brick masonry unit specified for verification, matching to existing masonry.
 - .2 Submit mortar stick samples colours matching existing for *Consultant* review and approval prior to mock up panel. Submit range of colour matching existing.
 - .3 1 of each type of masonry accessory specified.
 - .4 1 of each type of masonry reinforcement and tie proposed for use.

Masonry Procedures

1.4 Quality Assurance

.1 Qualifications:

.1 Installers:

- .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval of *Product* manufacturers.

.2 Masonry contractor's qualifications:

- .1 Membership in good standing in Canadian Masonry Contractors Association (CMCA).

.2 Mock-ups:

.1 Mortar colour selection mock-ups:

- .1 Construct sample panels approximately 300 mm x 300 mm (12" x 12") of exterior masonry faced assemblies to determine acceptable mortar colour.

1.5 Site Conditions

.1 Cold weather construction requirements:

- .1 Comply with requirements of CAN/CSA A371-14CAN/CSA A371-14, and as follows:

Air Temperature, °C	General requirements during construction
0 to 4	Sand or mixing water shall be heated to a minimum of 20°C and a maximum of 70°C.
-4 to 0	Sand and mixing water shall be heated to a minimum of 20°C and a maximum of 70°C.
-7 to -4	(1) Sand and mixing water shall be heated to a minimum of 20°C and a maximum of 70°C. (2) Source heat shall be provided on both sides of the walls under construction. (3) Windbreaks shall be employed when the wind speed exceeds 25 km/h.
-7 and below	(1) Sand and mixing water shall be heated to a minimum of 20°C and a maximum of 70°C. (2) Enclosures and supplementary heat shall be provided to maintain an air temperature above 0°C. (3) The temperature of the unit when laid shall be not less than 7°C.

- .2 Grout shall be placed in masonry at a minimum temperature of 20°C and a maximum temperature of 50°C.
- .3 Mortar temperature shall not exceed 50°C to avoid flash set.
- .4 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.

.2 Cold weather protection requirements:

Masonry Procedures

- .1 Comply with requirements of CAN/CSA A371-14, and provide protection requirements for completed masonry or sections not in progress shall be as follows:

Mean daily air temperature, °C	Protection
0 to 4	Masonry shall be protected from rain or snow for 48 h
-4 to 0	Masonry shall be completely covered for 48 h
-7 to -4	Masonry shall be completely covered with insulating blankets for 48 h
-7 and below	The masonry temperature shall be maintained above 0 °C for 48 h by enclosure and supplementary heat

- .3 Hot weather construction requirements:

- .1 Comply with requirements of CAN/CSA A371-14, and as follows:

- .1 The spreading of mortar beds shall be limited to 1.2 m, and the masonry units shall be set within 1 minute of spreading the mortar, when the air temperature is above:

- .1 38°C; or
.2 32°C, with a wind velocity greater than 13 km/h.

- .2 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Materials

- .1 Mortar and grout for masonry: in accordance with Section 04 05 13.
.2 Masonry reinforcement and connectors: in accordance with Section 04 05 19.
.3 Masonry accessories: in accordance with Section 04 05 23.
.4 Brick masonry units: in accordance with Section 04 21 00.
.5 Concrete masonry units: in accordance with Section 04 22 00.

PART 3 - EXECUTION

3.1 Workmanship

- .1 Build masonry plumb, level, and true to line, with vertical joints in proper alignment. Lay masonry to tolerances specified in CAN/CSA A371-14.
.2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
.3 Masonry mortar and grout work: CAN/CSA A179-14 except where specified otherwise.

Masonry Procedures

- .4 Masonry work: CSA S304-14, CAN/CSA A370-14, and CAN/CSA A371-14 except where specified otherwise.

3.2 General Erection Tolerances

- .1 Lay masonry units with required mortar joint thickness specified below, not to exceed 12.7 mm (1/2").
- .2 Construction tolerances:
- .1 Maximum variation from plumb in vertical lines and surfaces of columns, walls and arrises:
- .1 6.4 mm (1/4") in 3 m (10').
- .2 9.6 mm (3/8") in a storey height not to exceed 6 m (20').
- .3 12.7 mm (1/2") in 12 m (40') or more.
- .2 Maximum variation from plumb for external corners, expansion joints and other conspicuous lines:
- .1 6.4 mm (1/4") in any storey or 6 m (20') maximum.
- .2 12.7 mm (1/2") in 12 m (40') or more.
- .3 Maximum variation from level of grades for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:
- .1 6.4 mm (1/4") in any bay or 6 m (20').
- .2 12.7 mm (1/2") in 12 m (40') or more.
- .4 Maximum variation from plan location of related portions of columns, walls and partitions:
- .1 12.7 mm (1/2") in any bay or 6 m (20').
- .2 19 mm (3/4") in 12 m (40') or more.
- .5 Maximum variation in cross-sectional dimensions of columns and thicknesses of walls from dimensions shown on drawings:
- .1 Minus 6.4 mm (1/4").
- .2 Plus 12.7 mm (1/2").
- .6 Where masonry surfaces serves as substrate for thin-set tile and direct applied and insulated finish coatings, build to tolerance of 3.2 mm in 2440 mm (1/8" in any 8') under a straight edge.

3.3 Laying Masonry Units

- .1 Coursing design:
- .1 Brick masonry units:
- .1 To match existing coursing design.
- .2 Concrete masonry units:

Masonry Procedures

- .1 To match existing coursing design.
- .2 Installation and materials shall meet or exceed that of accepted samples and mock-up.
- .3 Units shall be cut only upon acceptance of *Consultant*. Walls are to be laid-up with full size masonry units.
- .4 Keep cavity space at cavity and/or veneer walls clear of mortar droppings and debris.
- .5 Remove loose and foreign materials from supporting bed surfaces to ensure bonding.
- .6 Do not tooth at wall terminations. Rake back 1/2 unit length where stop-off occurs in horizontal run of masonry.
- .7 At openings in existing masonry created as a result of the *Work*, tooth-in salvaged brick masonry units to match existing coursing.
- .8 Do not install masonry units with face or faces exhibiting chips, cracks, blemishes, texture variation, and other imperfections detracting from appearance when viewed from distance of 4600 mm (15').
- .9 Do not install defective, cracked, and broken masonry units.
- .10 Mixing and blending: Mix units from a minimum of 3 pallets to ensure uniform blend of colour and texture and comply with manufacturer's recommended installation requirements. Distribute masonry units of varying textures to avoid spotty appearance over wall surfaces exposed to view. Do not use units which contrast too greatly with overall range.
- .11 Maintain bracing of walls and piers continuously during construction until structure provides support.
- .12 Extend masonry and partitions to deck, slab or structural members, as applicable, except where otherwise noted in the *Contract Documents*. Incorporate both lateral support and deflection space at termination of walls as required by this section.
- .13 Grouted reinforced masonry: incorporate reinforcing steel and construct masonry to indicated requirements.
- .14 Lay masonry level, true to line, square, plumb, and as indicated. Lay masonry courses in vertical alignment to ensure vertical joints align for full height of masonry and full height of building face.
- .15 Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- .16 Fully bond intersections, and external corners.
- .17 Do not adjust masonry units after placement. Where resetting of masonry is required, remove units, clean and reset in new mortar.
- .18 Cut masonry around obstructions, leaving maximum joint size as specified in this section (below).
- .19 Build chases, do not cut them.
- .20 Lay hollow concrete masonry units so that shells rest and align.
- .21 Exposed cuts shall be made clean and true with a suitable masonry saw.

Masonry Procedures

3.4 Exposed Masonry

- .1 Do not lay chipped, cracked, blemished, and otherwise damaged units whether exposed or concealed.
- .2 Do not lay concrete masonry units that will appear smooth or slick where exposed to view, whether painted or not finished.
- .3 Remove chipped, cracked, and otherwise damaged units and replace with undamaged units.
- .4 Maintain and control water-to-cement ratio, rate of hydration, environmental conditions, tooling of the mortar joints, and cleaning procedures, to produce masonry of uniform appearance matching accepted mock-up.

3.5 Jointing

- .1 Form tooled mortar joints whenever exposed to view, and behind cabinets, fitments, and wall accessories. Tool when mortar is thumb-print hard by tools having long bearing surface to avoid uneven depressions. Close cracks and crevices.
- .2 Tool with non-staining pointing tool to provide smooth, compressed, uniformly formed joints as follows:
 - .1 For exposed brick masonry:
 - .1 To match existing.
 - .2 For concealed masonry: strike flush joints concealed in walls and joints in walls to receive plaster, stucco, tile, insulation, resilient bases, or other applied material except paint or similar thin finish coating. Ensure that no mortar protrudes from joints on wall surfaces to receive materials and coatings.
- .3 Joint thickness:
 - .1 Maintain mortar joint thickness of 10 mm (3/8"), unless otherwise specified or indicated.
 - .2 At masonry cut around obstructions: maximum joint size of 13 mm (1/2").
- .3 Make joints of uniform thickness with vertical joints in alignment.
- .4 Trowel point joints in unparged masonry at below grade locations in contact with earth.
- .5 Form reglets where indicated for metal flashing in masonry.
- .6 Remove loose or defective mortar when masonry is removed and replace.
- .7 Rake out joints at junctions of masonry with concrete walls and columns, and at intersection of masonry walls and partitions where joint reinforcement is installed. These joints shall be sealed in accordance with Section 07 92 00.

3.6 Built-In Work

- .1 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

Masonry Procedures

- .2 Coordinate and cooperate in the provisions for setting, anchorage and alignment of built-in work.

3.7 Reinforced Masonry

- .1 Conform to requirements of CAN/CSA A371-14.

3.8 Provision for Movement

- .1 Deflection space:
 - .1 Incorporate and maintain existing deflection space between tops of non-load-bearing walls/partitions and structure to prevent transference of structural loads to masonry.
- .2 Coordinate work of this section with installation of lateral supports.

3.9 Loose Lintels

- .1 Loose lintels: in accordance with Section 05 50 00.
- .2 Install galvanized loose lintels as required to suit required openings. Set and level lintels, centred over opening width, on a 20 mil PVC slip-sheet membrane, placed over bed or mortar. Allow suitable movement joint at ends of lintels for expansion and contraction movement at exterior lintels.

3.10 Lateral Supports

- .1 In addition to requirements of *Contract Documents*, supply and install horizontal and vertical wall and partition lateral support anchors in accordance with CAN/CSA A370-14.

3.11 Movement (Control) Joints

- .1 For masonry without openings, space vertical movement joints at no more than 7620 mm (25') on centre.
- .2 For masonry with multiple openings, provide symmetrical placement of movement joints and reduced spacing of no more than 6096 mm (20 ft) on center.
- .3 Place movement joints at changes in wall direction, changes in building heights, at door and window locations where necessary and directed, at major changes in thickness of wall.
- .4 Extend movement joints to top of masonry, including parapets.
- .5 Review and coordinate movement joint locations with the *Consultant* prior to installation of masonry.

3.12 Temporary Bracing

- .1 Supply and install temporary bracing to masonry walls.

3.13 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00 and perform field control tests in accordance with CSA S304-14.

Masonry Procedures

3.14 Adjusting and Cleaning

- .1 Clean masonry in accordance with masonry manufacturer's written requirements. Remove masonry and install new masonry, if masonry is damaged by cleaning work.
- .2 Use proprietary PH-neutral cleaning solution with water as approved by manufacturer of masonry units in accordance with manufacturer's written directions.
- .3 Test cleaning agent and procedures by cleaning small, inconspicuous sample location prior to commencement of overall cleaning work. Review cleaning test area with *Consultant* and obtain acceptance in writing prior to cleaning remainder of areas requiring cleaning.
- .4 Soak wall with clean water and flush off loose dirt and mortar.
- .5 Apply specified cleaning agent in accordance with the manufacturer's direction, working from top to bottom.
- .6 Rinse areas thoroughly with clean water to remove cleaning solutions, dirt, and mortar residue.
- .7 Remove mortar from exposed masonry face immediately after pointing and prior to full set to avoid mortar staining of masonry units. Remove efflorescence and mortar deposits from surfaces to receive coatings and surfaces which are exposed to view. Remove masonry and install new masonry, if mortar staining cannot be removed without damaging masonry work.
- .8 Remove mortar droppings from flashings and other materials immediately to prevent damage and discolouration.
- .9 Remove efflorescence and mortar deposits from surfaces to receive coatings or surfaces which are exposed to view, occurring within a time period of 1 year after date of *Substantial Performance of the Work*.

3.15 Protection

- .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .2 Protect other materials and finishes from contamination by mortar droppings.
- .3 Supply and install temporary bracing of masonry work during and after erection until permanent lateral support is in place.

END OF SECTION

Mortar and Grout for Masonry

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Mortar and grout for masonry work.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00 and Section 04 05 00.
- .2 Test and evaluation reports:
 - .1 Submit test results confirming compliance of aggregates with CAN/CSA A179-14.

PART 2 - PRODUCTS

2.1 Materials

- .1 Mortar and grout: Comply with CAN/CSA A179-14.
- .2 Portland cement: in accordance with CAN/CSA A3001-13, GU (Type 10). For exposed mortar, maintain uniformity of cement manufacturer and batch for colour uniformity.
- .3 Hydrated lime: in accordance with ASTM C207-18, Type S.
- .4 Sand: in accordance with CAN/CSA A179-14.

2.2 Material Source

- .1 Maintain uniformity of mortar material manufacturers, mortar materials and source of aggregate throughout the *Work*.

2.3 Mortar Types

- .1 Mortar for exterior masonry above grade:
 - .1 Mortar for exterior exposed masonry veneer: Type N, Portland Cement/Lime/Sand mix.

2.4 Mortar Colour

- .1 Mortar colour; for use as indicated:
 - .1 Control mortar materials and workmanship to produce uniform colour to match existing.

PART 3 - EXECUTION

3.1 Masonry Procedures

- .1 Masonry procedures shall be in accordance with Section 04 05 00 as supplemented herein.
- .2 Comply with CAN/CSA A179-14, except where indicated otherwise.

Mortar and Grout for Masonry

3.2 Measurement and Mixing

- .1 Mix mortars and grout as specified in CAN/CSA A179-14. Use only dry aggregate. Test for bulking to determine accurate proportioning.
- .2 Adjust water in mortar mix to suit absorption rates of masonry units.
- .3 Concrete grout: mix as required to achieve specified compressive strength.

3.3 Field Quality Control

- .1 Field tests and inspections:
 - .1 Supply and install mortar for strength testing in accordance with CAN/CSA A179-14 and Section 01 45 00.

3.4 Protection

- .1 Supply and install protection where required at mixing areas to prevent damage attributed to materials of this section.

END OF SECTION

Masonry Reinforcement and Connectors

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Masonry reinforcing and anchorage.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00 and Section 04 05 00.

PART 2 - PRODUCTS

2.1 Materials

- .1 General: in accordance with building code and CAN/CSA A370-14 and OBC Table 4.1.8.18.
- .2 Corrosion protection; metal materials: in accordance with building code and CAN/CSA A370-14:
 - .1 For metal located interior to air barrier location: Hot dipped after fabrication in accordance with ASTM A1064/A1064M-22, and ASTM A153/A153M-09 Class B2 (457 g/m²), mill galvanized.
 - .2 For metal located exterior to the air barrier membrane: Stainless steel Type 304/316.
- .3 Joint reinforcement:
 - .1 Acceptable manufacturers:
 - .1 Blok-Lok.
 - .2 Substitutions: in accordance with Section 01 25 00.
 - .2 Exterior wall assemblies: 4.75 mm (3/16") wire, welded rod, ladder design unless otherwise indicated.
 - .3 Interior wall assemblies: 9 gauge mill galvanized wire ladder reinforcement.

PART 3- EXECUTION

3.1 Masonry Reinforcing, Ties, and Connectors - Engineered Applications

- .1 Install masonry reinforcing, ties, and connectors in accordance with engineered design and CAN/CSA A371-14.

3.2 Movement (Control) Joints

- .1 Installation requirements in accordance with Section 04 05 00 and as supplemented herein.
- .2 Stop reinforcing 25 mm (1") short of each side of movement joints unless otherwise indicated.

Masonry Reinforcement and Connectors

3.3 Horizontal Reinforcing

.1 Joint reinforcement:

- .1 Install horizontal joint reinforcement in cavity walls, solid walls, and partitions in accordance with CAN/CSA A371-14 and as indicated in the *Contract Documents*, the more stringent requirements shall govern.

3.4 Lateral Support and Anchorage

- .1 Install lateral support and anchorage in accordance with CAN/CSA A370-14 and as indicated on the structural drawings.

END OF SECTION

Masonry Accessories

PART 1- GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Movement (control) joint filler at masonry veneer.
 - .2 Weep vents at cavity masonry veneer.
 - .3 Cavity drainage material at exterior masonry cavity walls.
 - .4 Metal flashing at masonry wall assemblies.
 - .5 Through wall flashing membrane.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00 and Section 04 05 00.

PART 2 - PRODUCTS

2.1 Materials

- .1 Movement (control) joint filler at masonry veneer: sealant and backer rod in accordance with Section 07 92 00.
- .2 Weep vents: Full height of masonry unit, designed to keep weep hole open for passage of air and water, UV stabilized polypropylene.
 - .2 Size: Height of head joint x depth of masonry unit x thickness of mortar joint.
 - .3 Colour: to later selection by *Consultant* from manufacturer's full range.
 - .4 Acceptable *Product*:
 - .1 Advanced Building Products, Inc. 'Mortar Maze Weep Vents.'
 - .2 Blok-Lok Limited 'Cell-Vent'.
 - .3 Mortar Net Solutions 'WeepVent'.
 - .4 Wire-Bond 'Cell-Vent'.
- .3 Cavity drainage material: Free-draining mesh made from polymer strands or extruded polypropylene formed cavity units to suit cavity depth, that will not degrade within the wall cavity.
 - .1 Acceptable *Products*: Subject to compliance with requirements, provide one of the following:
 - .1 Advanced Building Products Inc. 'Mortar Break DT'.
 - .2 Hohmann & Barnard Inc 'Mortar Trap'.
 - .3 Mortar Net Solutions 'MortarNet'.
 - .4 Wire-Bond 'Cavity Net DT'.

Masonry Accessories

- .4 Through wall flashing membrane:
 - .1 Sheet membrane:
 - .1 Single source responsibility: Components required for complete air barrier system and through wall flashing membrane behind the opaque wall assemblies to be obtained from single manufacturer. Coordinate with Section 07 27 00.
 - .2 Primer: as per manufacturer's installation requirements.
 - .3 Service temperature: -40 °C to 70 °C.
 - .4 Acceptable *Products*:
 - .1 Carlisle Coatings & Waterproofing: CCW-705 TWF.
 - .2 GCP Applied Technologies 'Perm-A-Barrier Wall Flashing'.
 - .3 Henry Company 'Bakor Blueskin TWF'.
 - .4 Soprema 'Soprasedal Stick 130-S'.
 - .5 W.R. Meadows 'Air-Shield Thru-Wall Flashing'.
 - .5 Metal flashing:
 - .1 In accordance with Section 07 62 00. Flashing between shelf angle and through wall flashing for bridging over insulation to connect to air barrier system in accordance with 07 27 00.

PART 3- EXECUTION

3.1 Masonry Installation and Procedures

- .1 Masonry installation and procedures shall be in accordance with Section 04 05 00, as supplemented herein.

3.2 Movement (Control) Joints

- .1 Installation requirements in accordance with Section 04 05 00 and as supplemented herein.
- .2 Keep movement joints clear for application of joint sealants.
- .3 Install movement joint filler in accordance with product manufacturer's written requirements.

3.3 Vents

- .1 Install weep vents at top at cavities, at second brick course from top, at uniform and consistent horizontal spacing not exceeding 610 mm (24").
 - .1 Stagger vents below upper floor level vents to ensure that upper vents are not located directly over lower vents, in consistent arrangement reviewed and accepted by *Consultant* prior to commencement of installation.
 - .2 Do not locate at window sills.

Masonry Accessories

- .3 Do not locate at top of parapet cavities.
- .4 Do not locate within 610 mm (24") of corners of building.

3.4 Masonry Flashing

- .1 General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- .2 Install flashing as follows unless otherwise indicated:
 - .1 Install flashings in masonry in accordance with CAN/CSA A371-14.
 - .2 Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal laps and penetrations in flashing watertight in accordance with manufacturer's installation requirements.
 - .3 At lintels and shelf angles, extend flashing a minimum of 150 mm (6") into masonry at each end. At heads and sills, extend flashing minimum of 150 mm (6") at ends and turn up 50 mm (2") minimum to form end dams.
 - .4 Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 12.7 mm (1/2") back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 - .5 Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
 - .6 Flashings shall be installed to shed water in masonry cavity to exterior. Make flashings watertight.
 - .7 Install masonry flashing to perform as dampproof course in walls that extend below grade except walls which are not exposed to moisture or protected by moisture retarding materials. Locate more less than 150 mm (6") above finished grade.

3.5 Cavity Drainage Material

- .1 Install cavity drainage units over weep hole vents, flashings, in exterior wythes of masonry cavity and veneer wall construction.
- .2 Install free-draining mesh units in continuous manner for full cavity length and depth.

3.6 Deflection Space Filler

- .1 Non-fire rated walls: Fill deflection space with deflection space filler. Where deflection space is exposed, tamp filler into deflection space 25 mm (1").

3.7 Slip Sheet at Metal Lintels

- .1 Install slip sheet at loose lintel locations between bearing area of lintel and bed. Trim away exposed slip sheet.

END OF SECTION

Brick Masonry Units

PART 1- GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Supply and installation of new brick to match existing.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00 and Section 04 05 00.

PART 2 - PRODUCTS

2.1 Materials

- .1 Manufacture: Manufacture total required brick in one continuous batch, for maximum colour and texture uniformity.
- .2 Salvaged brick: in accordance with 02 41 16 – Demolition.
- .3 New Clay brick:
 - .1 Exterior kiln fired clay brick veneer: in accordance with CAN/CSA A82-14.
 - .1 Grade EG.
 - .2 Type: X.
 - .2 Size:
 - .1 To match existing brick masonry.
 - .3 Colour:
 - .1 To match existing brick masonry.
 - .4 Special shapes:
 - .1 Supply and install special units for:
 - .1 Supply and install solid brick units where necessary to avoid exposing brick cores.

PART 3 - EXECUTION

3.1 Laying

- .1 Lay masonry in accordance with good practice, CAN/CSA A371-14 and as accepted in mock-up sample wall and as specified in Section 04 05 00.
- .2 Review locations of coursing alignment and layout with *Consultant*, and seek approval, prior to commencement of the work of this section.

END OF SECTION

Structural Ceiling Grid

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Metal framing material, fittings, and related support system accessories as indicated on the drawings. Rails shall be true, plumb and level to the tolerances indicated when maximum loading conditions are applied due to equipment operation.
 - .2 Installation, supervision, engineering, and fabrication required for installation of the support system in accordance with the drawings and as specified herein.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets: Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Shop drawings shall include, but are not limited to, the following:
 - .1 Submit structural calculations for approval by the project engineer. Calculations may include, but are not limited to:
 - .1 Description of design criteria.
 - .2 Stress and deflection analysis.
 - .3 Selection of framing members, fittings, and accessories.
 - .4 Seismic design, connections and restraint of wall assemblies.
 - .5 Submit all pertinent manufacturers published data.
- .4 Samples:
 - .1 Submit samples as follows for verification of each type of exposed finish required.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers/installers:
 - .1 Shall have 10 years' experience, minimum, in manufacturing and installing adjustable metal framing ceiling grid supports.
 - .2 Shall demonstrate experience of projects of similar scope and size.

Structural Ceiling Grid

- .3 Shall maintain continuing quality assurance program for both its material and installation crews.
- .4 Shall provide the single source responsibility for materials and workmanship.
- .2 Manufacturer must certify in writing that components have been produced in accordance with an established quality assurance program.

1.4 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Manufacturer

- .1 Provide products of the following manufacturer or approved alternative:
 - .1 Unistrut Canada Limited.
- .2 Installation by Unistrut Canada Limited or a Unistrut authorized installer.

2.2 Performance/Design Requirements

- .1 In accordance with CSA-S16-19 - "Limit States Design of Steel Structures".
- .2 In accordance with AISI specification for the Design of Cold-Formed Steel Structural Members August 2001 Edition, December 11, 1989 Addendum.
- .3 Design to be by a professional engineer registered in the *Place of the Work*, except work designed on structural drawings. Professional engineer to be experienced in this type of engineering and in accordance with Section 01 33 00.
- .4 Support structure: The support members shall be located as indicated on the drawings. The spacing shall be as shown on the drawings.
- .5 Ceiling anchorage: Whenever possible, attachment to the ceiling structure above shall be by means of imbedded concrete inserts, through bolts, or by direct attachment to the structural framing of the building. When possible, fasteners will not be in direct pullout.
- .6 Vertical supports: Vertical supports shall provide for both basic and micro vertical adjustments.
- .7 Seismic bracing: Framing system shall be adequately braced to meet code requirements.
- .8 Loading: The support structure shall be designed to support a uniform load of equipment as indicated in equipment schedule.
- .9 Safety factor: The system shall be designed with a maximum safety factor of 3 based upon ultimate strength under static loading conditions.
- .10 Maximum allowable deflection under live load: 1/240 of span; size components of single span.

Structural Ceiling Grid

2.3 Materials

- .1 Channel members shall be fabricated from structural grade steel conforming to the following: ASTM A1011/A1011M-18a SS (Structural Steel) Grade 33.
- .2 Fittings shall be fabricated from steel conforming to one of the following: ASTM A575, ASTM A576, or ASTM A36.
- .3 Materials shall be stamped and identifiable by manufacturer and part number (where appropriate). Materials that appear damaged, distressed, unidentifiable or rusted shall not be used and will not be accepted.
- .4 Channel Sizes (see drawings for locations):
 - .1 P1000, P1001, P5000 or P5501 Channels as manufactured by Unistrut Corporation.

2.4 Connections

- .1 Framing fittings shall be of 6 mm (1/4") thick steel bar, 40 mm (1-5/8") wide, with 14 mm (9/16") holes to accommodate 12 mm (1/2") threaded rods.
- .2 The standard Unistrut Nut (12 mm (1/2")) used for framing and attachments shall have serrated grooves to match and engage the inturned channel edges.

2.5 Finishes

- .1 Channel:
 - .1 Rust inhibiting thermoset acrylic enamel paint applied by electro-deposition, after cleaning, phosphating, and thoroughly baked.
- .2 Fittings: Polyester powder coat after cleaning, phosphating and thoroughly baked.
- .3 Colour shall be white.
- .4 Bolts and Unistrut Nuts shall be electro-galvanized.
- .5 Concrete inserts:
 - .1 Continuous channel type inserts shall be fabricated to the same general specifications as the 12 gauge channel members of the framing systems and also shall have an ultimate resistance to pulling out of the concrete not less than 3400 kgs (7,500 lbs) average for 10 mm (1-3/8") deep inserts and 2721.55 kg (6000 lbs) average for 21 mm (7/8") deep inserts in each foot of length. Finish shall be prior to forming and zinc coated.

PART 3 - EXECUTION

3.1 Examination

- .1 The installer shall inspect the work area prior to installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed.

Structural Ceiling Grid

3.2 Installation

- .1 Installation shall be accomplished by a fully trained installer authorized by the manufacturer, *Consultant*, *Contractor* or *Owner*.
- .2 Set support system components into final position true to line, level and plumb, in accordance to approved shop drawings.
- .3 Anchor material firmly in place. Tighten connections to their recommended torques.
- .4 The mounting surfaces of the support system shall be horizontal within the tolerance of 1 mm (1/32") and within 1.5 mm (1/16") in any 610 mm (24") length of the rails.
- .5 The elevation of one rail mounting surface to the other shall be within 3.2 mm (1/8") in any 610 mm (24") length of the rails.

3.3 Adjusting and Cleaning

- .1 Upon completion of the work of this section, remove protective wraps and debris. Repair damage due to installation.
- .2 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.

3.4 Protection

- .1 Protect finished surfaces from damage.

END OF SECTION

Lateral Load-Bearing Cold-Formed Metal Framing

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Lateral load-bearing cold-formed metal framing, including but not limited to metal studs, furring, at exterior assemblies subject to lateral loads and loads transferred by exterior materials and assemblies.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings, including seismic design, connections and restraint of wall and soffit assemblies. Field review requirements shall include the following:
 - .1 Checking that mill test reports are properly correlated to materials.
 - .2 Sampling fabrication and erection procedures for general conformity to requirements of the *Contract Documents*.
 - .3 Checking fabricated members against specified member shapes.
 - .4 Sample checking of screwed and bolted joints.
 - .5 Sample checking that tolerances are not exceeded during fit-up or erection.
 - .6 General review of field cutting and alterations required by other sections.
 - .2 Include necessary shop details and erection diagrams. Indicate member sizes, locations thicknesses exclusive of coating, coatings and materials. Include connection details for attaching framing to itself and for attachment to the structure. Show splice details where permitted. Indicate dimensions, openings, requirements of related work and critical installation procedures. Show temporary bracing required for erection purposes.
 - .3 Indicate design loads and design calculations, including horizontal and vertical reactions at connections to building structure for all load cases.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*.

Lateral Load-Bearing Cold-Formed Metal Framing

- .1 Has adequate equipment and skilled workers to perform the work expeditiously.
- .2 Has successfully completed installations similar to that specified during a period of at least the immediate past 5 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Base design on limit states design principles using factored loads and resistances.
- .2 Specified lateral loads shall be in accordance with the building code, for building classification - 'Post-Disaster Building'.
- .3 Resistances and resistance factors shall be in accordance with the building code and CAN/CSA S136-07.
- .4 Conform to the requirements of fire rated assemblies which have been tested in accordance with CAN/ULC S101-07 and provide indicated fire resistance rating.
- .5 Design and provide work of this section in accordance with Exterior Insulation and Finish Systems Best Practice Guide Building Technology, latest edition.
- .6 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. Do not rely on collateral sheathing to help restrain member rotation and translation perpendicular to the minor axis. Provide bridging at 1525 mm (60") on centre maximum. Space bridging at equal intervals over the span length of the member.
- .7 Design anchorage and splice details for bridging.
- .8 Design for local loading due to anchorage of cladding and interior wall mounted fixtures.
- .9 Maximum flexural deflections under specified lateral loads shall conform to following:
 - .1 Metal framing supporting masonry veneer shall meet the requirements of CSA S304.1-04.
- .10 Design components or assemblies to accommodate specified erection tolerances of the structure.
- .11 Provide head, sill and jamb members and connections to frame openings larger than 100 mm (3-15/16") in any dimension.
- .12 Limit free play and movement in connections perpendicular to the plane of the framing to ± 0.5 mm (0.019") relative to the building structure.
- .13 Anchor top and bottom track to the structure at a maximum spacing of 813 mm (32") centre to centre. Closer spacing shall be required in accordance with design requirements.
- .14 Allow for movement of structure. Design end connections to accommodate floor/roof deflections such that framing is not loaded axially.
- .15 Connections between lightweight steel framing members shall be by bolts or sheet metal screws.

Lateral Load-Bearing Cold-Formed Metal Framing

- .16 Resistances for sheet metal screws shall be based on manufacturer's lowest bound test values multiplied by appropriate resistance factor, given in CAN/CSA S136-07.
- .17 Lateral load bearing metal framing include:
 - .1 Framing subjected to lateral loads.
 - .2 Steel bridging.
 - .3 Top and bottom track.
 - .4 Head and sill members and jamb framing for openings.
 - .5 Bridging and track connections.
 - .6 Top and bottom track connections to main structure including detailing to accommodate floor deflections.

2.2 Materials

- .1 Steel to conform to requirements of CAN/CSA S136-07 and be identified as to specification, type grade and mechanical properties.
 - .1 Minimum base steel thickness exclusive of coating shall be as follows:
 - .1 1.087 mm (0.0428"). Use greater stud thickness if required by the design criteria.
 - .2 Minimum thickness for clip angles shall be 1.367 mm (0.054"). Use greater clip angle thickness if required by the design criteria.
 - .2 Metal framing members forming part of exterior building envelope shall have a minimum coating of Z275 galvanizing in accordance with ASTM A653/A653M-11. Other coatings providing equal or better corrosion protection may be used, subject to acceptance of *Consultant*.
 - .3 Sheet metal screws shall have a minimum coating thickness of 0.008 mm (0.0003") of zinc. Other coatings providing equal or better corrosion protection may be used, subject to acceptance of *Consultant*.
 - .4 Zinc rich paint for touching up damaged metallic coatings shall conform to CAN/CGSB 1.181-M99.
 - .5 Galvanic/dissimilar metal corrosion inhibitor (isolation coating): in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
 - .6 Concrete anchors shall have a minimum coating thickness of 0.008 mm (0.00032") of zinc. Other coatings providing equal or better corrosion protection may be used.
 - .7 Screws:
 - .1 Steel screws shall be equal to or exceed minimum diameter indicated on shop drawings.
 - .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
 - .3 Thread types and drilling capability shall conform to manufacturer's recommendations.

Lateral Load-Bearing Cold-Formed Metal Framing

- .4 Screws covered by sheathing materials shall have low profile heads.

2.3 Fabrication

- .1 Provide cut-outs centred in webs of members to accommodate mechanical and electrical services. Effect of cut-outs on strength and stiffness of members shall be considered.
- .2 Steel thickness exclusive of coating shall be marked on each member by embossing, stamping with indelible ink or by colour coding.

PART 3 - EXECUTION

3.1 Erection

- .1 Erect lateral load-bearing metal framing true and plumb within specified tolerances.
- .2 Employ temporary bracing wherever necessary to withstand loads to which the structure may be subject during erection and subsequent construction.
 - .1 Leave temporary bracing in place as long as required for safety and integrity of structure.
 - .2 Erector shall verify that during erection a margin of safety consistent with the requirements of the building code and CAN/CSA S136-07.
- .3 Provide galvanic/dissimilar metal corrosion inhibitor (isolation coating) in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
- .4 Erection tolerances:
 - .1 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.
 - .2 For framing, out of plumbness shall not exceed 1/500th of member length. Out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
 - .3 Metal framing shall seat into top and bottom tracks. Gap between end of stud and web of track shall not exceed 4 mm (0.158").
 - .4 For track, camber shall not exceed 1/1000th of member length.
 - .5 Spacing of metal framing shall not be more than 3 mm (1/8") from design spacing. Cumulative error in spacing shall not exceed requirements of finishing materials.
- .5 Make field measurements necessary to ensure proper fit of members.
- .6 Cutting of members may be by saw or shear. Torch cutting is not permitted.
- .7 Holes that are field cut into lightweight steel framing members shall conform to requirements specified under "Fabrication" heading in Section 05 41 13 and requirements specified under "Erection" heading in Section 05 41 13.
- .8 Insulation equal to that specified shall be placed in jamb and header assemblies that will be inaccessible after their installation into wall. Ensure that insulation is kept dry and not compressed.

Lateral Load-Bearing Cold-Formed Metal Framing

3.2 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

END OF SECTION

Metal Fabrications

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Work of this section includes metal fabrications as set-out in the Metal Fabrications Schedule or as indicated.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Submit list of fabrications to be provided as part of the work of this section.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Include plans, sections and large scale details, and indicate components and methods of assembly, materials and their characteristics, fastenings, metal finishes, welds, and their structural characteristics relative to their purpose, and other fabrication information required.
 - .3 Indicate seismic design, connections and restraint.
 - .4 Indicate proposed *Place of the Work* connections and methods.
 - .5 Submit coordination drawings indicating locations of concealed grounds, cutouts, plates, and other required fabrications.
 - .6 Show relation to adjoining construction, details of outside and inside corners and door openings.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Maintenance data:
 - .1 Submit maintenance data for incorporation into maintenance manual specified in Section 01 78 00.

1.5 Quality Assurance

- .1 Qualifications:

Metal Fabrications

.1 *Subcontractor:*

- .1 Has adequate plant, equipment, and skilled workers to perform work expeditiously.
- .2 Has successfully completed installations similar to that required in the *Work* during a period of at least the immediate past 5 years.
- .2 Requirements of regulatory agencies: the work of this section that functions to resist forces imposed by dead and live loads shall conform to requirements of jurisdictional authorities.

1.6 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 05 50 00.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Design, fabricate, and install work of this section in accordance with the building code and requirements of authorities having jurisdiction.
- .2 Welding:
 - .1 Steel: Weld components to conform to requirements of CSA W59-18, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1-19 and CSA W55.3-08 (R2018) as applicable.
- .3 Design assemblies and connections to withstand own dead load, live loads, super-imposed dead loads, and fabrication forces, without permanent distortions or deformation, to maximum allowable deflection of L/360, within the following construction tolerances:
 - .1 Maximum variation from plumb in vertical lines: 3.2 mm (1/8") in 3 m (10'-0").
 - .2 Maximum variation from level: 3.2 mm (1/8") in 9 m (30'-0").
 - .3 Maximum variation from straight: 3.2 mm (1/8") in 3 m (10'-0") under a 3 m (10'-0") straight edge.
 - .4 Maximum variation from angle indicated: 10 seconds.
 - .5 Tolerances shall be non-cumulative.

2.2 Materials

- .1 General:
 - .1 Unless detailed or specified otherwise, standard *Products* will be acceptable if construction details and installation meet requirements of the *Contract Documents*.
 - .2 Include materials, *Products*, accessories, and supplementary parts necessary to complete assembly and installation of work of Section 05 50 00.

Metal Fabrications

- .3 Incorporate only metals that are free from defects that are visible, or that impair strength or durability. Install only new metals that are of best quality, free from rust or waves and buckles, clean, straight, with sharply defined profiles.
- .2 Steel:
 - .1 Structural shapes, plate, bars: hot-rolled, in accordance with CSA G40.21-13, Grade 300W.
 - .2 Hollow structural sections: hot-formed, seamless, in accordance with CSA G40.21-13, Grade 350W, Class H.
 - .3 Mild sheet and strip: hot rolled, in accordance with ASTM A1011/A1011M-14.
 - .4 Cold rolled sheet: stretcher levelled, fully pickled, in accordance with ASTM A1008/A1008M-13, Grade CS Type A exposed, matte finish, dry, unless otherwise indicated.
 - .5 Steel pipe: in accordance with ASTM A53/A53M-12, Type E or S, Grade A or B, standard weight, Schedule 40 seamless black or AISI MT 1010/1015.

2.3 Accessories

- .1 Fasteners:
 - .1 Exposed fasteners to match the appearance of the surface on which they occur.
 - .2 For fastening steel: Zinc plated screws and bolts, and in accordance with ASTM A307-21, Type 304 stainless steel where exposed to exterior.
 - .3 High strength bolts: in accordance with ASTM A325-14.
 - .4 Other types of fasteners as appropriate to meet design requirements.
 - .5 Fasteners shall be tamperproof where exposed.
- .2 Welding materials:
 - .1 Steel: in accordance with CSA W59-18.
- .3 Grout:
 - .1 Epoxy grout; non-shrink, non-expanding.
 - .1 Acceptable *Products*:
 - .1 Hilti 'HY-200'.
 - .2 Sika 'Sika AnchorFix 3001'.
 - .3 W.R. Meadows 'REZI-WELD 3/2 EPOXY GROUT/PATCH'.
 - .4 Substitutions: in accordance with Section 01 25 00.
 - .2 Cementitious grout: non-shrink, non-expanding in accordance with ASTM C1107/C1107M-20:
 - .1 Acceptable *Products*:
 - .1 Sika 'Sika Grout 212' or 'Sika M-Bed Standard'.

Metal Fabrications

- .2 W.R. Meadows 'Sealtight CG-86 Construction Grout'.
- .3 Substitutions: in accordance with Section 01 25 00.
- .4 Galvanic/dissimilar metal corrosion inhibitor (isolation coating): in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.

2.4 Finishes

- .1 Shop primer; steel:
 - .1 In accordance with CISC/CPMA 2-75 or SSPC-Paint 20, Paint Specification No. 20: Zinc-Rich Primers (Type I "Inorganic" and Type II "Organic").
- .1 Hot dip galvanizing: in accordance with ASTM A123/A123M-13, minimum zinc coating of 600 g/m². Use air cooling method (no water or chromate dipping treatment permitted).
- .2 Zinc rich paint; steel: Two-component zinc-rich coating, zinc powder in accordance with ASTM D520-00(2019) Type III, SSPC-Paint 20, Type 1 Inorganic or single-component zinc-rich coating to SSPC-Paint, Type 2 Organic, CAN/CGSB 1.181-M99, VOC content <100 g/l to ASTM D1475-13(2020).
 - .1 Acceptable Products:
 - .1 Aervoe Industries, Inc. 'Low VOC Cold Galvanize Coating 93% Zinc'.
 - .2 ZRC Worldwide 'ZRC Zero-VOC Galvanizing Compound'.
 - .3 Substitutions: in accordance with Section 01 25 00.

2.5 Fabrication

- .1 General:
 - .1 Fabricate metal fabrications with machinery and tools specifically designed for the intended manufacturing processes and by skilled tradesmen.
 - .2 Fit and assemble metal fabrications in shop. When this is not possible, make a trial shop assembly.
 - .3 Incorporate means for fastenings of other work secured to work of this section.
- .2 Construction:
 - .1 Fabricate with materials, component sizes, metal gauges, reinforcing, anchors, and fasteners of adequate strength to withstand intended use, and within allowable design factors imposed by jurisdictional authorities. Fabricate items from steel unless otherwise noted.
 - .2 Metal fabrications shall remain free of warping, buckling, opening of joints and seams, distortion, and permanent deformation.
 - .3 Construct items that are part of floor construction, such as gratings and trench covers, to support the same live loads for which surrounding construction is designed.
- .3 Assembly:

Metal Fabrications

- .1 Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .2 Provide smooth welds with splatter removed where exposed to view.
 - .1 Finish welds shall comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #4 - Good quality, uniform undressed weld with minimal splatter as shown in NAAMM-AMP 521-01(R2012).
- .3 Allow for differential movements within assemblies and at junctions of assemblies with surrounding *Work*.
- .4 Field welding of hot dipped galvanized members permitted only when other fastening methods are not possible. Locations of field welds to be clearly identified on reviewed shop drawings.
- .5 Incorporate holes and connections for work installed under other sections.
- .6 Cleanly and smoothly finish exposed edges of materials including holes.
- .7 Cap open ends of sections exposed to view, such as pipes, channels, angles, and other similar work.
- .4 Shop prime painting:
 - .1 Clean loose mill scale, rust, dirt, weld flux and spatter from the work after fabrication.
 - .2 Prepare and prime paint in accordance with manufacturer's installation requirements. Prepare steel by methods specified in CISC/CPMA 2-75 or SSPC-SP3-18.

PART 3 - EXECUTION

3.1 Examination

- .1 Take measurements at the *Place of the Work* to verify that metal fabrications fit surrounding construction, around obstructions and projections in place, or as indicated, and to suit service locations.

3.2 Installation

- .1 Install metal fabrications plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work.
- .2 Include in work of this section anchor bolts, high tensile bolts, washers and nuts, expansion bolts, toggles, straps, sleeves, brackets, clips, and other items necessary for secure installation as required by loading and jurisdictional authorities.
- .3 Countersink holes at wood screw locations where wood is attached to metal fabrications.
- .4 Attach metal fabrications to interior concrete and masonry with corrosion resistant expansion bolts to support load with a safety factor of 3.
- .5 Provide galvanic/dissimilar metal corrosion inhibitor (isolation coating) in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.

Metal Fabrications

- .6 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

3.3 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

3.4 Adjusting and Cleaning

- .1 After erection, touch up primed surfaces that are burned, scratched or otherwise damaged with prime paint to match shop paint.
- .2 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.
- .3 Clean and repair areas of bare metal and welds on galvanized surfaces with zinc rich paint. Mask welded areas of members to minimize overpainting of adjacent undamaged surfaces. Prepare substrate to remove oil and grease in accordance with SSPC-SP1-16, rust scale in accordance with SSPC-SP3-18, mill scale in accordance with SSPC-SP6/NACE No. 3-07.

3.5 Metal Fabrications Schedule

- .1 Medical equipment supports for patient lift track.
- .2 Reinforcement for hollow metal door frames with lead.
- .3 Support framing for toilet partitions.

END OF SECTION

Rough Carpentry

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 The work of this section includes, but is not necessarily limited to, the following:
 - .1 Plywood backing panels.
 - .2 Wood grounds, nailers, blocking and sleepers.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.

1.3 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 06 10 53.
- .2 Where stability of wood dimensions and tolerances is required to ensure accurate installation of later work, store and install only in dry areas where no installation of moist or wet materials will be undertaken.

PART 2 - PRODUCTS

2.1 Wood Materials

- .1 General requirements:
 - .1 Except as indicated or specified otherwise lumber shall be softwood, S4S, moisture content not greater than 19% at time of installation, in accordance with following standards:
 - .1 CSA O141-05.
 - .2 NLGA-2014 Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds:
 - .1 Use S2S material.
 - .2 Dimension lumber sizes: in compliance with Section 12 of the NLGA-2014.
 - .3 Dimension lumber species and grades:
 - .1 Spruce-Pine-Fir.
 - .2 Light framing in accordance with NLGA-2014 Construction grade, S-Dry.
 - .3 Planks in accordance with NLGA-2014 No. 2 grade, S-Dry.
 - .4 Boards in accordance with NLGA-2014 No. 4 Common grade, S-Dry.

Rough Carpentry

2.2 Wood Treatment

- .1 Fire retardant pressure treatment:
 - .1 Wood shall be pressure impregnated with fire-retardant chemicals in accordance with CAN/CSA O80 Series-08 and have flame-spread rating of not more than 25 in accordance with CAN/ULC-S102-10.
 - .2 Comply with VOC limits in accordance with Section 01 81 13.

2.3 Panel Materials

- .1 Softwood plywood (CSP): in accordance with CSA O151-09.
- .2 Douglas Fir plywood (DFP): in accordance with CSA O121-08.

2.4 Fastenings and Hardware

- .1 General:
 - .1 Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 38 mm (1-1/2") into wood substrate.
 - .2 Anchors to concrete and unit masonry: Capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing according to ASTM E488/E488M-22.
 - .3 Use surface fastenings of following types, except where specific type is indicated.
 - .1 To hollow masonry, plaster and panel surfaces use 9 mm (11/32") 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.
 - .4 Fastener materials:
 - .1 Hot-dip galvanized fasteners: in accordance with ASTM A153/A153M-09 Class A or B1 G185 and connectors meeting ASTM A653/A653M-13 Class G-185 sheet or better.
 - .5 Hardware materials:
 - .1 Hot-dipped galvanized in accordance with ASTM A153/A153M-09, Class A or B1, and connectors in accordance with ASTM A653/A653M-13, Class G185.

2.5 Source Quality Control

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

Rough Carpentry

PART 3 - EXECUTION

3.1 General

- .1 Layout work to accommodate work of others. Cut and fit accurately. Erect in position indicated. Align, level, square, plumb, and secure work permanently in place.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolt head and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Include in work of this section rough hardware such as nails, bolts, nuts, washers, screws, clips, and connectors required for complete and proper installations; and operating hardware required on work of this section for temporary use.
- .4 Do not attach work by wood plugs or blocking in concrete or masonry.
- .5 Do not regard nailers, blocking, and such other fastening provision indicated as exact or complete. Install required provisions for fastening, located and secured to suit *Place of the Work* conditions, and adequate for intended support.
- .6 Verify that grounds required for fastening of components and equipment are located correctly, and sized for adequate support.
- .7 Do not rip or mill fire retardant treated lumber. Only end cuts, drilling holes, and joining cuts are permitted.

3.2 Equipment Backboard

- .1 Provide backboards for mounting equipment as required. Use 19 mm (3/4") Softwood Plywood.
- .2 Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28 for requirements for electrical backboards.

3.3 Miscellaneous Plywood Blocking

- .1 Provide minimum 19 mm (3/4") softwood plywood blocking for attachment of miscellaneous fitments as indicated.
- .2 Wood blocking within gypsum board metal stud assemblies under work of Section 09 22 00.

END OF SECTION

Architectural Woodwork

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Work of this section includes architectural woodwork including, but not limited to, the following:
 - .1 Cabinetry and hardware.
 - .2 Plastic laminate fabrications.
 - .3 Solid surfacing fabrications.
 - .4 Factory and site finishing of architectural woodwork.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordinate with other work for satisfactory and expeditious completion of the work of this section. 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 Where woodwork is 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. Coordinate manufacturing schedule with construction progress to avoid delays in the *Work*.
 - .3 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the work of this section and set in place. Instruct applicable *Subcontractors* as to their locations.
 - .4 Provide cut-outs for raceways, sleeves, grommets and other manufactured accessories which are required for the work of this section and for work by others.
 - .5 Architectural woodwork specified under this section includes woodwork items which are closely integrated with both prefinished and field painted architectural metalwork, stonework, glass, and built-in electrical components, and consequently requires close coordination with such allied trades. This section is responsible for ensuring correct installation procedures and results.
- .2 Conduct a pre-fabrication meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data for each type of *Product* and process proposed for use in the work of this section and incorporated into items of architectural woodwork.
- .3 Shop drawings:

Architectural Woodwork

- .1 Submit shop drawings for the work of this section complying with the North American Architectural Woodwork Standards 4.0 requirements.
- .2 Submit engineered shop drawings, including seismic design, connections and restraint.
- .3 Indicate quality standards and grades.
- .4 Include full scale drawings of exposed-to-view edge conditions.
- .5 Include plans, sections and large scale details, and indicate components and methods of assembly, fastenings, and other fabrication information required for the work of this section. Indicate assembly joint lines.
- .6 Include materials and their characteristics and finishes as applicable including the following:
 - .1 Panel core and material types, thicknesses, compliance with specified standards, special treatments.
 - .2 Adhesive types to be used and locations.
 - .3 Finishing requirements including North American Architectural Woodwork Standards 4.0 finish system number, sheen, and required application steps.
- .7 Submit coordination drawings indicating locations of concealed grounds, cut-outs, plates, and other required fabrications.
- .8 Show relation to adjoining construction, details of outside and inside corners and door openings.
- .4 Selection samples:
 - .1 Casework hardware, one unit of each type and finish.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for finishes requiring specific care, noting particularly those procedures or materials which will cause damage to finished surfaces to be included in maintenance manuals.
- .3 Maintenance materials:
 - .1 Deliver extra sets of hardware items for maintenance as follows:
 - .1 10 % of each type actually installed, but not less than 2 sets.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers:
 - .1 Architectural woodwork shall be manufactured by a firm having 5 years' experience, minimum, on work of similar size and quality.

Architectural Woodwork

- .2 Shall be a member in good standing of the Architectural Woodwork Institute or the Architectural Woodwork Manufacturers Association of Canada or the Woodwork Institute.
- .3 Solid surfacing fabricator: Fabrication to be performed by a solid surface manufacturer's certified fabricator. Submit certification letter prepared by the solid surfacing manufacturer.
- .2 Installers:
 - .1 Has successfully completed 2 architectural woodwork projects similar in scope, materials and design to this *Project* within the last 5 years.
- .2 Quality standard:
 - .1 Work shall be in accordance with the North American Architectural Woodwork Standards 4.0, Premium Grade, or the highest grade available for performance and appearance characteristics of materials in Sections 3 – 5 used that apply to *Product* fabrication and installation requirements governed by Sections 6 – 12.

1.6 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 06 40 00.
- .2 Protect architectural woodwork during transit, delivery, storage and handling to prevent damage, spoilage, and deterioration.
- .3 Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate architectural woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified under paragraph Site Conditions paragraphs of Section 06 40 00.
- .4 The architectural woodwork manufacturer and the *Contractor* shall be jointly responsible to make certain that architectural woodwork is not delivered until the building and storage areas are sufficiently dry so that the architectural woodwork will not be damaged by changes in moisture content.

1.7 Site Conditions

- .1 During storage and installation: Obtain and comply with North American Architectural Woodwork Standards 4.0 for optimum temperature and relative humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained. Woodwork shall be acclimatized for a minimum of 72 hours prior to commencing woodwork installation.
- .2 During finishing: Comply with Architectural Woodwork Standard's temperature and humidity requirements before, during, and after application of finishes.
- .3 During service life of woodwork: Obtain and comply with woodwork manufacturer's advice for optimum temperature and humidity conditions.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

Architectural Woodwork

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Casework integrity shall meet the minimum acceptance levels in accordance with SEFA 8-1999 as outlined in the North American Architectural Woodwork Standards 4.0 and additional or greater loading capacities as specified throughout the North American Architectural Woodwork Standards 4.0.
- .2 Maximum allowable adjustable shelf lengths shall comply with shelves assembly rules per the North American Architectural Woodwork Standards 4.0 based on shelf thickness indicated or scheduled.

2.2 Panel Materials

- .1 Panel material schedule; except where indicated otherwise:
 - .1 Thickness: 19 mm (3/4") minimum.
 - .2 Core panels:
 - .1 At plastic laminate: MDF.
 - .2 Plywood backing; countertops, backsplashes, and where indicated: Exterior grade plywood with no added urea-formaldehyde used in composition.
 - .3 Maximum moisture content at time of installation: 10% to 12%.
- .2 Plywood:
 - .1 Veneer core plywood non telegraphing grain: Sanded good one side or good two sides (when both sides exposed or to receive applied finish materials) plywood:
 - .1 Hardwood plywood: in accordance with ANSI/HPVA HP-1-2016.
 - .2 Softwood plywood: to Voluntary Product Standard: PS-1-09 Structural Plywood (with Typical APA Trademarks).
- .3 Medium density fibreboard (MDF):
 - .1 To ANSI A208.2-2016, 19 mm (3/4") minimum thickness, 720 kg/m³ (45 lbs/ft³) minimum density and as follows:
 - .1 Grade: Grade 130.
 - .2 Formaldehyde emission: No added urea-formaldehyde used in composition.

2.3 Plastic and Composite Materials

- .1 High pressure decorative laminate:
 - .1 General purpose grade: in accordance with ANSI/NEMA LD 3-2005, Horizontal General Purpose Grade (HGS).
 - .2 Colours, finishes, and patterns:
 - .1 Acceptable *Products*:
 - .1 ML-1: Wilsonart '5th Ave. Elm, soft grain finish.

Architectural Woodwork

- .2 Acceptable alternates to ML-1:
- .3 ML-5: Wilsonart 'White Cabinet Liner', matte finish.
- .2 Substitutions: in accordance with Section 01 25 00.
- .2 Solid surfacing sheet:
 - .1 Homogenous (not coated, laminated or composite construction), filled material containing methyl methacrylate.
 - .1 Acceptable *Product*: Dupont 'Corian'.
 - .2 Nominal sheet thickness: 13 mm (1/2") minimum, unless otherwise indicated.
 - .3 Colours:
 - .1 CTR-1: White Jasmine.
 - .4 Substitutions: in accordance with Section 01 25 00.
 - .2 Provide solid surface edges with 38 mm (1-1/2") bullnose where indicated.

2.4 Fasteners and Adhesives

- .1 Fasteners shall comply with North American Architectural Woodwork Standards 4.0.
- .2 Adhesives: 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.

2.5 Hardware

- .1 Casework hardware; to be furnished and installed by the architectural woodwork manufacturer.
 - .1 Where casework hardware is not specified or indicated on drawings or scheduled, casework hardware shall comply with ANSI/BHMA Standards, latest edition, minimum grades, loading and other basic rules per the North American Architectural Woodwork Standards 4.0.
 - .2 Drawer slide; medium duty:
 - .1 Soft close.
 - .2 Pound Class 100.
 - .3 Height: 45 mm (1-47/64").
 - .4 Clearance: 13 mm (1/2") plus 0.8 mm (1/32") minus 0 inches per side.
 - .5 Acceptable *Products*:
 - .1 BLUM Movento.
 - .2 Salice 'Futura'.
 - .3 Hinges:
 - .1 Acceptable *Product*:

Architectural Woodwork

- .1 Marathon 'DTC C-80 Soft-Close Hinge, 105-C80A675NF'.
- .2 Substitutions: in accordance with Section 01 25 00.
- .4 Pulls; doors and drawers, except where otherwise indicated:
 - .1 Acceptable *Product*:
 - .1 Marathon 'Modern Bar Pull, 128 mm, Brushed Satin Nickel, 9303-BSN'.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .5 Locks; swinging doors and drawers, except where otherwise indicated:
 - .1 Locks shall be keyed alike, unless otherwise indicated.
 - .2 Acceptable *Product*:
 - .1 Hafele 'Cam locks, FH Series'.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .6 Magnetic catches:
 - .1 Acceptable *Product*:
 - .1 Hafele 'Magnetic Catch 3-4 KG Pull.'
 - .1 Colour/finish: to be later selected by Consultant.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .7 Grommets:
 - .1 Acceptable *Product*:
 - .1 Richelieu 'Round Cable Grommet, 9004430'.
 - .1 Colour: White.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .8 Exposed shelf supports.
 - .1 Acceptable *Product*:
 - .1 Richelieu 'U-Shaped Steel Pilaster, 2553024'.
 - .2 Substitutions: in accordance with Section 01 25 00.
 - .2 Colour shall be White.
- .9 Pilaster strips:
 - .1 Flush mounted.
 - .2 Acceptable *Product*:
 - .1 Knappe & Vogt 255 Series.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .10 Pilaster clips:
 - .1 Acceptable *Product*:

Architectural Woodwork

- .1 Knappe & Vogt 256 Series.
- .2 Substitutions: in accordance with Section 01 25 00.
- .11 Adjustable shelf standards and supports:
 - .1 Finishes:
 - .1 For cabinets with baked enamel finish: Cadmium or chrome plated steel.
 - .2 For stainless steel cabinets: stainless steel or gloss nickel finish.
 - .2 Acceptable *Product*:
 - .1 Richelieu 'Model 1461210'.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .12 Nuts, bolts, and washers: shall be stainless steel or aluminum.

2.6 Finishes - Interior Architectural Woodwork

- .1 General: The entire finish of interior architectural woodwork is specified in this section, regardless of whether factory applied or applied after installation.
- .2 Preparations for finishing:
 - .1 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.
 - .2 Concealed surfaces of woodwork that might be exposed to moisture, such as those adjacent to exterior concrete or masonry walls, shall be back-primed.
 - .3 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.

2.7 Fabrication

- .1 Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises pre-cut, where possible, to receive hardware and other items of work.
- .2 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.
- .3 Provide woodwork, solid tops and other indicated materials with pre-cut openings, where possible, for hardware, appliances, plumbing fixtures, electrical work, telephone cut-outs and similar items. Locate openings accurately and provide proper size and shape. Smooth edges of cut-outs and, where located in countertops, seal edges of cut-outs with a water-resistant coating.
- .4 Provide framing for architectural woodwork, complete with bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.

Architectural Woodwork

- .5 Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Take responsibility for the stability of furniture and fitments.
- .6 Provide balancing sheets as required, and specified, complying with the North American Architectural Woodwork Standards 4.0.
- .7 Provide surface mount blocking and strapping necessary to support the work of this section. Such blocking shall not be exposed upon completion of work.
- .8 Prefinish work at the factory, except where specified or indicated otherwise.
- .9 Solid wood edging: No end grain shall be visible; mitre external corners; house internal corners.

2.8 Fabrication - Solid Surfacing

- .1 Fabricate components in shop to greatest extent practical to size and shape indicated, in accordance with reviewed shop drawings and manufacturer's written requirements.
- .2 Form joints between components using manufacturer's standard joint adhesive. Joints shall be inconspicuous in appearance and without voids. Attach 100 mm (4") wide solid surfacing material reinforcing strip under joints.
- .3 Provide holes and cut-outs as indicated or as required.
- .4 Rout and finish component edges to a smooth, uniform finish. Rout cut-outs then sand edges smooth. Repair or reject defective or inaccurate work.
- .5 Surfaces shall have a uniform finish.

PART 3 - EXECUTION

3.1 Preparation

- .1 Condition woodwork to field conditions in installation areas before installing. Ensure that field conditions have been provided as requested and specified.
- .2 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.
- .3 Provide grounds, nailers and other required fabrications which are to be built into other work when required.
- .4 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, level, flat, straight, square, of the correct size. Variations shall be corrected prior to installation of work of this section.
- .5 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

3.2 Installation

- .1 Install woodwork to comply with North American Architectural Woodwork Standards 4.0 for same grade specified in Part 1 of this section for type of woodwork involved.
- .2 Install woodwork plumb, level, true, and straight with no distortions.

Architectural Woodwork

- .3 Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- .4 Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- .5 Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.

3.3 Installation - Tolerances

- .1 Install to a tolerance of 3 mm in 2400 mm (1/8" in 8'-0") for plumb and level (including tops) and with no variations in flushness of adjoining surfaces unless otherwise acceptable in accordance with the North American Architectural Woodwork Standards 4.0.

3.4 Adjusting and Cleaning

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

3.5 Protection

- .1 Protect architectural woodwork during remainder of construction period to ensure that work will be without damage or deterioration at time of acceptance.
- .2 Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that woodwork is without damage or deterioration at time of *Substantial Performance of the Work*.

END OF SECTION

Thermal Insulation

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Thermal insulation forming part of the building envelope, including:
 - .1 Batt insulation.
 - .2 Semi-rigid insulation (Cavity Wall Insulation).
 - .3 Polyurethane foam (gap filler) insulation.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit data and installation instructions for materials and prefabricated devices, providing descriptions sufficient for identification at the *Place of the Work*.
 - .3 Submit data from manufacturer's or independent laboratory indicating compatibility and adhesive results of proposed materials.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*:
 - .1 Has adequate plant, equipment and skilled workers to perform the work expeditiously.
 - .2 Has successfully completed installations similar to that specified during a period of at least the immediate past 5 years.

1.4 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Batt Insulation

- .1 Batt insulation:
 - .1 Unfaced, mineral-fibre batts, formaldehyde-free, in accordance with CAN/ULC S702.1-14, Type 1.

Thermal Insulation

- .2 Acceptable manufacturers:
 - .1 Johns Manville 'Unfaced Batts'.
 - .2 CertainTeed Insulation Canada Inc. 'Fibre Glass Building Insulation'.
 - .3 Knauf Insulation 'EcoBatt'.

2.2 Semi-Rigid Insulation

- .1 Semi-rigid insulation(Cavity Wall Insulation):
 - .1 Mineral-fibre in accordance with CAN/ULC S702.1-14, Type 1, either dual density or mono density.
 - .1 Dual density:
 - .1 Outer layer: 100 kg/m³ (6.2 lb/ft³) in accordance with ASTM C303-21.
 - .2 Inner layer: 61 kg/m³ (3.8 lb/ft³) in accordance with ASTM C303-21.
 - .2 Mono density:
 - .1 96 kg/m³ (6.0 lb/ft³) in accordance with ASTM C612-14.
 - .2 Acceptable *Products*:
 - .1 Johns Manville 'Cladstone Water & Fire Block Insulation – 6.0 PCF'.
 - .2 Owens Corning 'Thermafiber RainBarrier HD'.
 - .3 Rockwool 'CavityRock'.
 - .1 Acceptable *Products*:
 - .1 Lamtec Corporation 'GYMGUARD'.
 - .2 Substitutions: in accordance with Section 01 25 00.
 - .2 Acceptable *Products*:
 - .1 Substitutions: in accordance with Section 01 25 00.

2.3 Polyurethane Foam (Gap Filler) Insulation

- .1 Polyurethane Foam for thermal insulation around exterior framing assemblies (Gap Filler):
 - .1 One-component CFC-free polyurethane foam in accordance with CAN/ULC S710.1-19.

2.4 Accessories

- .1 Insulation fasteners: HDPE washer, zinc plated pin finish, pins purpose made to suit substrate material, 50 mm (2") minimum insulation holding diameter; direct fasten type, pin depth length to suit insulation thickness.
 - .1 For insulation equal or less than 150 mm (6") thick:
 - .1 Acceptable *Products*:
 - .1 ITW Construction Products Ramset 'InsulFast'.

Thermal Insulation

- .2 For insulation greater than 150 mm (6") and equal or less than 200 mm (8") thick:
 - .1 Acceptable *Products*:
 - .1 Hilti 'X-IE'.
 - .2 Batt insulation wire mesh restraint; locations where insulation is not sandwiched by sheet metal or board materials: Zinc coated woven wire and mechanical fasteners.

PART 3 - EXECUTION

3.1 Installation - General

- .1 Install insulation in accordance with manufacturer's written requirements 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 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. Where multiple layers of insulation boards/batts are required, offset outer layer insulation board/batt joints 150 mm (6") from underlying insulation layer(s).
- .5 Install attachment at rate as required to prevent displacement of insulation boards during construction operations.
- .6 Butt joints tightly and offset vertical joints to form an unbroken thermal envelope. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .7 Apply insulation to ensure total and complete coverage of surfaces indicated to be insulated, and in direct contact with such surfaces.
- .8 Ensure integrity and continuity of insulation at juncture with different types of materials and seal in an acceptable manner.
- .9 Do not cover insulation until it has been reviewed and accepted by *Consultant*.

3.2 Installation - Batt Insulation

- .1 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .2 Install batt insulation to fill cavity unless otherwise indicated.
- .3 Trim insulation to provide close-fit contact to framing assemblies and fill the required cavity or insulation assemblies to thicknesses specified or indicated.
- .4 Do not over compress or pack insulation to fit into spaces; maintain density to be consistent with the density of the uncompressed batt product.

Thermal Insulation

- .5 Cut insulation to provide close-fit contact around electrical boxes, pipes, and other obstructions and penetrations through and within assemblies.
- .6 Secure insulation in such a manner that it will not sag or settle away from required locations.
- .7 At locations where insulation is not sandwiched by sheet metal or board materials, install continuous woven wire restraint mechanically fastened to steel studs to hold insulation against exterior sheathing materials.
- .8 Place insulation equal to that indicated for applicable assembly in jamb and header assemblies that will be inaccessible after their installation into wall.

3.3 Installation - Semi-Rigid Insulation

- .1 Install at masonry assembly locations in accordance with Section 04 05 00.
 - .1 Where applicable, fasten insulation using masonry tie securement plates provided under Section 04 05 19.
 - .2 In locations where insulation clips are not practical or available with masonry connectors, mechanically fastened to substrate with minimum of 5 insulation fasteners per insulation board and maximum spacing of 610 mm (24") on centre.
 - .3 Position fasteners 75 mm (3") from insulation board edges.

3.4 Installation - Foamed-in-Place (Gap Filler) Insulation

- .1 Install one-component foam insulation to fill gaps where indicated, in accordance with CAN/ULC S710.2-11 application standard.

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

3.6 Protection

- .1 Comply with manufacturer's written requirements respecting protection.
- .2 Repair damage resulting from performance of work of this section in manner acceptable to *Consultant*.

END OF SECTION

Air Barrier Systems

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Sheet-applied self-adhesive vapour impermeable air barrier membrane.

1.2 Administrative Requirements

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Compatibility statement:
 - .1 Submit manufacturer's compatibility statement validating compatibility of air barrier system materials with substrates and adjacent materials.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

1.5 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 07 27 00.
- .2 Store surface conditioner at temperature above 5°C.

1.6 Site Conditions

- .1 Low temperature application:
 - .1 Perform adhesion test for membrane when ambient temperature is below -5°C.
 - .2 Proceed with work when temperature is (or is predicted) to fall below -5°C ambient temperature only with the mutual documented agreement of independent inspection and testing company, manufacturer, and applicator.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

Air Barrier Systems

PART 2- PRODUCTS

2.1 Performance/Design Requirements

- .1 Air barrier system shall perform as continuous air barrier and as liquid-water drainage plane flashed to discharge to exterior of building envelope incidental condensation or water penetration.
- .2 At wall and roof assembly transitions, air barrier system shall perform as continuous air barrier and as liquid-water drainage plane flashed to discharge to exterior of building envelope incidental condensation or water penetration by creation of unobstructed drainage plane that extends across the cladding transition or by flashing to discharge to exterior of building envelope incidental condensation or water penetration.
- .3 Air barrier system shall accommodate substrate movement, construction material changes, and transitions at perimeter conditions without deterioration which permits air and water leakage exceeding the following specified limits and requirements, or interruption of the drainage plane:
 - .1 Air permeance of air barrier material: Maximum 0.02 L/s.m² at 75 Pa (0.004 cfm/ft² at 1.57 psf) in accordance with ASTM E2178-21a.
 - .2 Rate of air leakage of air barrier system at 75 Pa (1.57 psf) when tested in accordance with ASTM E2357-24:
 - .1 0.15 L/s.m² (0.030 cfm/ft²) for RH <27%.
 - .3 Water vapour transmission for air and vapour barriers: Maximum 60 ng/Pa.s.m² (1.0 perms).
 - .4 Water vapour transmission for vapour permeable air barriers: Minimum 570 ng/Pa.s.m² (10 perms).
 - .5 Air barrier system structural performance while maintaining air barrier performance for air leakage: Air barrier system shall transfer wind loads to structure and shall resist design wind load in accordance with the building code.
 - .6 Low temperature performance: Minimum -30°C (-22°F).
 - .7 Compatibility: Air barrier system materials shall be compatible with substrate and adjacent materials with material manufacturers and show no performance deterioration during service conditions.
 - .8 Self-sealability: in accordance with ASTM D1970/D1970M-21.
 - .9 Adhesion: in accordance with ASTM D4541-22, 110 kPa (16 psi) minimum performance for site tested adhesion.
- .4 Air barrier system shall be joined in an airtight and flexible manner to air barrier material of adjacent building envelope air barrier systems, allowing for relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between the following unless otherwise applicable:
 - .1 Walls and openings (windows, doors, louvres, and other wall penetrations).
 - .2 Walls, floor and roof across construction, control, and movement joints.

Air Barrier Systems

- .3 Walls, floors and roof to utility, pipe and duct penetrations.

2.2 Materials - General

- .1 Single source responsibility: Materials shall be sourced from one manufacturer including sheet membranes, air barrier sealants, primers, mastics and adhesives.

2.3 Sheet-Applied, Vapour Impermeable Self-Adhesive Air and Vapour Barrier Membrane System

- .1 Description: Composite preformed membrane system consisting of SBS modified asphalt or butyl backing and polyethylene or polypropylene scrim facer:
 - .1 Single source responsibility: Components required for complete air barrier system and through wall flashing membrane behind the opaque wall assemblies to be obtained from single manufacturer. Coordinate with Section 04 05 23.
 - .2 Thickness: 1.0 mm (40 mils) for modified asphalt-based membrane and 0.55 mm (28 mils) for butyl-based membranes.
 - .3 Application temperature: in accordance with manufacturers written requirements.
 - .4 Primer: in accordance with manufacturers written requirements.
 - .5 Termination and penetration sealing mastic: in accordance with manufacturers written requirements.
 - .6 Acceptable product systems:
 - .1 Carlisle Coatings & Waterproofing 'CCW 705'.
 - .2 GCP Applied Technologies 'Perm-A-Barrier Wall Membrane'.
 - .3 Henry Company 'Blueskin SA' and 'Blueskin SA LT'.
 - .4 IKO 'AquaBarrier AVB' and AquaBarrier AVB Low Temp'.
 - .5 Soprema 'Sopraseal Stick 1100 T'.
 - .6 Tremco ExoAir 110AT.
 - .7 W.R. Meadows 'Air Shield' and 'Low Temperature Air Shield'.
- .2 Preformed sheet membrane systems; non-bituminous:
 - .1 Description: elastomeric proprietary film with high-tack acrylic pressure sensitive adhesive, with physical properties as follows:
 - .1 Thickness: 0.25 mm (10 mils).
 - .2 Application temperature: in accordance with manufacturers written requirements.
 - .3 Acceptable *Products*:
 - .1 3M 'Self-Adhered Air and Vapour Barrier Membrane 3015', complete with 'All-Weather Flashing Tape 8067' and 'Polyurethane Sealant 540'.
 - .2 IKO 'AcrylicStick SA'.

Air Barrier Systems

- .2 Description: composite sheet designed for use as the membrane or as a component of an air barrier system, with physical properties as follows:
 - .1 0.41 mm (16 mils) of butyl laminated to a 0.15 mm (6 mils) high-density polypropylene film.
 - .2 Application temperature: in accordance with manufacturers written requirements.
 - .3 Material air permeance: in accordance with ASTM E2178-13.
 - .4 Assembly air leakage: in accordance with ASTM E2357-17.
 - .5 Acceptable *Products*:
 - .1 Tremco 'ExoAir 110AT'.

PART 3- EXECUTION

3.1 Installation - General

- .1 Surfaces to receive air barrier systems shall be smooth, dry and free from conditions that will adversely affect execution, permanence, or quality of the work of this section.
- .2 Air barrier system shall be continuous in the building envelope. Lap and seal air barrier systems in accordance with product manufacturer's written installation requirements to construction, control, and expansion joints, across junctions between different building assemblies, and around penetrations through the building assembly.
- .3 Wrap into jamb, head and sill of building envelope window openings, door openings, and other openings with air barrier system membrane by returning membrane to inside face of opening unless otherwise indicated.
 - .1 Coordinate air / vapour barrier terminations of work of this section with air / vapour barrier membrane in Section 08 44 00.

3.2 Installation - Sheet Applied, Self-Adhesive Membrane

- .1 Apply self-adhering membrane continuous to prepared and primed substrate in an overlapping shingle fashion to shed moisture towards exterior and in accordance with manufacturer's written requirements.
- .2 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel apply a feathered edge to seal termination and shed water.
- .3 Apply self-adhering membrane continuous across junctions between different building assemblies, and around penetrations through the building assembly. Provide overlap in accordance with manufacturer's written requirements.
- .4 Inspect membrane for punctures, misaligned seams and fishmouths, apply additional layer of membrane over affected area.

Air Barrier Systems

- .5 Apply membrane continuous across junctions between different building assemblies, and around penetrations through the building assembly. Provide overlap in accordance with manufacturer's written requirements. Where adjacent air barrier or other building material is sensitive to damage by heat required for application, provide transition membrane which is compatible with thermofusible membrane and adjacent building material in accordance with manufacturer's written requirements.

3.3 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

END OF SECTION

Metal Flashing

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Supply and installation of prefinished aluminum flashings.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Shop drawings:
 - .1 Submit shop drawings including the following:
 - .1 Plans, elevations, sections, and attachment details.
 - .2 Detail fabrication and installation layouts, expansion-joint locations, and key details. Distinguish between shop and field assembled work.
 - .3 Include identification of material, thickness, weight, and finish for each item and location in the work.
 - .4 Include details for forming, including profiles, shapes, seams, and dimensions.
 - .5 Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - .6 Include details of termination points and assemblies.
 - .7 Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contracting from fixed points.
 - .8 Include details of special conditions.
 - .9 Include details of connections to adjoining work.
- .3 Samples:
 - .1 Submit full-size samples of each specified flashing material formed to detailed profile including corner, curb, cap, and parapet flashing, and coping including lock-joints and hold-down clips.
 - .2 Submit 2 - 50 mm x 50 mm (2" x 2") samples of each type of sheet metal material, colour and finish.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:

Metal Flashing

- .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval of *Product* manufacturers.
 - .2 Sealant shall be applied by a *Subcontractor* of recognized standing, having preferably not less than 5 years of proven experience in this type of work, and who has the necessary equipment and skilled mechanics to carry out the work of this section satisfactorily and can substantiate this to satisfaction of *Consultant*.
- .2 Quality standards:
- .1 Quality of fabrication and installation of sheet metal work shall comply with recommendations published by Sheet Metal and Air Conditioning Contractors National Association.

1.4 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 07 62 00.
- .2 Comply with AAMA CW-10 – Care and Handling of Architectural Aluminum from Shop to Site.

1.5 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Prefinished Aluminum Flashing

- .1 Aluminum flat sheet: Flat aluminum sheet in accordance with ASTM B209/B209M-21a, to the following minimum thickness and alloy:
 - .1 Anodizing quality: 5005H14 to ANSI H35.1/H35.1M-2017.
 - .2 Minimum thickness:
 - .1 1.27 mm (0.050").

2.2 Prefinished Metal Finishes

- .1 Provide the following finish to exposed prefinished aluminum:
 - .1 Clear anodized to AAMA 611-14, designation AA-M12C22A31.

2.3 Accessories

- .1 Galvanic/dissimilar metal corrosion inhibitor (isolation coating): in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
- .2 Sealants:
 - .1 Exposed sealants: Silicone in accordance with Section 07 92 00, colour as selected by *Consultant* from manufacturer's full range.

Metal Flashing

- .2 Concealed flashing sealants; hooked-type expansion joints with limited movement: Butyl sealant to ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.
- .3 Cleats: of matching metal to flashing material, continuous, and of greater thickness than flashing material. Offset joints in cleats 305 mm (12") with joints in perimeter edge metal. Allow a 12.7 mm (1/2") gap between pieces.
- .4 Fasteners:
 - .1 Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - .2 General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head:
 - .1 Exposed screws: 38 mm (1-1/2") long minimum at 450 mm (18") on centre maximum. Heads matching colour of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM washer under heads of exposed fasteners.
 - .2 Blind fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - .3 Cleat fasteners: Corrosion-resistant barbed angular ring or screw shank nail; length to achieve approximately 32 mm (1-1/4") penetration into nailer.
 - .3 Fasteners for aluminum sheet: Aluminum or Series 300 stainless steel.
 - .4 Fasteners and plates to meet the requirements of FM 4470-12 for wind uplift and corrosion resistance.

2.4 Fabrication

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable SMACNA "Architectural Sheet Metal Manual (Seventh Edition) details and as indicated.
- .2 Form pieces in 3048 mm (10 ft) maximum lengths. Make allowance for expansion at joints.
- .3 Sealed joints: Form non-expansion but movable joints in metal to accommodate sealant.
- .4 Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, and of greater thickness of metal being secured.
- .5 Hem exposed edges on underside 12.7 mm (1/2"). Mitre and seal corners with butyl sealant.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .7 Provide 25.4 mm (1") gap between drip edges and wall finish material to redirect water runoff away from walls.

Metal Flashing

PART 3- EXECUTION

3.1 Flashing Installation

- .1 Install sheet metal work in accordance with SMACNA Architectural Sheet Metal Manual - Seventh Edition - 2012.
- .2 Provide galvanic/dissimilar metal corrosion inhibitor (isolation coating) in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
- .3 Provide watertight flashing installing capable of resisting specified uplift pressures in accordance with specifications, thermally induced movement and exposure to weather.
- .4 Provide minimum 2% sloped.
- .5 Provide continuous cleats for attachment of flashings at exterior face of wall and fasten at 150 mm (6") spacing and not less than 2 fasteners per cleat.
- .6 Provide radius (3-piece) copings for curved wall condition unless otherwise indicated.
- .7 Prefabricate corner copings in 610 mm (24") x 610 mm (24") shop fabricated and connected one pieces sections.
- .8 Concealed fastenings and cleats, from view except where exposed flashings are accepted by *Consultant* prior to installation.
- .9 Flash joints using S-lock forming tight fit over hook strips/cleats; unless otherwise indicated.
- .10 Install surface mounted flared joint true and level, and caulk top of reglet with sealant at reglets.
- .11 Insert metal flashings to other materials and flashings to form weather-tight junction.

3.2 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

3.3 Adjusting and Cleaning

- .1 Remove deposits, stains or protections and wash metals left unpainted and exposed to view as recommended by manufacturer of metal or paint finish.

3.4 Protection

- .1 Advise *Contractor* of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering.

END OF SECTION

Joint Firestopping and Smoke Seals

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Materials installed in joints to restrict the spread of fire and smoke.
 - .1 Joints in or between fire-resistance-rated constructions.
- .2 Section excludes:
 - .1 Firestopping and smoke seals, for mechanical, electrical and communications penetrations of fire resistant assemblies, and firestopping and smoke seals within their respective assemblies. Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordinate joint firestopping and smoke seal work with Section 01 33 00, paragraph 1.7 Project Firestopping Manual and Coordination.
 - .2 Coordinate with other sections to assure that pipes, conduit, cable, and other items that penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
 - .3 Schedule the *Work* to assure that penetrations and other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.
 - .1 Representatives for mechanical and electrical work and independent inspection and testing company shall attend pre-installation meeting.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 *Product* data sheets shall include the following information:
 - .1 Data and installation instructions for *Products* providing descriptions sufficient for identification at the *Place of the Work*.
 - .2 Materials list of *Products* proposed for use in the work of this section; complying with listed systems designs.
 - .3 Listing agency's detailed drawing showing joint assemblies and firestopping materials, identified with listing agency's name and number or designation, fire rating achieved, and date of listing.

Joint Firestopping and Smoke Seals

- .4 Submit fire resistance rating test listings for firestopping and smoke seal systems.
- .3 Shop drawings:
 - .1 Submit drawings indicating fire resistance rated assembly number, required temperature, hose stream, and flame rating, material thicknesses, installation methods and materials of firestopping and smoke seals, primers, supports, damming materials as applicable, reinforcements, anchorages, fastenings and methods of installation for each condition to be encountered.
 - .2 Designate on shop drawings static and dynamic joint systems, relative positions, expansion and control joints in rated slabs and walls, and firestopping details.
 - .3 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 particular 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. The engineering judgment submittal shall include both *Project* name, *Project* location, and *Subcontractor's* name who will install firestop system as described in engineering judgement shop drawings.
 - .3 Provide complete details of specific application of listed system and its modifications upon which the engineered judgement is based upon.
 - .4 For perimeter fire barrier systems:
 - .1 Submit engineered shop drawings for engineering judgements covering perimeter fire barrier systems. Identify each cladding assembly type in contact with each perimeter fire barrier system.
 - .4 Manufacturers' instructions:
 - .1 Manufacturer of *Products* proposed for use in work of this section shall prepare firestopping manual scheduling products to be used for each assembly and installation required in the *Work*.
 - .1 Coordinate with project firestopping manual specified under Section 01 33 00.
 - .2 Manual shall include manufacturer's *Product* data sheets as specified under "*Product* data sheets" paragraph of Section 07 84 00.
 - .3 Firestopping manual shall be submitted within 4 weeks of *Contract* award.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Submit the following for inclusion in the operation and maintenance manual:

Joint Firestopping and Smoke Seals

- .1 Letter signed by firestopping and smoke seal manufacturer on manufacturer's letterhead verifying that installed firestopping and smoke seal *Products* are suitable for the use indicated and comply with requirements of the *Contract Documents*.
- .2 Letter signed by firestopping and smoke seal installer on installer's letterhead verifying that joint firestopping system installations are completed and that installations comply with listed systems designs and requirements of the *Contract Documents*.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval, training and certification of *Product* manufacturers.
 - .1 Submit proof of manufacturer's installer certification for each installer of firestopping and smoke sealant systems.
 - .1 Manufacturer's willingness to sell its firestopping *Products* to the *Contractor* or to an installer engaged by the *Contractor* does not in itself confer qualification on the buyer.
 - .2 Applicator shall designate a single individual as *Project* foreperson who shall be present at the *Place of the Work* at all times throughout the work of this section when the work of this section is being performed.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Manufacturers

- .1 General: Manufacturers of firestopping and smoke seal system *Products* and installation specialists for the work of this section are limited to applicable assemblies as required for the *Work* and having listing mark on packaging.
- .2 Subject to compliance with requirements, provide products by one of the following:
 - .1 3M Canada Inc.
 - .2 Hilti Canada Corp.
 - .3 NUCO Inc.
 - .4 STI Firestop.
 - .5 Tremco Commercial Sealants & Waterproofing.

Joint Firestopping and Smoke Seals

2.2 Performance/Design Requirements

- .1 Firestop and smoke sealant systems shall consist of material, or combination of materials installed to retain integrity of fire-rated construction by effectively impeding spread of flame, smoke, and/or hot gasses through perimeter joint or gaps, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers.
- .2 Smoke sealants applied over firestopping materials or combination smoke seal/firestop seal material shall form air tight barriers to prevent passage of gas and smoke.
- .3 Fire-resistance rating of firestopping system shall be equivalent to rating of adjacent floor, wall or other fire separation assembly.
- .4 Firestopping system at fire rated assemblies with assembly STC rating requirements shall provide STC rating equal to STC rating of fire rated assembly.
- .5 Confirm locations of exposed/non-exposed firestopping/smoke seal surfaces with *Consultant* prior to application.
- .6 Provide movement capability at movement joints in accordance with design requirements for movement joint.
- .7 Head-of-wall joints; with dynamic designation:
 - .1 Joint assemblies shall permit vertical movement allowing wall to move independent of structure due to forces including, but not limited to, live loads, dead loads, thermal expansion/contraction, seismic movements, and wind sway. Such movement shall not damage the wall assembly or its fire protection components.
 - .1 Provide head-of-wall joints with dynamic designation.
 - .2 Seismic dynamic joints: Provide head-of-wall joints with dynamic designation to accommodate seismic movement. Seismic requirements in accordance with building code.
- .8 Regulatory requirements:
 - .1 Joint firestop systems shall be listed in accordance with CAN/ULC-S115-11 and shall achieve required fire resistance rating in accordance with building code.
 - .2 Proposed firestopping and smoke seal materials and methods shall conform to applicable governing codes having local jurisdiction.

2.3 Materials

- .1 Single source responsibility for firestopping and smoke seal materials:
 - .1 Obtain firestopping and smoke seal materials from single manufacturer for each different *Product* required.
 - .2 Manufacturer shall instruct applicator in procedures for each material.
- .2 Firestopping and smoke seal systems shall conform to the following:
 - .1 Have a VOC limit of 250 g/L maximum, unless otherwise specified.

Joint Firestopping and Smoke Seals

- .2 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gasses in compliance with requirements of CAN/ULC-S115-11 and not to exceed opening sizes for which they are intended.
- .3 Provide firestopping materials and systems with fire-resistance rating not less than the fire-resistance rating of applicable adjacent assembly.
- .4 Listed in accordance with CAN/ULC-S115-11.
- .5 Use only joint firestop systems that have been tested by an accredited third party testing agency for specific fire-rated construction conditions conforming to construction assembly type, joint type and fire-rating requirements for each separate instance.
 - .1 Where there is no specific third party tested and classified firestop system for a particular firestop configuration, submit engineered shop drawings.
- .6 For joints in fire-separations, provide listed systems designs for the joint firestop and smoke seal systems as required by building code to maintain the integrity of the fire separations.
- .7 *Products* shall be compatible with abutting dissimilar membranes, architectural coatings, finishes at floors, walls and ceilings. Check with requirements of *Contract Documents* and manufacturer of selected materials being installed.
- .3 Smoke sealants for overhead and vertical joints shall be non-sagging; sealants for floors shall be self-levelling.

PART 3 - EXECUTION

3.1 Preparation

- .1 Examine sizes, anticipated movement and conditions to establish correct thickness and installation of back-up materials.
- .2 Prepare surfaces in accordance with manufacturer's written specifications and to requirements of listed system designs.

3.2 Installation

- .1 Install joint firestopping and smoke seal systems in accordance with manufacturer's written requirements and in compliance with listed system designs. Products and installation requirements must comply with listed system designs.
- .2 For materials that will remain exposed after completing the *Work*, finish to achieve smooth, uniform surfaces. Tool or trowel exposed surfaces.
- .3 Notify *Consultant* when random completed installations are ready for review, as directed by *Consultant*, prior to concealing or enclosing firestopping and as applicable, smoke seals.
- .4 Protect materials from damage on surfaces subjected to traffic.

Joint Firestopping and Smoke Seals

3.3 Identification and Documentation

- .1 Provide documentation for each joint firestop system application addressed. This documentation is to identify each joint location on the entire Project.
- .2 Documentation for installed joint firestop systems is to include:
 - .1 Sequential location number.
 - .2 Project name.
 - .3 Date of installation.
 - .4 Detailed description of joint firestop system location.
 - .5 Listed firestop system design number or engineered judgment number.
 - .6 Type of joint.
 - .7 Width of joint.
 - .8 Overall length of joint.
 - .9 Number of sides addressed.
 - .10 Hourly rating of firestop joint system to be achieved.
 - .11 Installers name.

3.4 Field Quality Control

- .1 Conduct quality control to be in accordance with Section 01 45 00.
 - .1 Field tests and inspections:
 - .1 Examine completed firestop joint installations to ensure proper installation before concealing or enclosing areas. Keep areas of work accessible until inspections are completed.
 - .2 Inspection consultant to review installation of the work of this section and to perform random tests to verify its completion in accordance with the requirements of the *Contract Documents*.
 - .3 Give at least 48 hours notice before operations commence, and arrange for a pre-job conference with *Contractor*, installer, independent inspection and testing company, manufacturer, and *Consultant* present.
 - .4 Independent inspection and testing company shall examine installed firestopping in accordance with ASTM E2174-20a and ASTM E2393-20a. Independent inspection and testing company shall examine firestopping and shall determine, in general, that firestopping has been installed in accordance with requirements of the *Contract Documents* and in compliance with each listed firestop system design.
 - .5 Representatives of the manufacturer(s) shall have access to the *Work*. *Contractor* shall provide assistance and facilities for such access in order that the manufacturer(s) representative(s) may properly perform its function.
 - .2 Manufacturer's field review to be in accordance with Section 01 45 00.

Joint Firestopping and Smoke Seals

END OF SECTION

Joint Sealants

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Joint sealants – exterior building envelope locations.
 - .2 Joint sealants – interior locations.
- .2 Section excludes:
 - .1 Glazing system assembly sealants.
 - .2 Mechanical and electrical sealants.
 - .3 Acoustic sealants.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit manufacturer's and *Product* name for each sealant which will be used in the *Work* prior to commencing the *Work*.
- .3 Samples:
 - .1 Submit "wet sample" sealant colour samples for each sealant *Product* and colour.

1.3 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
 - .1 Include manufacturer's warranties.
- .2 Maintenance instructions:
 - .1 Submit maintenance instructions for all items for incorporation into the operation and maintenance manuals.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*:
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified.
 - .2 Comply with quality assurance articles referenced in ASTM C1193-16(2023) for installation of joint sealants.

Joint Sealants

1.5 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranties:
 - .1 For silicone sealants applied to porous substrates, provide *Product* non-stain sealant warranty for period of 20 years, against migrating, bleeding into, or staining abutting materials.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Interior sealants shall have a VOC limit of 50 g/L maximum, unless otherwise specified, and comply with South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications.
- .2 Joint sealants:
 - .1 Shall perform as air tight and water-tight joints.
 - .2 Defects shall include, but are not limited to:
 - .1 Staining from abutting materials or filler.
 - .2 Migrating, bleeding into, or staining abutting materials.
 - .3 Unsightly surface deformation.
 - .4 Excessive colour change, chalking, or dust pick-up.
 - .5 Failing adhesively or cohesively where maximum elongation is less than 25% of designed width of exposed joints.
 - .6 Hardening to more than 25% over specified hardness.

2.2 Sealants

- .1 General:
 - .1 Colours: Sealant colours shall match colours of adjacent materials, as selected and approved by *Consultant*.
 - .1 Colours: shall be selected from manufacturer's full range of colours.
 - .2 In accordance with ASTM C920-14 and other requirements indicated for each liquid-applied chemically curing sealant, including those referencing ASTM C920-14 classifications for type, grade, class, and uses.
 - .3 For sealants to be applied to porous substrates:
 - .1 Provide products that have undergone testing in accordance with ASTM C1248-22 and have not stained porous joint substrates indicated for *Work*.
 - .4 Sealant supplied shall not exude any material(s) which travel into adjacent materials, or travel onto surfaces of adjacent materials; causing damage, or attracting soiling, which becomes apparent during the service life of the building.

Joint Sealants

- .2 Exterior sealants; joints in vertical and overhead surfaces:
 - .1 Silicone sealant; high performance; 100% inorganic type:
 - .1 Single-component, non-sag, low to medium modulus non-bleed, high-performance silicone joint sealant, in accordance with the following: ASTM C920-11, Type S, Grade NS, Class 50 or greater. SWR Institute Sealant Validation Program.
 - .2 Provide low or medium modulus sealants as recommended by exterior wall cladding manufacturer.
 - .3 Acceptable *Products*:
 - .1 Low modulus:
 - .1 DOWSIL '790'.
 - .2 Momentive 'SCS2700 Silpruf LM.
 - .3 Sika 'Sikasil WS-290'.
 - .4 Tremco, Inc. 'Spectrem 1'.
 - .2 Medium modulus:
 - .1 DOWSIL '795'.
 - .2 Momentive 'SCS 2000 Silpruf'.
 - .3 Sika 'Sikasil WS-295'.
 - .4 Tremco, Inc 'Spectrem 2'.
- .3 Interior general sealants:
 - .1 VOC limit: Maximum 50 g/L, unless otherwise indicated.
 - .2 Interior sealant; at joints with painted gypsum board: one-component paintable acrylic in accordance with ASTM C834-10 Type OP; or polyurethane in accordance with ASTM C920-14 Type S, Grade NS, Class 35.
 - .1 Acceptable *Products*:
 - .1 Acrylic sealants:
 - .1 Master Builders Solutions Canada 'MasterSeal NP 520'
 - .2 Tremco, Inc. 'Tremflex 834'.
 - .2 Polyurethane sealants:
 - .1 Sika 'Sikaflex 1A'.
 - .3 Substitutions: in accordance with Section 01 25 00.
 - .3 Interior sealant; gap filler: at movement paintable joints in vertical surfaces: One-component polyurethane sealant in accordance with the following: ASTM C920-14, Type M or S, Grade NS, Class 25.
 - .1 Acceptable *Products*:

Joint Sealants

- .1 Master Builders Solutions Canada 'MasterSeal NP100'.
- .2 Sika 'Sikaflex 15LM'.
- .3 Substitutions: in accordance with Section 01 25 00.
- .4 Interior sealant; at movement joints in vertical surfaces: one-component polyurethane sealant in accordance with the following: ASTM C920-14, Type M or S, Grade NS, Class 25.
 - .1 Acceptable *Products*:
 - .1 Master Builders Solutions Canada 'MasterSeal NP1'.
 - .2 Sika 'Sikaflex 15LM'.
 - .3 Tremco, Inc. 'Dymonic 100'.
 - .4 Substitutions: in accordance with Section 01 25 00.
 - .5 Interior sealant, mildew resistant one part silicone sealant in accordance with the following: ASTM C920-14, Type S, Grade NS, Class 25.
 - .1 Acceptable *Products*:
 - .1 DOWSIL '786'.
 - .2 Momentive 'Sanitary SCS1700 Sealant'.
 - .3 Sika 'Sikasil GP'.
 - .4 Tremco, Inc. 'Tremsil 200'.

2.3 Accessories

- .1 General: Provide joint sealants, primers, backings, and fillers that are compatible with one another and with joint substrates and other sealants or joint fillers specified and approved for applications indicated under joint sealant scheduled and under conditions of service and application as demonstrated by joint sealant manufacturer based on proven test results and field experience. When incompatible, inform *Consultant* and change to compatible type acceptable to *Consultant*.
- .2 Cylindrical sealant backings: Provide joint backings that meet ASTM C1330-02, Type O (open-cell polyurethane), or Type B (non-absorbent bi-cellular backing materials with surface skin), sized 25 percent or greater than joint opening with proper density to control sealant depth and profile. Follow joint sealant manufacturer's recommendations with backing selections for optimum joint sealant performance, in accordance with the following schedule:
 - .1 Use open cell foam with non-absorbing closed cell skin (Sof-Rod) for vertical joints; round shape for open joints and triangular shape for angular joints.
 - .2 Use closed cell foam for horizontal joints.
- .3 Bond-breaker tape: Polyethylene tape or other approved plastic tape as recommended by joint sealant manufacturer to prevent 3-sided joint adhesion to rigid, inflexible joint fillers or joint surfaces at back of joint where such adhesion would restrict proper sealant movement or result in sealant failure.

Joint Sealants

- .4 Masking tape: Non-staining, non-absorbent and compatible with joint sealants and adjacent surfaces.
- .5 Sealant primers: Use primers only as recommended by sealant manufacturer where required to enhance adhesion of sealant to specific joint substrates indicated and as determined for use from pre-construction mock-up testing. Select primers in consultation with sealant manufacturer and manufacturer of substrate material which do not have a detrimental effect on sealant adhesion or in-service performance.
- .6 Cleaners for nonporous surfaces:
 - .1 Provide non-staining, chemical cleaners of type which are acceptable to manufacturer of sealant and sealant backing material, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.
 - .2 Provide cleaner conditioner required for glass and glazed surfaces as recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 Manufacturer's Recommendations

- .1 Unless specified otherwise herein, comply with the recommendations and directions of the manufacturer whose materials are being used in the work of this section.

3.2 Preparation

- .1 Protect adjacent work areas and finished surfaces from damage during joint sealant installation.
- .2 Clean and prepare joint surfaces and substrates in accordance with ASTM C1193-16(2023) and outlined by joint sealant manufacturer's written requirements.
- .3 Prepare rusting or scaling surfaces using abrasive cleaning methods as recommended by joint sealant manufacturer prior to joint sealant installation. Remove and neutralize efflorescence, mould, mildew and algae prior to joint sealant installation.
- .4 Prepare finish-coated surfaces per joint sealant manufacturer's specific recommendations.
- .5 Test materials for indications of staining or poor adhesion before any sealing is commenced. Submit reports in writing to *Consultant* of results.
- .6 Do not proceed with installation of joint sealants under the following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer, or are below 5°C (40°F).
 - .2 When joint substrates are wet.
 - .3 Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

Joint Sealants

- .4 Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

3.3 Masking

- .1 Where necessary to prevent contamination or marring surfaces of adjacent materials, mask areas adjacent to joints with masking tape prior to priming or sealing application. Remove tape immediately after joint has been completed and an initial set achieved.

3.4 Installation

- .1 Install in accordance with joint sealant manufacturer's installation written requirements for products, primers and applications indicated unless more stringent project-specific instructions or requirements apply.
- .2 Apply joint sealants for continuous waterproof sealant joint protection. Lap vertical joints over horizontal joints as recommended by sealant manufacturer. Comply with installation recommendations in ASTM C1193-16(2023) for use of joint sealants as applicable to each specific sealant installation.
- .3 Install sealant primers only when recommended by sealant manufacturer and demonstrated at pre-construction tests after joint surface preparation has been completed and when surfaces are verified as clean and dry. Allow any primer installation to completely dry or cure prior to installation of backing or joint sealants. Primer is mandatory for gun applied sealants.
- .4 Install joint sealants using proven techniques that comply with the following and in proper sequence with installation of primers and backings.
 - .1 Using proper joint sealant dispensing equipment, place sealants by pushing sealant beads into opening to fully wet-out joint sealant substrates. Fill sealant joint opening to full and proper configuration.
 - .2 Provide uniform cross-sectional shapes and depths in relation to joint width for optimum sealant movement capability per joint sealant manufacturer's written requirements.
- .5 Joint sealant tooling is required for non-sag joint sealant installations. Immediately after placing fresh sealants and before skinning or curing begins, tool sealants using metal spatulas designed for this purpose in accordance with manufacturer's recommendations. Provide a smooth, uniform sealant finish, eliminating air pockets and ensuring good contact for optimum sealant adhesion within each side of the joint opening.
 - .1 Provide concave joint configuration as indicated in Figure 8-A in ASTM C1193-16(2023) unless otherwise indicated.
 - .2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces.
 - .3 Remove excess sealant from surfaces adjacent to joint openings using metal spatula, promptly cleaning any sealant residue from adjacent finished surfaces. Remove masking after joint sealant is installed.
- .6 Allow single-component sealants to fully cure before adhesion testing is performed as recommended by joint sealant manufacturer.

Joint Sealants

- .7 Match approved sealant mock-up for colour, finish and overall aesthetics. Remove, refinish or re-install work not in compliance with the *Contract Documents*.
- .8 When surfaces of adjacent materials are to be painted, perform sealant work before these surfaces are painted.
- .9 Check form release agent used on concrete for compatibility with primer and sealant. If they are incompatible inform *Consultant* and change primer and sealant to compatible type, or clean concrete to sealant manufacturer's acceptance.
- .10 Install joint backing material, filler strips, gaskets, bond breakers and similar type material of comparable performance characteristics. Install bond breaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.
- .11 Where joints are 12.7 mm (1/2") or deeper, insert backing material in continuous uniform compression with setback from finished face of adjoining materials equal to required depth of sealant (width/depth ratio) as specified herein.
- .12 On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- .13 Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.
- .14 Maintain correct sealant depth. Sealant depth shall be 1/2 the width of the joint, maximum depth shall be 12.7 mm (1/2"), minimum depth shall be 6 mm (1/4"). Comply with manufacturer's written recommendations.
- .15 Fillet bead sealant joints to be sized to provide proper contact area with substrates, in accordance with manufacturer's written recommendations.
- .16 Apply sealants using pressure-operated guns fitted with suitable nozzles in accordance with manufacturer's directions. Apply sealants in such manner as to ensure good adhesion to sides of joints and to completely fill voids in joints.
- .17 Apply sealants so that surfaces of joints are smooth, full bead, free from ridges, wrinkles, sags, air pockets and embedded impurities. Tool sealant surfaces to produce a smooth surface.
- .18 Install sealant with exterior face of sealant set back 10 mm (3/8") from face of adjacent materials at building movement joints, unless otherwise indicated.
- .19 Do not apply sealants to areas where installation of paints, coatings or flooring is in progress. Apply sealants after such work is complete and fully cured.

3.5 Interior Sealant Schedule

- .1 Include in work of this section sealants to seal open joints in surfaces exposed to view, and to make building weather-tight and air-tight, as applicable, as indicated, and as otherwise specified, except where specified under the work of other sections.
- .2 Install sealant to:
 - .1 Movement and control joints on exposed insitu concrete walls.
 - .2 Interior control and expansion joints in floor and wall surfaces.

Joint Sealants

- .3 Raked out joints at junctions of masonry with concrete walls and columns, and at intersection of masonry walls and partitions where joint reinforcement is installed.
- .4 Perimeters of exterior and interior door and window frames.
- .5 Joints at tops of non-load bearing masonry walls at the underside of insitu concrete.
- .6 Exposed interior control joints in gypsum board.
- .7 Millwork junctions with walls.
- .3 Mildew resistant sealant:
 - .1 Wall tile joints, tile to tile at bathtub or shower corners. Gap between tile backer board and edge of bathtub or shower base.
 - .2 Counter/wall junctions at countertops.
 - .3 At wet areas not listed above.
 - .4 At resilient flooring and resilient base.

3.6 Exterior Sealant Schedule

- .1 Include in work of this section joint sealants in exterior assemblies to seal open joints in surfaces exposed to view, and to make building weather-tight, as indicated, and as otherwise specified, except where specified under the work of other sections.
- .2 Exterior sealant work is part of the work of this section. Install sealant to:
 - .1 Sealing and repairs to perimeters in existing work of exterior openings in exterior facade of building.
 - .2 Perimeters of mechanical and electrical penetrations including but not limited to outlets and electrical boxes.

3.7 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

3.8 Adjusting and Cleaning

- .1 Remove droppings and clean off excess sealant or sealant residue adjacent to sealant joint installations as the work progresses by methods approved by joint sealant manufacturer before material achieves initial set.
- .2 Do not damage adjacent surfaces with harmful removal techniques and protect finished surfaces beyond those that have been masked.
- .3 Remove and replace damaged joint sealants.
- .4 Remove temporary coverings and masking protection from adjacent work areas upon completion.

Joint Sealants

3.9 Protection

- .1 Protect installed sealants during and after final curing from damage resulting during construction.

END OF SECTION

Steel Frames

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Metal frames (steel frames, transom frames).
 - .2 Metal frames (steel frames for screens, sidelights, window assemblies).

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Cooperate fully with finish hardware distributor's representative during preparation of shop drawings and execution of shop fabrication.
 - .2 Coordinate installation of frames with installation of hardware specified in Section 08 71 00.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Submit copy of NAAMM-HMMA 840-17 standard.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Shop drawings:
 - .1 Include details of each frame type, finish hardware types and locations, frame profiles, frame elevations, mitre details, glazing preparation details and anchor details and locations.
 - .2 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and in door schedule.
 - .3 Electrified hardware requirements and preparations shall be clearly indicated on shop drawings.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers:
 - .1 Provide frames manufactured by a firm specializing in the design and production of hollow metal steel doors and frames.
 - .2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).

Steel Frames

1.5 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 08 11 13.
- .2 Product handling shall be in accordance with CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Manufacturers

- .1 All Steel Doors 2000 Ltd.
- .2 Apex Industries Inc.
- .3 Artek Door (1985) Ltd.
- .4 Daybar Industries Ltd.
- .5 Fleming-Baron Door Products.
- .6 M.J. Daley Manufacturing Co. Ltd.
- .7 Trillium Steel Doors Limited.
- .8 Vision Hollow Metal Limited.

2.2 Performance/Design Requirements

- .1 Doors and frames shall function as intended, including but not limited to:
 - .1 Be in true alignment.
 - .2 Operate and swing freely, smoothly, and easily.
 - .3 Remain stationary at any point.
 - .4 Close evenly and tightly against stops without binding.
 - .5 Latch positively when doors are closed with moderate force.

2.3 Materials

- .1 Steel:
 - .1 Fabricated from tensioned levelled steel in accordance with ASTM A924/A924M-22a, galvanized in accordance with ASTM A653/A653M-13, Commercial Steel CS, Type B.
 - .2 Steel shall be free of scale, pitting, coil breaks, surface blemishes, buckles, waves, and other defects.
 - .3 Minimum sheet thickness; uncoated steel sheet: in accordance with Appendix 1 of ANSI/NAAMM HMMA 861-14 "Guide Specifications for Commercial Hollow Metal Doors and Frames".

Steel Frames

- .4 Finish: Minimum Galvanneal coating designation ZF120 (A40).
- .2 Adhesives:
 - .1 Heat resistant, single component, polyurethane reactive (water) hot melt, thermoset adhesive.
 - .2 Lock seam doors: fire resistant, resin reinforced polychloroprene, high viscosity sealant-adhesive.
- .3 Primer: rust inhibitive for touch-up.
- .4 Finishing hardware: in accordance with Section 08 71 00.
- .5 Miscellaneous:
 - .1 Door silencers: single stud rubber or neoprene type.
 - .2 Channel glazing stops and glazing trim: formed channel of minimum 0.81 mm (0.032") (20 gauge) steel, 15.9 mm (5/8") high.
- .6 Lead lining: Rolled pure sheet lead, in accordance with Section 13 49 00.

2.4 Fabrication - General

- .1 Fabricate steel frames, transoms, sidelights and borrowed lights as applicable, to the design and dimensions indicated. Take field measurements where coordination with adjoining work is necessary.
- .2 Fabricate steel frames to be rigid, neat in appearance and free from defects, warp, wave or buckle with all corners square unless otherwise indicated.
- .3 Operating clearances:
 - .1 Provide clearance at floor with allowance made for indicated finish flooring materials.
 - .2 Clearances for Non-Fire-Rated Doors: Not more than 3 mm (1/8") at jambs and heads, except not more than 6 mm (1/4") between pairs of doors. Not more than 19 mm (3/4") at bottom.
- .4 Drill and tap or reinforce for mortised or surface mounted hardware in accordance with accepted hardware schedule, ANSI A115, NFPA 80-2013, or manufacturers recommendations.
- .5 Countersink exposed fasteners unless otherwise shown. Use flat or oval head screws.
- .6 Reinforce components to resist stresses imposed by hardware in use.
- .7 Allow for anticipated expansion and contraction of frames and supports.
- .8 Fit elements at intersections and joints accurately together, in true planes, and plumb and level.
- .9 Perform welding in accordance with CSA W59-18.
- .10 Mortise, reinforce, drill and tap to receive hardware and security devices using templates provided by respective *Supplier*.
- .11 Touch up finish damaged during fabrication.

Steel Frames

- .12 Prepare frames to receive seals where seals are indicated.

2.5 Fabrication - Steel Frames

- .1 General: Applicable to frames, transom panel frames, sidelights, and window assemblies.
- .2 Interior and non-thermally broken frames; welded:
 - .1 Fabricated from:
 - .1 1.34 mm (0.053") (16 gauge) steel.
 - .2 1.70 mm (0.067") (14 gauge) steel for frames noted as heavy duty.
 - .2 Supplied set-up and welded (SUW).
- .3 Factory assembled frame product shall be square, free of defects, warps or buckles.
- .4 Set-up and welded corner joints (SUW):
 - .1 Profile welded—punch mitred, continuously welded on inside of the profile faces, rabbets, returns and soffit intersections, with exposed faces filled and ground to a smooth, uniform seamless surface, as defined in the CSDMA - "Recommended Specifications for Commercial Steel Door and Frame Products".
- .5 Set-up and welded joints at mullions, sills and center rails:
 - .1 Coped accurately, butted and tightly fitted.
 - .2 At intersecting flush profile faces, securely weld, fill and grind to flush, smooth, uniform, seamless surface.
 - .3 At intersecting recessed profile faces, securely weld to concealed reinforcements, with exposed hairline face seams.
 - .4 At other intersecting profile elements make exposed face seams to hairline tolerance.
- .6 Where required due to site access, when required for co-ordination or installation, or shipping limitations, frame product shall be fabricated in sections for splicing in the field.
 - .1 Field spliced jambs, heads and sills shall be provided with 1.34 mm (0.053") (16 gauge) steel splice plates securely welded into one section, extending 100 mm (4") minimum each side of splice joint.
 - .2 Field splices at closed sections (mullions or center rails) shall be 1.34 mm (0.053") (16 gauge) steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100 mm (4") minimum into closed sections when assembled.
 - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the installation company responsible for installation after assembly.
- .7 On factory assembled frame product, provide 2 temporary steel shipping bars welded to the base of the jambs or mullions to maintain alignment during shipping and handling. Remove shipping bars prior to anchoring of frames to floor.
- .8 Each door opening shall be prepared for single stud door silencers. Silencers shall be shipped loose for installation by installer, after finish painting.

Steel Frames

- .1 Single interior doors: 3 at strike jamb.
- .2 Pair of interior doors: 2 at header.
- .3 Weather-stripped doors: None required.
- .4 Sound, light, or smoke sealed doors: None required.
- .9 Prior to shipment, mark each frame with an identification number as shown on the approved submittal drawings.
- .10 Provide mullions and transom bars of closed construction type. For fixed condition, attach members to frame with butt-welded joints. For removable condition, attach members with removable mullion anchors.
- .11 Conceal fastenings unless otherwise indicated.
- .12 Anchor frames to floor by 1.34 mm (0.053") (16 gauge) thick angle clips, welded to frame and provide with 2 holes for floor anchorage.
- .13 Grind welded corners to a flat plane, fill with metallic paste filler and sand to uniform smooth finish.
- .14 Protect strike and hinge reinforcements using guard boxes welded to frames at masonry construction.
- .15 Reinforce head of frames wider than 1220 mm (48").
- .16 Brace frame units to prevent distortion in shipment and protect finish.
- .17 Securely install lead lining to inside of frame profile from jamb return to jamb stop on both sides of the frame as indicated on drawings and in accordance with Section 13 49 00.

2.6 Hardware Reinforcements and Preparations

- .1 Frame product shall be blanked, reinforced, drilled and tapped at the factory for fully templated mortise hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.
- .2 Frame products shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
- .3 Where surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware are required frame product shall be reinforced only, with drilling and tapping done by field installation.
- .4 Templated holes 12.7 mm (1/2") diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by installation on site. Templated holes less than 12.7 mm (1/2") diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
- .5 Hinge reinforcements shall be 3.12 mm (0.123") (10 gauge) steel minimum, high frequency type shall be provided.
- .6 Frames shall be prepared for 114 mm (4.5") standard weight hinges minimum unless otherwise indicated.

Steel Frames

- .7 Frames in excess of 2450 mm (96") rabbet height shall be prepared for 114 mm (4.5") heavy weight 4.6 mm (0.180") hinges minimum.
- .8 Lock, strike and flush bolt reinforcements shall be 1.34 mm (0.053") (16 gauge) steel minimum, with extruded tapped holes that provide equivalent number of threads as 2.36 mm (0.093") (12 gauge).
- .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 1.06 mm (0.042") (18 gauge) steel minimum.
- .10 Reinforcements are not required for surface applied hardware supplied with thru-bolts and spacers or sex-bolts.
- .11 Provide hardware mortises on perimeter frame members to be grouted in masonry or concrete partitions with 0.66 mm (0.026") (22 gauge) steel grout guards.
- .12 Electrified hardware:
 - .1 Where electrically or electronically operated hardware is specified on the schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and inter-connected with CSA approved 12.7 mm (1/2") 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 hardware is specified in the 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 Frames:
 - .1 Frames with electrified devices shall include electrical connection boxes sized to accommodate devices specified in Section 08 71 00. At time of frame manufacture, electrical connection boxes shall be supplied by Divisions 26, 27, and 28 for installation into frame by work of this section.
 - .2 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.

2.7 Frame Anchorage

- .1 Frame products shall be provided with anchorage appropriate to floor, wall and frame construction.
- .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb.

Steel Frames

- .3 Frame products for installation in new masonry walls shall be provided with steel adjustable wall anchors of the T-strap, stirrup or wire, 1.34 mm (0.053") (16 gauge) minimum or 3.96 mm (0.156") diameter wire. Straps shall be not less than 50 mm (2") x 254 mm (10") in size, corrugated and/or perforated.
- .4 Frame products installed in steel stud and drywall partitions shall be provided with 0.81 mm (0.032") (20 gauge) steel snap-in or "Z" stud type anchors.
- .5 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4 mm (1/4") diameter, located not more than 150 mm (6") from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcing and directly opposite on the strike jamb. Each preparation shall be provided with 1.34 mm (0.053") (16 gauge) anchor bolt guides.
- .6 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the installation company.
- .7 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 1.34 mm (0.053") (16 gauge) steel floor anchors. Each anchor shall be provided with 2 holes for mounting to the floor and shall be securely welded to the inside of the jamb profile.
- .8 On sidelights or windows exceeding 3 m (9'-10") in width, installed in stud partitions, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 2.36 mm (0.093") (12 gauge) steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.

2.8 Sizes and Tolerances

- .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of ± 1.6 mm ($+0.063$ ").
- .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2 mm (± 0.047 ").
- .3 Unless finishing hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3 mm (1/8") clearance at jambs and head. A clearance of 19 mm (3/4") between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± 1.2 mm (± 0.047 ").
- .4 Manufacturing tolerances on formed frame profiles shall be ± 0.8 mm (± 0.031 ") for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbets shall be ± 1.6 mm (± 0.063 ") and ± 0.4 mm (± 0.016 ") respectively. Hardware cut-out dimensions shall be as per template dimensions, ± 0.4 mm ($+0.015$ ").

2.9 Hardware Locations

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in paragraph 2.9 of this section.

Steel Frames

- .2 Top of upper hinge preparation for 114.3 mm (4.5") hinges shall be located 180 mm (7.5") down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3 mm (4.5") hinges shall be located 310 mm (12.625") from finished floor as defined in paragraph 2.9 of this section. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033 mm (40-5/16") from finished floor. Strikes for deadlocks shall be centered at 1220 mm (48") from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
- .4 Push and/or pulls on doors shall be centered 1070 mm (42") from finished floor.
- .5 Preparations not noted above shall be as per hardware manufacturer's templates.
- .6 Hardware preparation tolerances shall comply with the ANSI A115 standards.

PART 3 - EXECUTION

3.1 Examination

- .1 Provide necessary grounds, bracing and strapping for fitting and adequate for securing of the work.
- .2 Cooperate with work of other sections to ensure fastenings set by others are provided and located, their work is installed to their specifications and that those responsible for back priming are notified in sufficient time for them to schedule work.

3.2 Installation - Steel Frames

- .1 Set frame product plumb, square, aligned, without twist at correct elevation in accordance with NAAMM-HMMA 840-07, maintaining clearances and hardware locations specified in Section 08 11 13.
- .2 Frame product installation tolerances:
 - .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be ± 1.6 mm ($\pm 1/16$ ").
 - .2 Squareness tolerance, measured through a line 90° from one jamb at the upper corner of the product, to the opposite jamb, shall be ± 1.6 mm ($\pm 1/16$ ").
 - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be ± 1.6 mm ($\pm 1/16$ ").
 - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be ± 1.6 mm ($\pm 1/16$ ").
- .3 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install temporary wood spreaders at mid-point of frame rabbet height to maintain frame widths. Remove wood spreaders after product has been built-in.
- .4 Provide vertical support at center of head for openings exceeding 1250 mm (48") in width.
- .5 Secure anchorages and connections to adjacent construction.
- .6 Adjust operable parts for correct clearances and function.

Steel Frames

- .7 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
- .8 Remove grout or other bonding material from products immediately following installation.
- .9 Provide appropriate anchorage for floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite the strike jamb. On each jamb, install 2 anchors for openings up to and including 1525 mm (60") high and install 1 anchor for each additional height of 760 mm (30") of height or fraction thereof, except as indicated below. Frames placed in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm (6") from top and bottom of each jamb, and intermediate anchors at 660 mm (26") on centre maximum.
- .10 Secure frames set in previously constructed concrete or masonry openings by countersunk expansion bolts at same centres as for adjustable Tee wall anchors. Reinforce frame at fastening location to prevent indentation of frame by fastening device.
- .11 Fill and grind smooth "punch and dimpled" frame installations.
- .12 Prior to site touch-up, exposed surfaces of galvalume steel to be finished shall be cleaned to remove foreign matter. Refer to paint manufacturers recommendations for additional information and requirements of Section 09 91 00.
- .13 Touch-up exposed field welds shall be finished to present a smooth uniform surface and with a rust inhibitive primer.
- .14 Touch-up exposed surfaces that have been scratched or otherwise marred during shipment, installation, and handling shall be with a rust inhibitive primer.
- .15 Finish paint in accordance with Section 09 91 00.
- .16 Install door silencers.
- .17 Properly fasten units and secure in place with concealed fixings wherever possible. Include grounds and furring where required.
- .18 Make allowance for deflection to ensure structural loads are not transmitted to frames.
- .19 Adjust operable parts for correct clearances and function.

3.3 Installation - Finishing Hardware

- .1 Install finishing hardware in accordance with ANSI A115.1G-1994, manufacturers' templates and instructions, and Section 08 71 00.

3.4 Adjusting and Cleaning

- .1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.
- .2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by *Supplier's* requirements.

Steel Frames

- .3 Adjust doors equipped with closers to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location, and traffic.
- .4 Clean hardware after installation in accordance with *Supplier's* requirements.

END OF SECTION

Flush Wood Doors

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Flush wood doors with high pressure decorative laminate facing.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordinate installation of doors with installation of frames provided as part of the work of other Sections of the Specifications and with hardware specified in Section 08 71 00.
 - .2 Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Indicate performance duty level for each *Product*, demonstrating that proposed *Product* meets or exceeds performance duty level specified. Indicate whether performance duty level has been independently tested or verified.
- .3 Shop drawings:
 - .1 Submit shop drawings for the work of this section complying with the North American Architectural Woodwork Standards 4.0 ("NAAWS") requirements.
 - .2 Indicate door location using numbering system per door schedule, size, and hand of each door, elevation of each door type, undercuts, bevelling, construction type core and edge construction not covered in product data, and blocking requirements.
 - .3 Indicate dimensions and locations of factory machining criteria for hardware, and extent of hardware blocking.
 - .4 Indicate dimensions and locations of cut-outs, including trim for openings.
 - .5 Indicate door face finish requirements.
 - .6 Indicate door edge finishing requirements.
 - .7 Indicate fire ratings for fire rated doors.
 - .8 Indicate electrified hardware requirements and preparations.
- .4 Verification samples:

Flush Wood Doors

- .1 Submit samples of proposed laminate for door faces for each colour, texture, and pattern specified or scheduled.
- .2 Submit cut-away sample of each type of door, to show stile and rail construction, core, cross banding, door face finish and edges.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturer shall be a member in good standing of the Architectural Woodwork Institute or the Architectural Woodwork Manufacturers Association of Canada or the Woodwork Institute.

1.5 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 08 14 00.
- .2 Doors shall be marked with door numbers used on shop drawings in the top hinge cavity created by the machining for hinges.
- .3 Identify doors with labels. Package with resilient packaging.
- .4 Store doors flat at the *Place of the Work* in piles with bottom face on bottom of pile. Protect from moisture by placing water resistant material under skids supporting piles. Cover top of piles and provide air at sides of piles.
- .5 Deliver the wood doors only after the building is closed and dry and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period. Do not receive the doors in a damp area. Do not drag the doors on the ground, floor or across one another.

1.6 Site Conditions

- .1 During storage and installation: Obtain and comply with NAAWS and with wood door manufacturer's instructions for optimum temperature and relative humidity conditions for wood doors during its storage and installation. In cases of conflict between Architectural Woodwork Standard's requirements and manufacturer's written requirements, the more stringent requirements shall govern. Do not install wood doors until these conditions have been attained.
- .2 During finishing: Comply with NAAWS and with wood door manufacturer's temperature and humidity requirements before, during, and after application of finishes. In cases of conflict between Architectural Woodwork Standard's requirements and manufacturer's written requirements, the more stringent requirements shall govern.
- .3 During service life of woodwork: Obtain and comply with wood door manufacturer's advice for optimum temperature and humidity conditions.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

Flush Wood Doors

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Flush wood doors, including installation, shall meet the minimum acceptance levels in accordance NAAWS:
 - .1 Grade: Custom.
- .2 Door construction, industry abbreviations and types specified are in accordance NAAWS.
- .3 Performance duty level:
 - .1 Lead lined doors:
 - .1 Doors shall meet the requirements of ANSI/WDMA I.S. 1A-13 for Extra Heavy Duty Performance Level unless otherwise indicated or scheduled.
 - .2 Other than lead lined doors:
 - .1 Doors shall meet the requirements of ANSI/WDMA I.S. 1A-13 for Heavy Duty Performance Level unless otherwise indicated or scheduled.
- .4 Doors and frames shall function as intended, including:
 - .1 Be in true alignment.
 - .2 Operate and swing freely, smoothly, and easily.
 - .3 Remain stationary at any point.
 - .4 Close evenly and tightly against stops without binding.
 - .5 Latch positively when doors are closed with moderate force.
 - .6 No delamination.
 - .7 No telegraphing of core construction in face panels exceeding 0.254 mm (0.01") in a 75 mm (3") span, and warp exceeding 3 mm (1/8") in a 1066 mm (42") x 2133 mm (84") section.
- .5 Wood-based materials are to contain no added urea-formaldehyde.
- .6 Fire Rating Requirements; doors indicated or scheduled as fire rated:
 - .1 Fire rated labelled doors tested to CAN/ULC-S104-15 and listed by a nationally recognized agency having a factory inspection service and shall be constructed as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
 - .2 Install fire rated doors in accordance with NFPA 80-2013.
- .7 Single-source manufacturing and fabrication responsibility: a qualified manufacturer shall assume undivided responsibility for wood doors specified in this section, including fabrication and finishing except where site finishing is specified.

2.2 Door Construction - General

- .1 Door core bonding:

Flush Wood Doors

- .1 Solid core doors: Bond stiles and rails to core; abrasive sand core assembly to achieve uniform thickness prior to lamination of door faces.
- .2 Blocking:
 - .1 Provide hardware blocking for doors in accordance with NAAWS and door manufacturer's written requirements according to door performance duty level, and as follows:
 - .1 Non-rated or 20 minute fire rated doors: Structural composite lumber for hardware blocking.
 - .2 45, 60, and 90 minute fire rated doors: Tectonite or door manufacturer's standard fire rated material for hardware blocking.
- .3 Thickness:
 - .1 45 mm (1-3/4") minimum unless otherwise indicated or scheduled.
- .4 Solid particle board core, veneer faced, lead lined, non fire rated and 20 minute fire rated wood door construction:
 - .1 Type PC-5-LL, agrifibre board core to ANSI A208.1-2009 LD-2 (545 kg/m³ – 609 kg/m³ (34-38 lbs/ft³) density), with rolled pure sheet lead meeting ASTM B749-14, two layers of 0.8 mm (1/32") minimum thickness, one on either side and bonded to core under faces.

2.3 High Pressure Decorative Laminate Faced Doors

- .1 Lead lined doors; solid particle board core, high pressure decorative laminate faced: in accordance with Section 13 49 00.
- .2 Panel edge types:
 - .1 For vertical edges (stiles) and exposed horizontal edges (rails). (Exposed horizontal edges are those edges that can be viewed from floors above.):
 - .1 High pressure decorative laminate finish, face and cross bands are covered.
 - .2 For unexposed horizontal edges (rails):
 - .1 Non rated or 20 minute fire rated doors: Minimum 25 mm (1") structural composite lumber.
 - .2 45, 60, or 90 minute fire rated doors: Tectonite or manufacturer's standard fire rated material for fire rated doors.
- .3 Plastic laminate facing:
 - .1 Acceptable manufacturers:
 - .1 Formica.
 - .2 Wilsonart.
 - .3 Substitutions: in accordance with Section 01 25 00.
 - .2 Type: Grade 10 General Purpose, in accordance with ANSI/NEMA LD 3-2005.

Flush Wood Doors

- .3 Basis of design: Wilsonart '5th Ave. Elm', with soft grain finish.

2.4 Accessories

- .1 Finishing hardware: in accordance with Section 08 71 00.

2.5 Fabrication

- .1 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. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - .1 Clearances: Refer to Part 3 of Section 08 14 00 for clearance tolerances.
 - .2 Fit doors for automatic door bottoms.
 - .3 Comply with NFPA 80-2013 for fire-rated doors. Attach labels to suit required fire-protection ratings.
 - .4 Bevel non-fire-rated doors 3-1/2 degrees (1/8 inch in 2 inches) at lock and hinge edges.
 - .5 Bevel fire-rated doors 3-1/2 degrees (1/8 inch in 2 inches) at lock edge; trim stiles and rails only to extent permitted by labelling agency.
- .2 Fabricate doors with hardware blocking as specified in Part 2 of this Section.
- .3 Factory machine doors for finish hardware that is not surface applied. Do not machine for surface hardware. Locate hardware to comply with Door and Hardware Institute (DHI) "Recommended Locations for Architectural Hardware for Flush Wood Doors" (latest edition). Comply with final reviewed hardware schedules, door and frame shop drawings and hardware templates.
 - .1 Metal astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire rated doors.
- .4 Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes.
- .5 Electrified hardware:
 - .1 Where electrically or electronically operated hardware is specified on the schedules or details or the final approved schedule and templates provided by the 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.
- .6 Factory cut and trim openings.

2.6 Factory Finishing

- .1 Finish work in factory in accordance with NAAWS and referenced quality standard.

Flush Wood Doors

- .2 Prior to finishing, 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.

PART 3 - EXECUTION

3.1 Installation - General

- .1 Execute installation and assembly at the *Place of the Work* using skilled forces under supervision of a competent joinery foreperson.
- .2 Install work plumb, level and straight, and fasten it securely to backing to support itself and anticipated superimposed loads.
- .3 Build into construction as indicated, or specified in other sections of this specification, or both.
- .4 Adequately fasten units and secure in place with concealed fixings wherever possible. Include grounds and furring where required.

3.2 Installation - Doors

- .1 Install fire rated doors in accordance with NFPA 80-2013.
- .2 Align and fit doors in frames with uniform clearances 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.
- .3 Clearances:
 - .1 Clearances shall be as follows except where more stringent clearance is required or indicated:
 - .1 Between door and frame at heads, jambs, and between pairs of doors: 3.18 mm (1/8") maximum.
 - .2 Between bottom of door and top of threshold: 6 mm (1/4") maximum.
 - .3 At door assemblies having fire-protection rating not less than 20-minutes: not more than 6 mm (1/4") at the bottom and not more than 3 mm (1/8") at the sides and top.
 - .4 Seal top and bottom edges of wood doors. Re-seal field cuts in accordance with manufacturer's written requirements.
 - .5 Pilot drill screw and bolt holes.

3.3 Installation - Finishing Hardware

- .1 Install finishing hardware in accordance with Section 08 71 00.

Flush Wood Doors

3.4 Adjusting and Cleaning

- .1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.
- .2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware in accordance with *Supplier's* written requirements.
- .3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.
- .4 Clean hardware after installation in accordance with *Supplier's* requirements.

END OF SECTION

Manual Sliding Entrance Doors

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Manual sliding entrance doors.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Indicate seismic design, connections and restraint.
 - .3 Clearly indicate each type of frame and screen, extrusion profiles, method of assembly, section and hardware reinforcement and mounting plates, locations of exposed fasteners, finishes, glazing systems, glass type, accessories, line of air barrier and drainage path, and as required to completely represent the proposed door system.
 - .4 Indicate fastening system for anchorage of door frame to opening, and structural design for each door type and size.
- .4 Samples:
 - .1 Submit samples of colour and finish prepared as specified on respective metal components.
 - .2 Identify samples as to treatment, thickness, alloy, framing composition, colour, manufacture, performance standard and portion of the work to which they apply.
 - .3 Fabrication shall not proceed without written acceptance of samples from *Consultant*.
- .5 Test reports:
 - .1 Submit relevant test report prepared by accredited independent testing laboratory, showing compliance with the design criteria of this section.

Manual Sliding Entrance Doors

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for incorporation into the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 Company:
 - .1 Shall have adequate plant, equipment, and skilled workers to perform the work expeditiously.
 - .2 Shall have successfully completed installations similar to that specified during a period of at least the immediate past 5 years.
 - .2 Provide at least one trade specialist who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of this work, and personally direct installation performed under this section.
 - .1 Foreperson experience: Shall have 10 years' experience, minimum, as glazing mechanic.
 - .2 Typical glazing mechanic experience: Shall have 3 years' experience, minimum, as glazers.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Manufacturer shall have in place a dispatch procedure that shall be available 24 hours a day, 7 days a week for emergency call back service, for duration of both base contract warranty period and extended warranty, including:
 - .1 A factory-trained technician shall perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the *Owner*.
 - .2 Performance of warranty work and emergency service work during normal business hours.
- .3 Extended warranties:
 - .1 System:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 The warranty is a total system warranty, and includes hardware, sealants, hanging and fitting, and finishing.
 - .3 Duration: 2 years.

Manual Sliding Entrance Doors

- .2 Glass and glazing: in accordance with Section 08 80 00.

PART 2 - PRODUCTS

2.1 Manual Sliding Entrance System Manufacturer

- .1 Subject to compliance with the requirements of the *Contract Documents*, provide Manual sliding entrance systems by the following:
 - .1 Horton Automatics (division of Overhead Door Corporation).
- .2 Substitutions: in accordance with Section 01 25 00.

2.2 Performance/Design Requirements

- .1 Reinforce units to withstand handling stresses, temperature changes, the effect of shrinkage forces, wind loads, dead and live loads, seismic loads, and related elements.
- .2 Design components to achieve sufficient freedom of movement of members to allow for thermal expansion and contraction within the range of air and surface temperatures as applicable to the location of the components without causing harmful buckling, opening of joints, distortion, undue stress on fasteners, breakage of sealants, or other detrimental effects.
- .3 Design light gauge aluminum *Products* to CAN/CSA S157-05/S157.1-05.
- .4 Design and anchor work so that there will be no objectionable distortion or seriously stressed fastenings as the metal expands and contracts. Design and fabricate expansion joints to ensure that they will be, and remain, permanently watertight. Locate joints as shown on reviewed shop drawings. provide necessary wind bracing as required.
- .5 Design mullions for maximum deflection of 1/175.
- .6 Doors shall be in certified in accordance with NFPA 105.
- .7 Doors shall be in accordance with NFPA 101.

2.3 Manual Sliding Entrance Systems

- .1 Subject to compliance with the requirements of the *Contract Documents*, provide the following manual sliding entrance systems:
 - .1 Horton Automatics (division of Overhead Door Corporation) 'FlexBarn Series Door and Framing System X-A60.4, Type 010 Biparting P-X-X-P, Smoke Rated', with acoustic drop down seals.
- .2 Substitutions: Not Permitted.

2.4 Manual Sliding Entrance Configuration

- .1 Bi-parting, surface mounted, door system:
 - .1 Configuration: Bi-parting, two panel door unit with two operable leaves and no sidelite units; using fixed sidelite guide tracks.
 - .2 Traffic pattern: Two-way.

Manual Sliding Entrance Doors

- .3 Mounting: Surface mounted header installed on face of wall.

2.5 Materials

- .1 Framing: Extruded aluminum, Aluminum Association alloy AA6063-T5 alloy and temper, to the following minimum thicknesses:
 - .1 Structural header sections: 5 mm (3/16").
 - .2 Structural frame sections: 3 mm (1/8").
 - .3 Structural panel sections: 3 mm (1/8").
- .2 Glass and glazing: in accordance with Section 08 80 00.
- .3 Weatherstripping: durable, non-absorbing material resistant to deterioration by aging and weathering.
- .4 Frame sealant: One component elastomeric chemical curing, compatible with insulated glass unit sealants, to ASTM C920-18.
- .5 Fasteners; for aluminum framing: Commercial quality steel screws, zinc plated and case hardened.
- .6 Fasteners; for concrete/masonry: Commercial quality zinc plated steel concrete screws or bolts.
- .7 Galvanic/dissimilar metal corrosion inhibitor (isolation coating): in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
- .8 Sealing of joints perimeter frame joints: in accordance with Section 07 92 00.

2.6 Door Units

- .1 Manual sliding entrance doors shall include operator, header and track, jambs, sliding door panel(s), and sidelite(s).
- .2 Mounting configuration: Surface mounted with sliding panel(s) sliding along wall.
- .3 Door motion shall be bi-parting as indicated on drawings.
- .4 Acceptable *Product*:
 - .1 Type 010 P-X-X-P: Sliding panel(s) shall slide along interior side, as manufactured by Horton Automatics.
- .5 Header: Aluminum with removable face plate for service and adjustment of operator and controls.
 - .1 Where indicated, provide transom panel of size and type indicated, mounted on header.
 - .2 Header sizes to be: 73 mm (2-7/8") deep by 100 mm (4") high.
 - .3 Closing mechanism: Soft opening and soft closing dampening combination.
- .6 Track: Aluminum track, 6 mm (1/4") wide and replaceable.

Manual Sliding Entrance Doors

- .1 Door-hanger rollers shall be steel ball bearing wheels 29 mm (1-1/8") diameter. Anti-derailing shall be accomplished by means of a continuous aluminum extrusion full length of slide panel travel.
- .7 Sliding panels and sidelites:
 - .1 Fabricate from aluminum, 44 mm (1-3/4") deep with medium stile horizontal rails. Concealed guides to stabilize bottom of sliding panel.
 - .2 Weather-stripping shall be along perimeter of sliding panels captured in extruded aluminum door panel. Surface applied self-adhesive weather-stripping not acceptable. Adjustable spring-loaded double astragal weather-stripping at lead edge.
 - .3 Bottom rail: Shall be 4" (102mm) tall.
 - .4 Finger safety: When unit slides open, strike rail of sliding panel will stop 89 mm (3-1/2") short of adjacent sidelite; resulting opening is net slide.
 - .5 Sash consists of snap-in glass stops, snap-in glazing beads, and vinyl gaskets.
 - .6 Sliding panel and sidelite:
 - .1 Horizontal muntin(s) of size and type indicated, 57 mm (2-1/4").
- .8 Frames and jambs:
 - .1 Fabricated from aluminum, butt joints, neatly and mechanically secured by means of screws and formed aluminum corner brackets, dimensions as follows:
 - .1 44 mm (1-3/4") deep by 102 mm (4") wide.
- .9 Thresholds:
 - .1 Fabricate from aluminum, to following dimensions:
 - .1 13 mm (1/2") tall by 102 mm (4") wide.
- .10 Hardware:
 - .1 Manufacturer's slide panel with positive latch that will latch the panel in place when closed.
 - .2 Manufacturer's lever handle on each side of the sliding panel to unlock the door along with interior thumb-turn and exterior key-turn lock, in accordance with UL1784 Smoke Rating.
- .11 Make allowances for deflection of structure and temperature movement. Ensure that structural loads are not transmitted to aluminum work.
- .12 Fit intersecting members to flush, hairline, and weather tight joints and mechanically fasten together.
- .13 Conceal fastenings from view, unless otherwise indicated.
- .14 Fabricate items fitting to the building from measurements taken on the *Work* as verified from the *Work* as built. Full responsibility for the proper coordination of the different components of the cladding and doors rests with this section.

Manual Sliding Entrance Doors

- .15 Fabricate and assemble work of this section by skilled glazing installers. Do forming operations prior to finishing.

2.7 Finishes

- .1 Exposed aluminum surfaces; anodized to AAMA 611-20:
 - .1 Clear anodized to AA Designation AA-M12C22A41 (Class I).
- .2 Anti-microbial coating.

PART 3 - EXECUTION

3.1 Examination

- .1 Take dimensions at the *Place of the Work* to ensure that adjustments in fabrication or installation are incorporated, that allowance is made for possible deflection of structure at heads and that clearance to other constructions have been maintained.
- .2 Ensure that anchors and inserts, installed by others are adequate to meet specified requirements.

3.2 Installation

- .1 Door system shall be installed by factory-trained installers in accordance with door system manufacturer's written installation recommendations and reviewed shop drawings.
- .2 Install work plumb, square, level, free from warp, twist and superimposed loads.
- .3 Set sill into three continuous beads of silicone sealant and seal as required to prevent water leakage.
- .4 Provide galvanic/dissimilar metal corrosion inhibitor (isolation coating) in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
- .5 Secure work in required position. Do not restrict thermal movement.
- .6 Install hardware in accordance with templates.
- .7 Adjust operable parts for correct function.
- .8 Fasten jambs at 450 mm (18") o/c maximum spacing with corrosion resistant anchors, and aluminum anchor plates as required.
- .9 Explosive actuated or powder actuated fasteners will not be permitted.

3.3 Glazing

- .1 Glaze aluminum doors with specified glazing tapes, blocks, and spacer shims in accordance with Section 08 80 00.

3.4 Sealant

- .1 Apply sealant between frame members, sills and adjacent construction as a part of the work of this section and in accordance with Section 07 92 00.

Manual Sliding Entrance Doors

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Manufacturer's field review to be in accordance with Section 01 45 00.

END OF SECTION

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PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Fixed aluminum windows.
 - .2 Glass and glazing in accordance with Section 08 80 00.
 - .3 Seal joints within the work of this section in accordance with Sections 07 27 00 and 07 92 00, except where specified otherwise and at abutting joints between this section and the work of other sections.
 - .4 Air barrier transitions and connections between air barriers of adjacent wall.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19 and the following requirements:
 - .1 Review methods and procedures related to glazing systems including the following:
 - .1 Review flashings, special interface details and scheduling with adjacent material assemblies, penetrations, and conditions of other construction that will affect glazing systems.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Submit warranty specimen prior to commencement of shop drawings.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Shop drawings:
 - .1 Submit engineered shop drawings, including seismic design, connections and restraint.
 - .2 Indicate with plans, sections, elevations and sufficient full size details, components and methods of assembly, materials and their characteristics relative to their purpose, and other fabrication information including relationships to adjacent systems.
 - .3 Identify and describe material types being supplied, wall thicknesses of extrusions, and shapes including connections and grades, dimensions and tolerances (minimum and maximum), attachments, reinforcing, anchorage and locations of fastenings, air barrier transitions to various adjacent building envelope air barrier materials, and provisions for thermal and structural movement between components of this section and adjacent materials.

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- .4 Include description of materials, metal finishing specifications, and other pertinent information.
- .5 Design loads, typical reactions and support movement allowances, both vertical and horizontal, shall be placed on the shop drawings.
- .6 Shop drawings shall clearly indicate the specification of materials and, where applicable, indicate installation methods and coordination with other sections.
- .7 Shop drawings shall clearly indicate paths and methods of moisture egress (should this occur) and ventilation of framing and spandrel conditions.
- .5 Design calculations:
 - .1 Submit under seal, calculations prepared by the professional engineer responsible for the preparation of the shop drawings that clearly indicate the following:
 - .1 Design assumptions regarding loadings and seismic design, related to the building code.
 - .2 Codes and standards to which calculations are based upon.
 - .3 Materials proposed and their allowable shear and bending stresses.
 - .4 Maximum and minimum tolerances for proposed materials including anchors, holes and spacings.
 - .5 Testing data to confirm compliance with performance requirements for the work of this section.
 - .6 Analysis for dead, wind, snow and guard loads as required and movements caused by temperature changes, support deflections and building sway.
 - .7 Analysis to include anchors, glazing members, structural joints, sealants, glass. Show section property computations for framing members and submit full sized drawings.
 - .8 Analysis to include thermal performance.
- .6 Samples:
 - .1 Submit 450 mm (18") x 450 mm (18") size samples of types of glass and aluminum framing assemblies with specified finishes. Submit 450 mm (18") x 450 mm (18") size samples of types of spandrel assemblies. Submit 200 mm (8") long samples of typical component sections (head, jamb, sill, meeting rail, and the like), fully assembled, indicating glazing and weatherproof methods.
 - .2 Control samples:
 - .1 Submit two 305 mm (12") square samples of aluminum having specified finish of the required colours. Submit samples as many times as required to obtain approval of the range.
 - .2 Mark direction of metal grain and rolling and aluminum finish application on back of control samples.
- .7 Test and evaluation reports:

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- .1 Submit valid independent laboratory test reports of full-scale mock-up for the specific glazing systems required under the work of this section, including framing members, glazing units, anchorage, slab edge covers, and transitions to adjoining assemblies and materials to demonstrate compliance respecting specified air and water infiltration and environmental separation performance and specified performance requirements specified in this section.
 - .1 Test reports shall be recent and produced within the past 5 years.
- .2 Work shall not be fabricated until laboratory test reports demonstrate compliance with requirements of the *Contract Documents*. Where independent laboratory test reports do not demonstrate compliance with the *Contract Documents* include the cost of necessary testing in the *Contract Price*.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Provide training to the *Owner* in the operation, maintenance, and cleaning of the aluminum framed glazing systems. Submit printed copies of maintenance instructions given to the *Owner*.
 - .2 Submit maintenance data for cleaning and maintenance for windows, curtain walls for incorporation into the operation and maintenance manuals.

1.5 Quality Assurance - General

- .1 Installers / applicators / erectors:
 - .1 The work of this section shall be performed by a *Subcontractor* who is regularly engaged in the engineering, manufacture, fabrication, assembly, glazing and installation of curtain wall glazing systems. *Subcontractor* shall demonstrate to the acceptance of the *Consultant*, that they have successfully performed on comparable projects over the previous 10 years.

1.6 Delivery, Storage, and Handling

- .1 Comply with AAMA CW-10-15 – Care and Handling of Architectural Aluminum from Shop to Site.
- .2 Store parts in a dry place and permit natural ventilation over their finished surfaces.
- .3 Store materials in locations protected from damage by other trades.
- .4 Under conditions of high humidity or cold temperatures, supply heating or forced air ventilation to prevent accumulation of surface moisture.
- .5 Mark components to show location on building and on drawings.
- .6 Protect finishes with strippable coating that will not mar, nor deface finish on removal, or a similar method designed to afford an equivalent amount of protection. Leave protected coating intact until damage risk is past or immediately prior to final cleaning.
- .7 Stacking should be done to prevent bending pressure or abrasion of finished surfaces.

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1.7 Field Conditions

- .1 Comply with requirements of *Product* manufacturers.

PART 2 - PRODUCTS

2.1 Manufacturer

- .1 Manufacturers shall develop materials and *Products* of this and related sections to achieve design intent as indicated and specified.
- .2 Subject to compliance with requirements, provide products by one of the following manufacturers:
 - .1 Alumicor Limited.
 - .2 Kawneer Company Canada Limited.
 - .3 Oldcastle Building Envelope.
 - .4 Schüco.
 - .5 CRL U.S. Aluminum.

2.2 Glazing System Design - Specific Component Requirements

- .1 Glass design:
 - .1 Design glass in accordance with CAN/CGSB 12.20-M89 and Section 08 80 00.
 - .2 Insulating glass units in accordance with Section 08 80 00.
- .2 Aluminum windows:
 - .1 Fixed windows; acceptable *Products*:
 - .1 Alumicor 'RainBlade 2970 ShadowLine'.
 - .2 Substitutions: in accordance with Section 01 25 00.
 - .2 Description:
 - .1 Thermally broken assemblies.
 - .2 Fasteners: concealed.
 - .3 Glazing pockets shall be vented, pressure equalized and drained to the exterior.
 - .4 Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners with silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

2.3 Performance/Design Requirements - General

- .1 Unless specified otherwise, glazing systems shall be designed to the following standards and references:
 - .1 American Architectural Manufacturers Association (AAMA).
 - .2 GANA 'Glazing Manual'.

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- .3 GANA 'Sealant Manual'.
- .4 IGMA 'North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use'.
- .2 Removal and replacement of broken lites of glass shall be possible without cutting metal or moving the main frame in relation to the anchors.
- .3 Design glazing system and framing to prevent thermal shock and edge pressure fracture damage to the glass.
- .4 Metal faces of flashings, caps, framing and sheet cladding shall be visually flat.
- .5 Accurately shape mullion and cover caps at intersecting joints to obtain hairline joints, just wide enough to permit thermal movements.
- .6 Anchor design:
 - .1 Design anchors of the framing members to the building support to accommodate movements specified herein and to allow for construction tolerances.
- .7 Noise:
 - .1 Design the *Work* so that movements specified herein are accommodated without any audible noise being generated. In general, noise is produced by metal to metal contacts, and/or stresses being built up by movements and suddenly being relieved when friction forces are overcome.
- .8 Conceal fasteners connecting and fixing the framing members.
- .9 Framing cavity shall be compartmentalized every 6000 mm (236") horizontally and at corners to prevent the movement of air, in accordance with standard rain screen design.
- .10 Framing cavity shall be compartmentalized at demarcation of interior and exterior building envelope spaces to prevent the movement of air, in accordance with rain screen design.
- .11 Presence of any of the following shall constitute failures including, but are not limited to:
 - .1 Structural failures including, but not limited to, excessive deflection.
 - .2 Noise or vibration created by wind and thermal and structural movements.
 - .3 Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - .4 Water penetration through fixed glazing and framing areas.
 - .5 Failure of operating components.
 - .6 Failed glass units.

2.4 Performance/Design Requirements - Structural

- .1 Design components to the relevant sections of the building code, using limit states design methods.
- .2 Design glass in accordance with CAN/CGSB 12.20-M89, except where greater requirements are specified. For the purposes of glass design, cladding design, seismic and wind loads shall be taken to have a minimum duration of 60 seconds.

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- .3 Design of framing systems shall include necessary adjustments to wall thickness of mullions, mullion reinforcing or other necessary structural design to comply with the specified design requirements. Such design measures shall not relieve the *Contractor* of achieving other requirements.
- .4 Movement criteria: the *Work* shall be designed and constructed so as to allow for movements of the *Work* and/or supporting structure as follows:
 - .1 Expansion and contraction of component materials of the *Work* produced by an exterior surface temperature range of -35°C to +60°C.
 - .2 Structural and thermal movements of the reinforced concrete and structural steel as prepared by the *Consultant's* structural engineers.
 - .3 The above movements to be accommodated without overstressing components in the *Work*, and without buckling, failure of weather seals, undue stress on glass, glass breakage, undue stress on structural elements, or other detrimental effects.
- .5 Design aluminum framing members in accordance with CAN/CSA-S157-17/S157.1-17.
- .6 Deflection limits:
 - .1 The deflection of framing member in direction normal to plane of glass when subjected to uniform load deflection test in accordance with ASTM E330/E330M-14(2021), under specified design loads, shall not exceed 1/175 of clear span clear spans up to 4110 mm (13'-6") and to 1/240 of clear span plus 6.4 mm (1/4") for spans greater than 4110 mm (13'-6") or an amount that restricts edge deflection of individual glazing lites to 19 mm (3/4"), whichever is less.
 - .2 In the plane of the wall, deflection of framing members shall not reduce the glass or panel bite below 75% of the design dimension and shall not reduce the glass or panel edge clearance below 25% of the design dimension or 3 mm (1/8") whichever is greater. Restrict dimensions further if required for assembly, fit of components or to accommodate movements specified herein.
 - .3 Deflection limits for sheet metal air/vapour barriers including backpans shall be L/240 or maximum 6.4 mm (1/4") whichever is less, under specified design loads.
 - .4 For the work of this section, air barrier components, including sealants and membranes shall not fail under design conditions. Failure shall include loss of adhesion, excessive deflection, movement or displacement beyond product limitations, materials placed under stress beyond manufacturers recommended range.
- .7 Glazing that extends to a dimension of less than 1070 mm (42") above the adjacent finished floor level which is greater than 600 mm (24") above the ground on the exterior or interior of the building, shall have the glass, mullions and connections be designed as a guard to the following:
 - .1 The building code requirements for guards.
 - .2 The building code requirements for glazing subject to human impact.
- .8 Design structural steel structural components and fasteners in accordance with CSA-S16-19.

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- .9 The design of the structural action of glazing systems shall be "simply supported" and shall not induce bending moment or thrust reactions into the building.
- .10 Seismic design: Comply with requirements of the building code and authorities having jurisdiction.
- .11 Design systems to withstand own dead load, snow, ice and wind loads and combination thereof, as calculated in accordance with the building code, to maximum allowable deflection without permanent deformation.
- .12 Design systems to have a method of attachment to the structure that will take into account peculiarities at the *Place of the Work* so that there shall be no possibility of site and air vibrations or normal temperature movements of the building to loosen, weaken, or fracture the connection between building envelope assembly components and the structure or between the components themselves.
- .13 Assembly shall be secured in a manner that will keep stresses on sealant within the sealant manufacturer's recommended working range.
- .14 Uniform load: No principal member shall display undue effects or permanent set in the framing members in excess of 0.2% of their clear spans after being subjected to structural load test equal to 1.5 times the specified design load, when tested in accordance with ASTM E330/E330M-14(2021).

2.5 Performance/Design Requirements - Air Filtration and Water Resistance

- .1 Air infiltration/exfiltration rate:
 - .1 Fixed glazing: Maximum 0.5 L/s/m² (0.1 cfm/ft²) of glazing area when tested in accordance with ASTM E283-04 at test pressure of 300 Pa (6.27 psf).
- .2 Water resistance:
 - .1 Static; fixed and operable glazing: No water penetration shall occur when the work is tested in accordance with ASTM E331-00, amended to prohibit water from passing through interior glazing seals or frame joints, at a test pressure equal to 20% of positive design wind pressure and but not less than 300 Pa (6.27 psf).
- .3 Design glazing systems using rain screen principle with the following characteristics:
 - .1 Interior (room-side) air seal at component interfaces.
 - .2 Exterior (weather-side) deterrent seal formed by continuous gaskets or flush silicone seal as applicable.
 - .3 Glazing pockets vented and drained to the exterior.
 - .4 Extrusions with integral gutters of sufficient depth to carry intruded rainwater and snow-melt to the exterior.
 - .5 System of baffles to prevent water entering the glazing cavity due to gravity, capillary action or rain momentum.

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- .6 Metal to metal joints within the glazing cavity shall be designed and installed to be sealed prior to assembly and fixing and so as to provide continuous drainage of water to points of egress from assembly. Where location of drainage must drain more than one lite and/or spandrel, the number of drainage holes shall be increased according to rain screen design principle.
- .4 Cap and seal exposed ends of mullions and caps, while not compromising drainage qualities.

2.6 Performance/Design Requirements - Thermal

- .1 No condensation or frost shall form on the interior of glazing or framing members when tested under the following conditions:
 - .1 Interior air: 22°C, 35% R.H.
 - .2 Exterior air: -20°C, 24 km/h (15 mph) wind speed.
- .2 In addition to the above requirements the framing system shall be designed such that condensation or frost will not form on the interior surface of the aluminum members before appearing on the adjacent insulating glass units. To achieve this requirement, any metal on the exterior of the *Work* will require a thermal break between metal on the interior.
- .3 Brackets and attachment shall not cause thermal bridging resulting in interior condensation forming at design conditions.

2.7 Materials

- .1 Glass: in accordance with Sections 08 80 00.
- .2 Aluminum extrusions: Accurately formed, extruded aluminum alloy in accordance with ASTM B221-21: AA-6063-T5/T6, free from defects impairing appearance, strength and durability.
- .3 Aluminum flashing: In accordance with 07 62 00 – Metal Flashing.
- .4 Shims: Utility grade aluminum sheet when not in contact with concrete; stainless steel when in contact with concrete or cementitious substances of thickness required, or galvanized steel.
- .5 Air barrier materials; transition from glazing system air barrier and tying into building envelope air barrier systems:
 - .1 Silicone sheet air barrier membrane and manufacturer's recommended sealants and accessories:
 - .1 Air barrier transition system to resist specified design loads when subjected to uniform load deflection test in accordance with ASTM E330/E330M-14(2021).
 - .2 Air barrier transition system to allow no water penetration in accordance with ASTM E331-00 to a design pressure not less than 720 Pa (15 psf).
 - .3 Acceptable *Products*:
 - .1 Tremco 'Proglaze ETA Engineered Transition Assembly'.
 - .2 Substitutions: in accordance with Section 01 25 00.

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.6 Fasteners:

- .1 Non-magnetic (austenitic) 300 series alloy stainless steel unless otherwise indicated.
- .2 Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
- .3 Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is not acceptable.
- .4 Provide concealed fasteners unless indicated otherwise.
- .5 For exposed locations, provide countersunk flathead fasteners with finish matching item fastened.

.7 Anchors: Three-way adjustable anchors with minimum adjustment that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

- .1 Inserts and surface mounted supports: Hot-dip galvanized cast-iron, malleable-iron, or steel complying with ASTM A123/A123M-17 or ASTM A153/A153M-16a requirements.

.8 Dielectric separator: Non-staining alkali resistant, rubber isolation pads or 10 mil vinyl membrane type, electrolytic isolation factor of 1.0.

.9 Internal sealant and air barrier sealant: One-part, neutral cure, high performance silicone sealant complying with ASTM C920-18, Type S, Grade NS, Class 25, capable of sustaining dynamic movements, SWRI sealant validated.

.10 Zinc-rich coating: Touch-up paint for welded galvanized areas; 2 coats of zinc-rich paint in accordance with CAN/CGSB 1.171-98, VOC <340 g/L.

.11 Thermal barrier component:

- .1 Rigid polyvinyl chloride or neoprene or polyurethane providing full separation of interior and exterior components. Thickness shall be as required to meet design.
- .2 Glass fibre reinforced polyamide porthole extrusion providing full separation of interior and exterior components. Thickness shall be as required to meet design.

.12 Miscellaneous steel: in accordance with CSA G40.21-13, Grade 300W.

.1 Finishes:

- .1 Behind air/vapour barrier: CISC/CPMA 2-75 primer.
- .2 Exterior to air/vapour barrier, and where condensation could occur: hot dip galvanized after fabrication or Type 300 series stainless steel.

.13 Spacers for glazing sections receiving metal flashed, panels; behind pressure plate: High density polyethylene (HDPE) or PVC.

.14 Foamed-in-place insulation: Refer to Section 07 21 00.

2.8 Finishes

- .1 Exposed aluminum surfaces; anodized in accordance with AAMA 611-14:

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- .1 Clear anodized to AA Designation AA-M12C21A31 or AA-M12C22A31 (Class II).
- .2 Finish exposed metal fasteners: baked-on finish to match related aluminum surfaces.
- .3 Finish steel clips and reinforcing steel with 610 g/m² zinc coating in accordance with ASTM A123/A123M-09.

2.9 Fabrication - General

- .1 Insofar as practical, execute fitting and assembly in the shop with the various parts or assemblies ready for erection at the *Place of the Work*.
- .2 Take field measurements and levels required to verify or supplement those shown for the proper layout and installation of the *Work*. Coordinate dimensional tolerances in adjacent building elements and confirm prior to the commencement of the work of this section. Commencement of installation floor by floor shall be construed as acceptance of building conditions. Glazing systems shall not deviate from tolerances specified.
- .3 Verify measurements at the *Place of the Work* and fabricate systems to suit dimensions at the *Place of the Work*.
- .4 Fabricate glazed framing to provide uniform rough opening dimension:
 - .1 Maximum tolerance will be +/- 3 mm (1/8") for rough opening joint width.
- .5 Conceal nuts, bolts, screws, clips and other means of fastening in finished *Work*, except where shown or specified otherwise.
- .6 Maintain dimensional tolerances from vertical and horizontal planes with the closest possible accuracy for the various parts as previously designated.
- .7 Means of anchoring systems shall have sufficient adjustment to permit correct and accurate alignment. After adjustment, positively lock anchorage devices in manner to preclude movement, once alignment is achieved.
- .8 Isolate aluminum bearing contact with dissimilar materials other than air/vapour seal. Method of isolation shall be to *Consultant's* acceptance.
- .9 Make allowances for deflection of structure above when making connection thereto, and ensure that no structural load is transmitted to glazing systems.
- .10 Fixing screws shall be countersunk and concealed. Screws shall be oval head, set flush with adjacent surfaces.
- .11 Assume full responsibility for the design of assemblies. Reinforcing, furring and anchoring shall suit each specific condition complying with the parameters previously specified, required and as shown.
- .12 Form accurate extrusions with clean, straight, sharply defined profiles free from any defects.
- .13 Form flashing bends with clean, straight, sharply defined profiles without damage and discolouration to finish.
- .14 Extrusion thickness shall be adequate to satisfy loading and deflection, as required and indicated.

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- .15 Weld aluminum where required with inert metal arc equipment by methods recommended by the Aluminum Co. of Canada. Welders shall qualify according to CSA W47.2-11(R2020). Make exposed welds continuous and flush with adjacent surface. Do not mar surface finishes with welds in back of exposed aluminum. Do not deform the exposed metal and finish in any way by welding.
- .16 Weld steel, where required, in accordance with CSA W59-24. Welded joints shall be of adequate strength and durability with jointing tight and flush. Welder shall be fully approved by the Canadian Welding Bureau and shall comply with CSA W47.1-19, Division 3. Where it is necessary to weld components already galvanized, remove galvanizing for 50 mm (2") around weld and paint over welds where galvanizing is removed as specified hereinafter.
- .17 Insert concealed prime painted steel reinforcement into cavities of frame members to the interior side of integral air seal web, sized to adequately withstand wind pressure requirements specified.
- .18 Include aluminum cover plates, trim components, bent plates, closure trim, extruded glazing corner posts, drips, flashings and other components required to complete the installation and as indicated whether specifically labelled/dimensioned or only notionally indicated.
- .19 Trim glazing spline at continuous embedded sill flashing locations (to ensure full upturn of flashing) behind pressure plate.
- .20 Include thermal barriers, and miscellaneous neoprene pads, shims and washers.
- .21 Provide weepholes in the glazing recess to drain condensate and water to exterior wall cavity. Provide drainage tubes as necessary to conduct water safely through isolated insulated areas to direct exterior discharge. Seal around tubes.
- .22 Metal-to-metal joints which require sealing to maintain weathertightness shall be designed and assembled with a ribbon of sealant that shall be compressed by approximately 50% of its original thickness when the joints are secured.
- .23 Fabricate frame systems complete with mullions, head and sill frames, spigots, and plugs for horizontals, spline gaskets, thermal break pressure plates, filler pieces, snap-on caps, and other necessary components.
- .24 Sill flashing: extruded aluminum with vertical concealed legs for support, finished to match aluminum frames, clipped to full length continuous bent aluminum clip with vertical leg at back, 25 mm (1") projection beyond wall cladding surface unless otherwise indicated. Provide preformed drip deflectors for sill ends at jambs. Provide preformed butt joint and corner sill splice connectors and sealant to prevent water penetration. Locate splice connectors (joint covers) at centre line of mullions when required.

2.10 Fabrication Tolerances

- .1 Comply with the following maximum tolerances:
 - .1 Plumb: 3.2 mm in 3 m (1/8" in 10'-0"); 6.35 mm in 12.2 m (1/4" in 40'-0").
 - .2 Level: 3.2 mm in 3 m (1/8" in 10'-0"); 6.35 mm in 12.2 m (1/4" in 40'-0").
 - .3 Alignment:

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- .1 Where surfaces abut in line or are separated by reveal or protruding element up to 12.7 mm (1/2") wide, limit offset from true alignment to 1.6 mm (1/16").
- .2 Where surfaces are separated by reveal or protruding element from 12.7 to 25.4 mm (1/2" to 1") wide, limit offset from true alignment to 3.2 mm (1/8").
- .3 Where surfaces are separated by reveal or protruding element of 25.4 mm (1") wide or more, limit offset from true alignment to 6.4 mm (1/4").
- .4 Variation from plane: 3.2 mm in 3.6 m (1/8" in 12'-0"); 12.7 mm (1/2") over total length.
- .5 Square or rectangular: Maximum 3.2 mm (1/8") difference between diagonal measurements.
- .6 Variation from indicated position: plus/minus 3 mm (1/8").
- .2 Tolerances shall not be cumulative.

PART 3 - EXECUTION

3.1 Installation - General

- .1 Verify dimensions of supporting structure by measurement at the *Place of the Work* so that aluminum framed glazing systems will be accurately designed, fabricated and fitted to the structure.
- .2 Coordinate with the work of other sections and hand-over items to be placed during the installation of other work at the proper time to avoid delays in the *Work*.
- .3 Erect frames complete with necessary reinforcing and incidental components.
- .4 Include anchors and fastenings shown, specified, or necessary to anchor work together or to work of separate sections. Supply items and inserts required to be built into other work. Submit instructions for proper location, and verify proper positioning. Survey location of imbeds after initial pour to verify tolerances.
- .5 Use anchors that will permit sufficient adjustment for accurate alignment.
- .6 Accurately fit and rigidly frame together units where required. Match components carefully to produce continuity of line and design. Provide flush hairline joints and weathertight connections.
- .7 Ensure adequate clearance and shim space at perimeter of openings.
- .8 After welding galvanized steelwork, touch-up weld areas with 2 coats of primer, zinc-rich at galvanized locations.

3.2 Installation Tolerances

- .1 Comply with the following maximum tolerances:
 - .1 Plumb: 3.2 mm in 3 m (1/8" in 10'-0"); 6.35 mm in 12.2 m (1/4" in 40'-0").
 - .2 Level: 3.2 mm in 3 m (1/8" in 10'-0"); 6.35 mm in 12.2 m (1/4" in 40'-0").
 - .3 Alignment:

Aluminum Window Systems

- .1 Where surfaces abut in line or are separated by reveal or protruding element up to 12.7 mm (1/2") wide, limit offset from true alignment to 1.6 mm (1/16").
- .2 Where surfaces are separated by reveal or protruding element from 12.7 to 25.4 mm (1/2" to 1") wide, limit offset from true alignment to 3.2 mm (1/8").
- .3 Where surfaces are separated by reveal or protruding element of 25.4 mm (1") wide or more, limit offset from true alignment to 6.4 mm (1/4").
- .4 Variation from plane: 3.2 mm in 3.6 m (1/8" in 12'-0"); 12.7 mm (1/2") over total length.
- .5 Square or rectangular: Maximum 3.2 mm (1/8") difference between diagonal measurements.
- .6 Variation from indicated position: plus/minus 3 mm (1/8").
- .2 Tolerances shall not be cumulative.

3.3 Foamed-in-Place Insulation

- .1 Install between aluminum framing and rough openings at exterior walls and where indicated, in accordance with Section 07 21 00.

3.4 Isolation

- .1 Backpaint aluminum surfaces in contact with cement, concrete, masonry, plaster or dissimilar metals with heavy coat of bituminous paint.

3.5 Air Barrier Continuity with Building Envelope

- .1 Provide continuous air barrier transition between work of this section where work interfaces with building envelope air barrier materials. Provide EPDM or PVC glazing pocket filler or joint plug to seal glazing rebate where applicable; sealed airtight with silicone sealant.
- .2 Install in accordance with manufacturer's installation instructions. Seal lap joints and seal perimeter to adjacent building envelope air barrier material with silicone sealant.
- .3 Coordinate with adjacent materials for continuity and compatibility.

3.6 Glass and Glazing

- .1 Furnish glass for work of this section to requirements herein and in accordance with Section 08 80 00, and assume total responsibility for sizing, design and other aspects of glass work and accessories.

3.7 Sealant - Installation

- .1 Provide sealants associated with this section, following the requirements of Section 07 92 00. Make entire installation watertight.

3.8 Field Quality Control – *Subcontractor*

- .1 The *Subcontractor* is responsible for quality control of the work of this section including quality control of sub-*Subcontractors* and material suppliers for work of this section.

Aluminum Window Systems

- .2 The *Subcontractor* shall develop a quality control manual for the factory and the field installation. The form of the manual shall be reviewed and accepted by the *Consultant*. This manual will document quality control practices of the *Subcontractor*, sub-*Subcontractors* and major material suppliers. The manual will include, but not be limited to, specific criteria related to:
 - .1 Surface preparation.
 - .2 Sealant mixing, tack time, set time, butterfly tests.
 - .3 Paint adhesion testing.
 - .4 Sealant adhesion testing.
 - .5 Material compatibility testing.
 - .6 Sealant staining of porous substrate testing.
 - .7 On line fabrication quality control practices.
 - .8 Shipping.
 - .9 Field installation.
- .3 The *Subcontractor* is to maintain a logbook (copies to be provided to the *Consultant* at completion of fabrication) documenting date, time, results, and significance of in plant testing carried out linked to daily panel production. The form of this logbook shall be reviewed and accepted by the *Consultant*.

3.9 Field Quality Control – Field Review

- .1 The *Owner* will engage the services of an independent inspection and testing company to carry out inspection and testing of work of this section.
 - .1 The cost of such inspection will be paid in accordance with Section 01 45 00.
- .2 Field review programme to include:
 - .1 Verification of proper insulation, vapour retarder, and air barrier installation.
 - .2 Checks of interface and termination seals against other elements.
 - .3 Review of panel to panel air seals, review of roof/wall interface.
 - .4 Review of panel fastening, exterior sealants etc.
 - .5 Checks of air and vapour seals/barriers for continuity, penetrations and correct orientation.
 - .6 Checks for continuity of insulation plane.
 - .7 Verification of flashing placement and continuity.
 - .8 Special review of interfaces between different elements such as wall/roof, curtain wall/masonry, to verify continuity of envelope performance.
 - .9 Review of exterior applied sealants and flashings.
 - .10 Confirmation of fastener size, type, and material.
 - .11 Review of drainage paths to confirm clear.

Aluminum Window Systems

.12 Verification of glass type and position.

3.10 Adjusting and Cleaning

- .1 Adjust operating hardware and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- .2 Remove as the work of this section progresses, corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage members. Inspect as often as required to ensure cleanliness.
- .3 Remove non-permanent labels.
- .4 Remove dirt and residue from surfaces.
- .5 Remove *Products* or materials that have been broken, chipped, cracked, discoloured, abraded, or damaged during construction period and provide undamaged *Products* or materials meeting the requirements of the *Contract Documents*.
- .6 Wash exposed surfaces with a cleaning solution approved by *Product* manufacturers.

3.11 Protection

- .1 At completion of the *Work*, remove protective coatings, clean glass and aluminum and remove surplus compounds and sealant materials. Replace or make good defective, scratched or damaged work.

END OF SECTION

Finish Hardware

PART 1 - GENERAL

1.1 Summary

.1 Section includes:

- .1 Supply and off-load to place in a clean, dry, and secure room at the *Place of the Work*, which has been designated for storage of all finish hardware specified including necessary fastening devices.
- .2 Supply all finish hardware required and not supplied under other Sections.
- .3 Check and verify hardware information on door and frame shop drawings, prior to fabrication.
- .4 Packaging, labelling, provision of installation instructions, templates, fixings and similar items, and delivery to the *Work* site.
- .5 Give assistance at the *Place of the Work* to organize hardware storeroom and supply qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.
- .6 Provide qualified staff at the *Place of the Work* promptly to assist installation trades subsequent to being requested and to ensure that hardware is being correctly installed.
- .7 Upon completion of installation of hardware, hardware *Supplier* shall arrange and conduct, in company of *Consultant* and *Contractor*, inspections to verify that all hardware is installed and functioning satisfactorily, and where necessary shall recommend adjustments of such items as closer arms, valves, door holders and latch and locksets. Report comments in writing to *Consultant* and *Contractor*.
- .8 Supply temporary locking cylinders and keys for construction purposes. Locks used for *Contractor* security shall be keyed as required to conform to building operations' security requirements.

1.2 Administrative Requirements

.1 Coordination:

- .1 Coordinate work of this section to ensure information and material is promptly provided, to ensure orderly and expeditious progress of the *Work*, and to comply with schedule for completion.
- .2 Within 3 weeks of *Contract Award*, submit confirmed orders to manufacturers/*Suppliers* to *Consultant*.
- .3 Assist *Contractor* to organize hardware storeroom and supply qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.

Finish Hardware

- .4 Coordinate the work of this section to ensure supplied hardware can function as required and can be installed within the particular details of the door and frame assemblies. Hardware that cannot be installed or will not function as intended will be replaced at no cost to the *Owner*.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Schedules and samples:
 - .1 Prepare and submit for review, a finish hardware schedule with technical product data sheets for use in the *Work*. List type, selected manufacturer's name and number, location, mounting heights and finish of hardware, and complete cross reference to door schedule.
 - .2 The indication or omission of a hardware component on the hardware schedule does not remove the responsibility of this section to ensure that all hardware can be installed and will function as intended.
 - .3 Submit samples of complete line of hardware and finishes. Identify samples indicating hardware item numbers used in the Finish Hardware Schedule, manufacturer's numbers, names, types, finishes, sizes and indication of door location(s). Approved samples will be retained for comparisons and returned upon completion of the *Work*.
 - .4 Prepare and submit for review, a keying schedule recognizing *Owner* requirements which shall be determined after award of *Contract*.
- .4 Templates:
 - .1 Submit for distribution, 3 copies of templates, template information, installation instructions and details necessary to enable preparation for, and installation of finish hardware in accordance with Door Hardware Institute recommended procedures. Submit templates arranged and marked coincident with specified hardware designations.
 - .2 Submit promptly when requested, the foregoing information in 3-ring plastic hard-covered binders suitably identified.
 - .3 In lieu of 1.3.4.1 arrange for the issue by each hardware manufacturer, the manufacturer's standard book of template drawings, at the option of door and frame manufacturers.
- .5 Jigs:
 - .1 Submit template jigs for each component to be recessed to enable installation trades to prepare doors to preclude misalignment and improper fit.

Finish Hardware

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Instruct the *Owner's* designated representative in proper care and preventative maintenance of hardware to assure longevity of operation.
 - .2 Submit maintenance data for cleaning and maintenance of finish hardware.
- .3 Submit to building maintenance staff prior to date of *Substantial Performance of the Work*, two sets of wrenches for door closers, locksets and fire exit hardware.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 *Supplier*:
 - .1 Shall have 5 years' experience, minimum, in *Products*, systems and assemblies specified and with approval of *Product* manufacturers.

1.6 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 08 71 00.
- .2 Package each item of hardware individually, complete with trim and necessary fastenings, and accessories, including wrenches, keys, and other appurtenances required for correct installation. Mark each package as to contents and appropriate use in specified groups.
- .3 Items of hardware subject to handling when installed shall be submitted with an easily removable covering to protect against scratches, abrasions, coating with dissimilar finish materials on adjacent surfaces, and tarnishing.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Comply with codes and requirements of governing authorities, and as specified.
- .2 Provide hardware items with characteristics to meet specified fire ratings, and conform to exit requirements of governing authorities.

2.2 Materials

- .1 Finish hardware: in accordance with Finish Hardware Schedule.

Finish Hardware

PART 3 - EXECUTION

3.1 Examination

- .1 Before furnishing any hardware, carefully check *Contract Documents*, verify door swings, door and frame materials and operating conditions, and assure that hardware will fit work to be attached.
- .2 Check shop drawings and frame and door lists affecting hardware type and installation, and verify to correctness thereof, or advise of required revisions. Check that doors, frames and panels requiring additional support are reinforced.
- .3 Point out special requirements to installer. Make final adjustment of hardware, in particular closer arms, valves and locksets, to work properly.

3.2 Installation

- .1 Install in accordance with manufacturer's written installation requirements. Refer also to installation requirements indicated, and specified in other sections of specifications.
- .2 Accurately locate and adjust hardware to meet manufacturer's written requirements. Use special tools and jigs as recommended.
- .3 Locate door stops to contact doors 75 mm (3") from latch edge.
- .4 Refer to Section 08 14 00 with respect to factory preparation for hardware for wood doors. Install wood doors and applicable hardware, including hinges.
- .5 Take delivery of finishing hardware and install, except hardware specified as part of work of another section. Check each item as received.
- .6 Set, fit and adjust hardware according to manufacturer's directions, at heights later directed by *Consultant*. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.
- .7 Sound and weather seals:
 - .1 Install seals to continuously seal entire perimeter of doors. Secure in place with non-ferrous screws, in accurate alignment.
 - .2 Maintain integrity of seal at head of doors fitted with closers. Adapt seals as required to achieve specified performance.
- .8 Pre-drill kickplates and doors prior to installation of kickplates. Apply with water-resistant adhesive and countersunk stainless steel screws.
- .9 Set thresholds on two continuous beads of polyurethane caulking fastened with a minimum of 4 countersunk screws.
- .10 At wood doors, use screw attachment for exit devices and closers except as follows:
 - .1 Use through-bolt attachment for exit devices and closers at mineral core doors.

Finish Hardware

3.3 Electrified Hardware

- .1 Install electronic components, security components such as magnetic locks, sentronic hold open devices door status switches, card readers, processors, transformers, and other electric devices.
- .2 Power wiring will be supplied and installed by Electrical Divisions 26, 27, and 28 including conduit, boxes and other electrical appurtenances, including connections and terminations. Be responsible for ensuring that all wiring work is done in accordance with the *Suppliers* wiring diagrams and directions.
- .3 Arrange for testing and commissioning of system by the distributor of the system. Submit a copy of reports to the *Consultant*.

3.4 Keying

- .1 Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- .2 Locks and latches shall be type to match the *Owner's* standard and supplied with interchangeable cylinders and construction cores.

3.5 Field Quality Control

- .1 Field tests and inspections:
 - .1 Inspect the installation of finish hardware on an agreed frequency.
 - .2 Advise in writing of work being performed that will prejudice the installation or correct operation of items of hardware.
 - .3 Ensure items have been installed complete with required trim and accessories, and fastenings are adequately secured and approved. Ensure closer arms, valves, holder devices, locksets and latchsets are correctly adjusted.

3.6 Adjusting and Cleaning

- .1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.
- .2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by *Supplier's* requirements.
- .3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.
- .4 Clean hardware after installation in accordance with *Supplier's* requirements.

END OF SECTION

DOOR HARDWARE

08 71 00

PROJECT:



SHN Satellite Imaging Renovation
Scarborough, ON

ARCHITECT:



401 Wellington Street W.
Suite 100
Toronto, ON

Prepared By: Alex Bekmansourov

Date: January 24, 2025

Revised:

Architectural Hardware Finishes

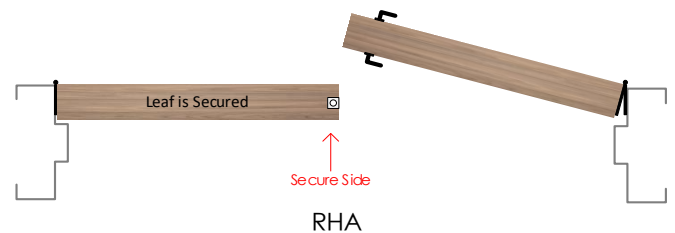
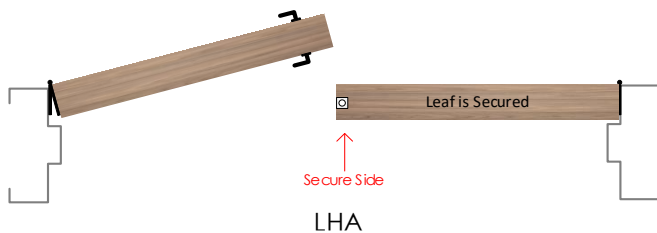
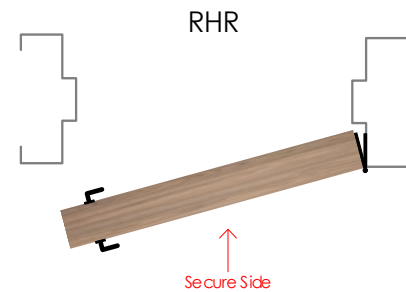
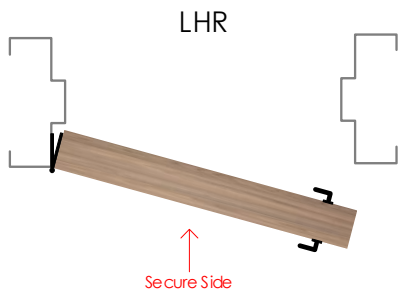
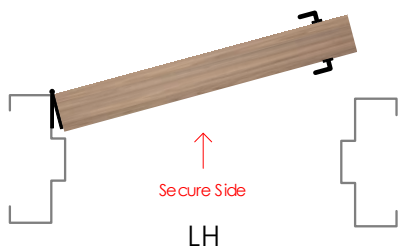
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Satin Nickel	646		619	670		US15
Polished Nickel	645		618	669		US14
Satin Stainless Steel		630				US32D
Polished Stainless Steel		629				US32
Satin Chrome	652		626	702		US26D
Polished Chrome	651		625	672		US26
Satin Brass	633		606	667	678	US4
Polished 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

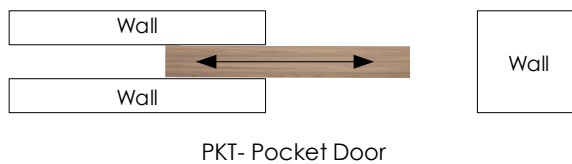
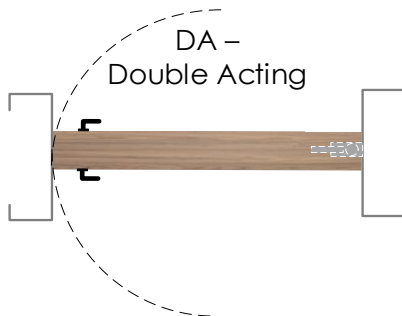
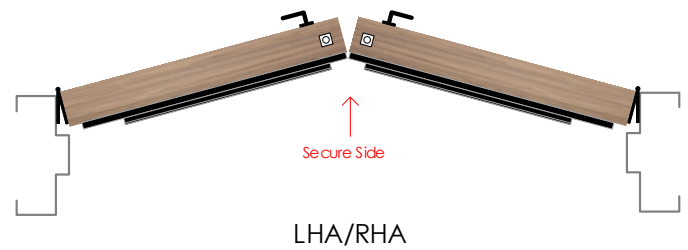
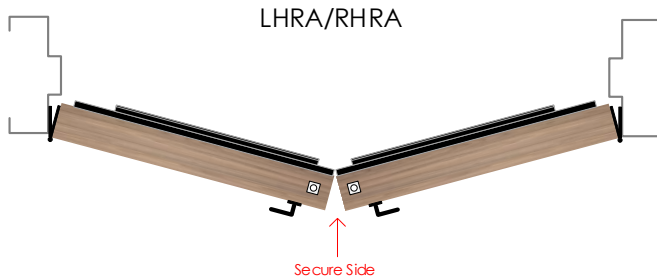
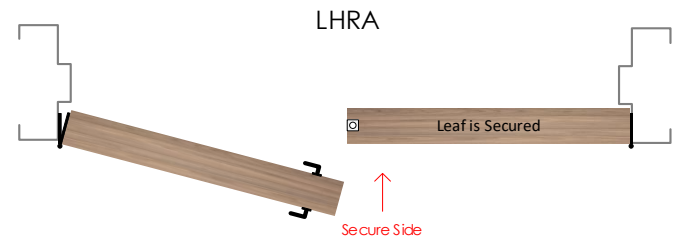
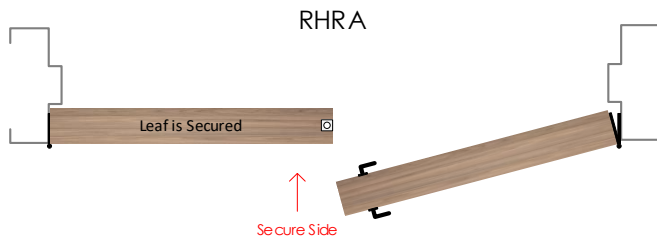
Door Handing's

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
Butt Hinge	CB1900	Best		
Lockset	L9000 series	Schlage		
Exit Device	98 series	Von Duprin		
Electric Strike	1500 / 1006	HES		
Overhead Stop	100 series	Glynn Johnson		
Door Closer	4040XP series	LCN		
Auto Door Operator	SW200i	Besam		
ICU Sliding Doors	Versamax 2.0 ICU Sliding Door	Besam		
Touchless Restroom Control Kit	CX-WC16	Camden		
Emergency Call Kit	CX-WEC10K2	Camden		
Power Transfer	EPT10	Von Duprin		
Double Acting Continuous Hinge	DSH1000	Pemko		
Emergency Release Stop	ERS	Pemko		
Kick / Armour Plate	K10 series	Standard Metal		
Edge Guard	K42	Standard Metal		
Full Frame Guard	K50	Standard Metal		
Flush Bolt	F65UL	Standard Metal		
Door Bottom	CT-54	KN Crowder		
Smoke / Sound Seal	W-66	KN Crowder		
Door Sweep	W-24S	KN Crowder		
Touchless Actuator	CM-331/43S-SGLR	Camden		
Touchless Actuator	CM-331/42-SWSGLR	Camden		
Logic Relay	CX-33	Camden		
Sliding Door Kit	CCSF-JST	KN Crowder		
Elec. Sliding Door Lock	XGT-202-PD97 ATL 80-S7	Inox		

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
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
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:	Pair	Opening Size:	1 – 1067 & 1 - 508 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4502	Location:	Stretcher G4504	To	Ultrasound G4502	Handing:	LHA

Web Link
Site Verified

By Hardware Supplier						
6	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Flush Bolt	F65UL	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Classroom Lockset	L9070BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Overhead Stop	105F (With Hold Open)	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Door Closer	4040XP REG ST-1630	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Drop Plate	4040XP-18TJ	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 1150 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10A 864 x 1150 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 470 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10A 864 x 470 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Door Edge Guard	K42F x 2134 x 3M Tape (Size to Suit Door Height)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
2	Frame Guard	K51F x 1220 x 3M Tape (Width to Suit Jamb Profile)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>

1	Wall Stop	S121 x C32D	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Astragal	Welded Z Astragal by Door Supplier				<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 8000	Black	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 1067	630 / US32D / Satin Stainless Steel	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 508	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
By Owner						
1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>

-----End of Heading-----

Heading# 2

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4503	Location:	Stretcher G4504	To	WR G4503	Handing:	DA

Web Link

Site Verified

By Hardware Supplier						
1	Double Acting Cont. Hinge	DSH1000 x 2135	628 / US28 / Clear Anodized	Pemko		<input type="checkbox"/>
1	Emergency Release Stop	ERS-M-2135-C-Notch x HT	628 / US28 / Clear Anodized	Pemko		<input type="checkbox"/>
1	Privacy Set	L9040 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Overhead Stop	104S (notch both sides of door)	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 852 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 852 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 890	630 / US32D / Satin Stainless Steel	KN Crowder		<input type="checkbox"/>

-----End of Heading-----



Heading#

3


Opening Information					
Opening Type:	Single	Opening Size:	1220 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4504	Location:	Ex Corridor G4-18	To	Strecher G4504	Handing:	LH

Tie hold open into fire alarm.

Web Link

Site Verified

By Hardware Supplier						
3	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		<input type="checkbox"/>
1	Door Closer	4040XP REG ST-1630	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Drop Plate	4040XP-18TJ	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Magnetic Hold Open	SEM 7830	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 1150 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10A 864 x 1150 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
2	Edge Guard	K42 x 864	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
4	Full Frame Guard	K50 x 864 (Cut for Hinge)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5800	Black	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 1220	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
By Security Supplier						
1	Card Reader	By Security Supplier to Suit Existing System				<input type="checkbox"/>
1	Door Contact	By Security Supplier				<input type="checkbox"/>
1	Request to Exit	By Security Supplier				<input type="checkbox"/>
1	Power Supply	By Security Supplier				<input type="checkbox"/>

1	Access Controller	By Security Supplier				<input type="checkbox"/>
By Owner						
1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>

-----End of Heading-----



Heading#

4

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4505	Location:	Ex Corridor G4-17	To	Team Room G4505	Handing:	LH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		<input type="checkbox"/>
1	Door Closer	4040XP REG ST-1630	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Drop Plate	4040XP-18TJ	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Overhead Stop	104S	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 927 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 927 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	Black	KN Crowder		<input type="checkbox"/>
1	Auto Door Bottom	CT-54 x 965	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

By Security Supplier

1	Card Reader	By Security Supplier to Suit Existing System				<input type="checkbox"/>
1	Door Contact	By Security Supplier				<input type="checkbox"/>
1	Request to Exit	By Security Supplier				<input type="checkbox"/>
1	Power Supply	By Security Supplier				<input type="checkbox"/>
1	Access Controller	By Security Supplier				<input type="checkbox"/>

By Owner

1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>
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SPYDER SC

-----End of Heading-----



Heading#

5

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4507	Location:	Ex Corridor G6-17	To	Control G4507	Handing:	RH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		<input type="checkbox"/>
1	Door Closer	4040XP REG ST-1630	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Drop Plate	4040XP-18TJ	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Overhead Stop	104S	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 927 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 927 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	Black	KN Crowder		<input type="checkbox"/>
1	Auto Door Bottom	CT-51 x 965	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

By Security Supplier

1	Card Reader	By Security Supplier to Suit Existing System				<input type="checkbox"/>
1	Door Contact	By Security Supplier				<input type="checkbox"/>
1	Request to Exit	By Security Supplier				<input type="checkbox"/>
1	Power Supply	By Security Supplier				<input type="checkbox"/>
1	Access Controller	By Security Supplier				<input type="checkbox"/>

By Owner

SPYDER SC

1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>
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.....End of Heading.....

Heading#









6

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	SCWD-LL	Frame Material:	HMF-LL	Fire Rating	None

1	Total Openings							
1	Door#	G4507A	Location:	Control G4507	To	CT C4508	Handing:	RH

Web Link

Site Verified

By Hardware Supplier						
4	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Passage Latchset	L9010 x 17B x XL11-515	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Door Closer	4040XP PA	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Overhead Stop	104S	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 927 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 927 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	Black	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 965	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

.....End of Heading.....

lead lined door



Heading#

7

Opening Information					
Opening Type:	Pair	Opening Size:	1-1220 / 1-610 x 2134 x 45	STC Rating	None
Door Material:	HMD-LL	Frame Material:	HMF-LL	Fire Rating	None

1	Total Openings							
1	Door#	G4508	Location:	Ex Corridor G6-17	To	CT G4508	Handing:	LHA

lead lined door

Is a door coordinator required?








Web Link

Site Verified

By Hardware Supplier

8	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Power Transfer	EPT-10	630 / US32D / Satin Stainless Steel	Von Duprin		<input type="checkbox"/>
1	Combination Flush Bolt	FB51T	630 / US32D / Satin Stainless Steel	Ives		<input type="checkbox"/>
1	Latch Retraction Storeroom Lockset	L9692EL-BDC 17B x XL11-515	630 / US32D / Satin Stainless Steel	Schlage		<input type="checkbox"/>
1	Overhead Stop	106S	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Wall Stop	S121 (Inactive Door)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10F – 864 x 1150 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10F – 864 x 572 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A – 152 x 1150 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A – 152 x 572 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Door Edge Guard	K42F x 2134 x 3M Tape (Size to Suit Door Height)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
2	Frame Guard	K51F x 1220 x 3M Tape (Width to Suit Jamb Profile)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Gasketing	W-66 X 8500	Black	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 1220	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 610	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

SPYDER SC

1	Astragal	By Lead Lined Door Manufacturer	600 / USP / Primed			<input type="checkbox"/>
2	Door Contact	DPS-M-BK	Black	Securitron		<input type="checkbox"/>
1	Power Supply	PS902 x 900-2RS	Black	Von Duprin		<input type="checkbox"/>
By Automatics Supplier						
1	Auto Operator	SW200i Pull x 1296mm header	689 / US28 / Painted Aluminum	Besam		<input type="checkbox"/>
2	Touchless Button	CM-331/42-SWSGLR	630 / US32D / Satin Stainless Steel	Camden		<input type="checkbox"/>
1	Logic Relay	CX-33		Camden		<input type="checkbox"/>
1	Safety Sensor Kit	10LZRFLATSCAN-SWB	Black	BEA		<input type="checkbox"/>
1	DOME LIGHT	X-RAY IN USE LIGHT				

Notes:

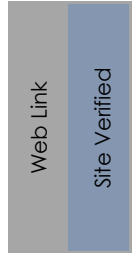
- 120VAC is required at the head of the door for all barrier free door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm with auto operator supplier the location and quantity of wires required prior to pulling wires.

-----End of Heading-----

Heading# 8

Opening Information					
Opening Type:	Sliding	Opening Size:	15'4	STC Rating	None
Door Material:	AL	Frame Material:	AL	Fire Rating	None

1	Total Openings							
1	Door#	G4509	Location:	CT C4508	To	CT Equip G4509	Handing:	RH



***ALL HARDWARE PROVIDED BY SLIDING ALUMINUM DOOR/SCREEN SYSTEM PROVIDER**

.....End of Heading.....



Heading#

9

Opening Information					
Opening Type:	Pair	Opening Size:	1-1067/ 1-457 x 2134 x 45	STC Rating	None
Door Material:	HMD-LL	Frame Material:	HMF-LL	Fire Rating	None





1	Total Openings							
1	Door#	G4511	Location:	Ex Corridor G6-17	To	X-RAY G4511	Handing:	RHA

Door holder and stop?

Web Link

Site Verified

By Hardware Supplier						
8	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Power Transfer	EPT-10	630 / US32D / Satin Stainless Steel	Von Duprin		<input type="checkbox"/>
1	Combination Flush Bolt	FB51T	630 / US32D / Satin Stainless Steel	Ives		<input type="checkbox"/>
1	Latch Retraction Storeroom Lockset	L9092EL-BDC 17B x XL11-51573	630 / US32D / Satin Stainless Steel	Schlage		<input type="checkbox"/>
1	Overhead Stop	6ADJ-536	689 / US28 / Painted Aluminum	Rixson		<input type="checkbox"/>
1	Closer	74-281-O	689 / US28 / Painted Aluminum	Sargent		<input type="checkbox"/>
1	Wall Stop	S121 (Inactive Door)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10F – 864 x 997 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10F – 864 x 419 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A – 152 x 997 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A – 152 x 419 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Door Edge Guard	K42F x 2134 x 3M Tape (Size to Suit Door Height)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
2	Frame Guard	K51F x 1220 x 3M Tape (Width to Suit Jamb Profile)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Gasketing	W-66 X 8500	Black	KN Crowder		<input type="checkbox"/>

1	Door Sweep	W-24S-SS x 1067	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 457	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
1	Astragal	By Lead Lined Door Manufacturer	600 / USP / Primed			<input type="checkbox"/>
2	Door Contact	DPS-M-BK	Black	Securitron		<input type="checkbox"/>
1	Power Supply	PS902 x 900-2RS	Black	Von Duprin		<input type="checkbox"/>
1	DOME LIGHT	X-RAY IN USE LIGHT				

-----End of Heading-----



Heading#

10

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4512	Location:	Ex Corridor G6-17	To	Control G4512	Handing:	RH

Door holder and stop

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		<input type="checkbox"/>
1	Door Closer	4040XP REG ST-1630	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Drop Plate	4040XP-18TJ	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Overhead Stop	104S	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 927 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 927 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	Black	KN Crowder		<input type="checkbox"/>
1	Auto Door Bottom	CT-51 x 965	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

By Security Supplier

1	Card Reader	By Security Supplier to Suit Existing System				<input type="checkbox"/>
1	Door Contact	By Security Supplier				<input type="checkbox"/>
1	Request to Exit	By Security Supplier				<input type="checkbox"/>
1	Power Supply	By Security Supplier				<input type="checkbox"/>
1	Access Controller	By Security Supplier				<input type="checkbox"/>

By Owner

1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>
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SPYDER SC

-----End of Heading-----



Heading# 11







Opening Information					
Opening Type:	Pair	Opening Size:	1-1067/ 1-457 x 2134 x 45	STC Rating	None
Door Material:	HMD-LL	Frame Material:	HMF-LL	Fire Rating	None

1	Total Openings							
1	Door#	G4513	Location:	Ex Corridor G6-17	To	X-RAY G4513	Handing:	LHA

Door holder and stop?

Web Link
Site Verified

By Hardware Supplier						
8	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Power Transfer	EPT-10	630 / US32D / Satin Stainless Steel	Von Duprin		<input type="checkbox"/>
1	Combination Flush Bolt	FB51T	630 / US32D / Satin Stainless Steel	Ives		<input type="checkbox"/>
1	Latch Retraction Storeroom Lockset	L9092EL-BDC 17B x XL11-51573	630 / US32D / Satin Stainless Steel	Schlage		<input type="checkbox"/>
1	Overhead Stop	6ADJ-536	689 / US28 / Painted Aluminum	Rixson		<input type="checkbox"/>
1	Closer	74-281-O	689 / US28 / Painted Aluminum	Sargent		<input type="checkbox"/>
1	Wall Stop	S121 (Inactive Door)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10F – 864 x 997 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Armour Plate	K10F – 864 x 419 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A – 152 x 997 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A – 152 x 419 x 3M Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Door Edge Guard	K42F x 2134 x 3M Tape (Size to Suit Door Height)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>

2	Frame Guard	K51F x 1220 x 3M Tape (Width to Suit Jamb Profile)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Gasketing	W-66 X 8500	Black	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 1067	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 457	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>
1	Astragal	By Lead Lined Door Manufacturer	600 / USP / Primed			<input type="checkbox"/>
2	Door Contact	DPS-M-BK	Black	Securitron		<input type="checkbox"/>
1	Power Supply	PS902 x 900-2RS	Black	Von Duprin		<input type="checkbox"/>
1	DOME LIGHT	X-RAY IN USE LIGHT				

-----End of Heading-----



Heading#

12

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4516	Location:	Ex Corridor	To	existing Staff WR G4516	Handing:	LH

Web Link

Site Verified

By Hardware Supplier

3	Heavy Weight Butt Hinge	HT-CB1901 127 x 114	652 / US26D / Satin Chrome	Best		<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Electric Strike	1006CS	630 / US32D / Satin Stainless Steel	HES		<input type="checkbox"/>
1	Door Closer	4040XP REG ST-1630	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Drop Plate	4040XP-18TJ	689 / US28 / Painted Aluminum	LCN		<input type="checkbox"/>
1	Overhead Stop	104S	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 927 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 927 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	Black	KN Crowder		<input type="checkbox"/>
1	Auto Door Bottom	CT-51 x 965	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

By Security Supplier

1	Card Reader	By Security Supplier to Suit Existing System				<input type="checkbox"/>
1	Door Contact	By Security Supplier				<input type="checkbox"/>
1	Request to Exit	By Security Supplier				<input type="checkbox"/>
1	Power Supply	By Security Supplier				<input type="checkbox"/>
1	Access Controller	By Security Supplier				<input type="checkbox"/>
1	Push to Lock Button	By Security Supplier (Disables outside CR)				<input type="checkbox"/>

By Owner

SPYDER SC

1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>
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-----End of Heading-----



Heading# 13

Opening Information					
Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1	Total Openings							
1	Door#	G4518	Location:	Waiting Area Fracture G4517	To	WR G4518	Handing:	DA

Web Link

Site Verified

By Hardware Supplier

1	Double Acting Cont. Hinge	DSH1000 x 2135	628 / US28 / Clear Anodized	Pemko		<input type="checkbox"/>
1	Emergency Release Stop	ERS-M-2135-C-Notch x HT	628 / US28 / Clear Anodized	Pemko		<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC 17B	626 / US26D / Satin Chrome	Schlage		<input type="checkbox"/>
1	Electric Strike	1500C (fail Safe)	630 / US32D / Satin Stainless Steel	HES		<input type="checkbox"/>
1	Overhead Stop	104S (notch both sides of door)	630 / US32D / Satin Stainless Steel	Glynn Johnson		<input type="checkbox"/>
1	Kick Plate	K10A 250 x 852 Tape	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Mop Plate	K10A 150 x 852 Tape (Pull Side)	630 / US32D / Satin Stainless Steel	Standard Metal		<input type="checkbox"/>
1	Door Sweep	W-24S-SS x 965	628 / US28 / Clear Anodized	KN Crowder		<input type="checkbox"/>

By Automatics Supplier

1	Auto Operator	SW200i DBL Acting x 1141mm header	689 / US28 / Painted Aluminum	Besam		<input type="checkbox"/>
1	Touchless Restroom Control Kit	CX-WC16	630 / US32D / Satin Stainless Steel	Camden		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630 / US32D / Satin Stainless Steel	Camden		<input type="checkbox"/>

By Owner

1	Permanent Cylinder	By SHN Locksmith	626 / US26D / Satin Chrome	Best		<input type="checkbox"/>
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SPYDER SC

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-----

END OF SCHEDULE

Glass and Glazing

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Glass and glazing.
- .2 Section excludes:
 - .1 X-ray protective glass or leaded glass: in accordance with Section 13 49 00.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Show details of each type of glazing system in conjunction with the framing system indicating type of glass, sizes, shapes, glazing material and quantity. Show details indicating glazing material, glazing thickness, bite on the glass and glass edge clearance.
 - .2 For glass scheduled or indicated as engineered and glass to serve as guards in accordance with building code, shop drawings to be engineered shop drawings.
 - .3 Indicate analysis of glass including maximum deflection and allowable stresses from imposed dead/live loads and thermal loads.
- .4 Samples:
 - .1 Submit 305 mm (12") square samples of each type of glass indicated except for clear monolithic glass products, and 305 mm (12") long samples of each color required, except black, for each type of sealant or gasket exposed to view.
 - .1 Submit 3 control samples for each glass type showing maximum range of visible difference between units for the *Project*.
 - .2 Submit samples of glass showing each type of shape and finish of glass edge for exposed glass edges.
- .5 Test and evaluation reports:
 - .1 Obtain compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealant as well as other glazing materials including insulating units.
- .6 Manufacturer reports:

Glass and Glazing

- .1 Submit glass fabricator's product information and structural calculations indicating compliance with glazing standards established by the Glass Association of North America (GANA). Submittal to include thermal stress and structural load analysis of the proposed glass types, configuration and sizes.
- .7 Submit sample glazing warranty.
- .8 Submit letter from insulating glass unit fabricator that insulating glass units supplied will bear the certification mark of IGMAC or IGCC/IGMA.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for glass and glazing for incorporation into the operating and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers: Fabrication processes, including low emissivity, insulating, and tempering shall be manufactured by a single manufacturer with a minimum of ten (10) years of fabrication experience and meet ANSI / ASQC 9002 1994.
 - .2 Installers / applicators / erectors:
 - .1 *Subcontractor:*
 - .1 Shall be thoroughly trained and experienced in skills required.
 - .2 Shall be completely familiar with referenced standards and requirements of the work of this section.
 - .3 Shall personally direct installation performed under this section.
 - .2 Foreperson experience: Shall have 10 years' experience, minimum, as glazing mechanic.
 - .3 Glazing mechanic experience: Shall have 3 years' experience, minimum, as glazers.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
 - .1 Special product warranty for tempered glass products:
 - .1 Warrant that tempered glass will not break spontaneously as a result of Nickel Sulfide (NiS) inclusions at a rate exceeding 0.8% (8/1000) for a period of five years from the date of manufacture. Warranty shall be manufacturer's standard form in which tempered-glass manufacturer agrees to replace tempered-glass units.
 - .2 Duration: 5 years from date of manufacture for fully tempered glass.

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- .2 Special product warranty for insulating glass unit products:
 - .1 Provide a written warranty from date of manufacture for sealed insulating glass units. Warranty shall cover the following:
 - .1 Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - .2 Duration: 10 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 General:
 - .1 Publications: Comply with recommendations in the publications below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section.
 - .1 GANA Glazing Manual.
 - .2 GANA Engineering Standards Manual.
 - .3 GANA Laminated Glazing Reference Manual.
 - .4 GANA Sealant Manual.
- .2 Regulatory requirements:
 - .1 Fire rated glass:
 - .1 Each lite shall bear permanent, non-removable label by accredited and recognized independent testing agency certifying it for use in tested and rated fire protective assemblies.
- .3 Glass strength:
 - .1 Design glass in conformance with the building code and the following requirements:
 - .1 Minimum thickness of annealed or heat-treated glass products to be selected so the worst case probability of failure does not exceed the following:
 - .1 8 breaks per 1000 for glass installed vertically less than 15 degrees from the vertical plane and under wind action.
 - .2 Maximum lateral deflection; insulating glass units:
 - .1 For insulating glass units supported on four edges, limit centre-of-glass deflection at design wind pressure to not more than 1/175 times the long-side length or 19 mm (3/4") maximum.

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- .2 Provide annealed, heat strengthened, and tempered lights where required by the building code, and where required for the various solar exposures on the building.
- .3 Glass thicknesses and glass types specified, indicated, or scheduled in the *Contract Documents* are minimums required. Modify glass thickness as required to satisfy design and building code requirements, and requirements of authorities having jurisdiction, and any such modifications shall be clearly indicated on shop drawings.
- .4 Thermal and optical performance: Provide glass products with performance properties specified or published by glass manufacturer where not specified. Performance properties to be manufacturer's published data as determined according to the following procedures:
 - .1 Centre of glass U-Value: National Fenestration Rating Council (NFRC) 100 methodology using Flixo Pro (version 8.0 or later) or LBNL WINDOW 7 computer program.
 - .2 Centre of glass solar heat gain coefficient: NFRC 200 methodology using LBNL-35298 WINDOW 5.2 computer program.
 - .3 Visible light transmittance: NFRC 200 methodology.
 - .4 Solar optical properties: NFRC 300 or LBNL Optics.
- .5 Provide glass *Products* of uniform appearance, reflectivity, hue, shade, visible light transmittance, and colour when viewed from distance of 3 m (10 ft) to 30 m (100 ft) perpendicular to the glass or from 45 degree angle to the glass.
- .6 Protect laminated glass interlayer from damage or discolouration resulting from contact with deleterious and incompatible sealants, substances, and materials. Comply with manufacturer's recommended installation requirements.

2.2 Glass Manufacturers

- .1 Subject to compliance with the requirements of the *Contract Documents*, provide primary glass by one of the following float glass manufacturers:
 - .1 Cardinal Glass Industries.
 - .2 Guardian Industries, LLC.
 - .3 Pilkington North America.
 - .4 Vitro Architectural Glass.

2.3 Glass Materials

- .1 General:
 - .1 Single source responsibility: Provide materials from a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source and manufacturing plant for each type and class required.
- .2 Insulating glass units:

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- .1 Warm edge, hermetically sealed, in accordance with CAN/CGSB 12.8-97 or ASTM E2190-10, minimum 12 mm (1/2") cavity, 90% argon/10% air filled, double sealed edges (primary to be polyisobutylene, secondary to be polysulphide, desiccant filled warm edge spacer (splice connectors at corner of each glass unit).
 - .1 Warm edge spacer:
 - .1 Stainless steel: RPM Rollforming 'ST-2000', Allmetal 'SST', Fenzi 'Rolltech Stainless Steel'.
 - .2 Colour: to be later selected by Consultant.
- .2 Grey coloured polyisobutylene shall not be acceptable.
- .3 Edge delete low 'E' coating down to bare glass in accordance with manufacturer's written requirements. Deletion shall be continuous around the entire periphery of glass edges to minimum deletion width from edge of glass to at least 50% through the primary sealant bead width.
- .4 Set spacer bar evenly into glass units to maximum variation of +/- 2.0 mm (0.080")/length of spacer bar. Primary sealant shall not extend past spacer bar greater than 1.5 mm (0.060").
- .5 IGMAC or IGCC/IGMA certified, permanently marked either on spacers or on at least one component lite of units with appropriate certification label.
- .1 Low 'E' coating:
 - .1 Triple silver type, neutral appearance.
 - .2 Overall insulating glass unit performance, based on glazing unit performance without patterned glass coatings:
 - .1 SHGC 0.30 maximum.
 - .2 VLT 55% minimum.
 - .3 Basis of design: Vitro 'Solarban 70'.
- .2 Glass thickness: 6 mm (1/4") minimum, and as required to suit design requirements.
- .3 Glass colour: clear, unless otherwise indicated.
- .3 Annealed (float) glass:
 - .1 Clear, annealed glass, 6 mm (1/4") thick minimum, in accordance with CAN/CGSB 12.3-M91, Glazing Quality.
- .4 Heat treated (tempered or heat strengthened) float glass:
 - .1 In accordance with CAN/CGSB 12.1-M90.
 - .2 Minimum thickness: 6 mm (1/4").
 - .3 Fabrication process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 - .4 For uncoated glass, comply with requirements for Condition A in accordance with ASTM C1048-18.

Glass and Glazing

- .5 For coated vision glass, comply with requirements for Condition C (other coated glass) in accordance with ASTM C1048-18.
- .6 Heat strengthened glass shall have surface compression of 24-52 MPa (3,500-7,500 psi).

2.4 Fire-Rated Glass

- .1 Fire-protective rated, impact safety resistant glass, non-wired:
 - .1 In accordance with CAN/ULC S104/106, CPSC 16 CFR 1201 (Cat. I and II).
 - .2 Film faced and non-film faced glazing:
 - .1 Fire-protective-rated and impact safety-rated, transparent glazing material and listed for use in doors, sidelites, transoms, and borrowed lites in both interior and exterior applications, not functioning as a barrier.
 - .2 Surface finish:
 - .1 Premium Grade: transparent glass, polished for superior optical clarity.
 - .3 Acceptable *Product*:
 - .1 Safti First 'SuperLite II-XL'.
 - .2 Saint Gobain 'Keralite Select F'.
 - .3 Schott 'Pyran Platinum F'.
 - .4 Technical Glass Products 'FireLite NT'.
 - .3 Non-film faced glazing:
 - .1 Fire-protective-rated and impact safety-rated, transparent glazing material with no exposed film facing, and listed for use in doors, sidelites, transoms, and borrowed lites in both interior and exterior applications, not functioning as a barrier to heat.
 - .2 Surface finish:
 - .1 Premium Grade: transparent glass, polished for superior optical clarity.
 - .3 Acceptable *Product*:
 - .1 Safti First 'SuperLite II-XL'.
 - .2 Saint Gobain 'Keralite Select L'.
 - .3 Schott 'Pyran Platinum L'.
 - .4 Technical Glass Products 'FireLite Plus'.

2.5 Glazing Materials (Non-Fire Rated)

- .1 Glazing materials; general: Select glazing sealants, tapes, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

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- .2 Glazing gaskets: Moulded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:
 - .1 Preformed silicone to ASTM C1115-17(2022).
- .3 Setting blocks: Moulded or extruded material with Shore, Type A Durometer hardness of 85, plus or minus 5, made from the following:
 - .1 Preformed silicone to ASTM C1115-17(2022).
- .4 Spacers: Moulded or extruded blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated made from the following:
 - .1 Preformed silicone to ASTM C1115-17(2022).
- .5 Edge blocks: Moulded or extruded material of hardness needed to limit glass lateral movement (side walking) made from the following:
 - .1 Preformed silicone to ASTM C1115-17(2022).
- .6 Cleaners, primers and sealers: Type recommended by sealant or gasket manufacturer.
- .7 Polyurethane foam glazing tape:
 - .1 High density, closed-cell, flexible, non-extruding tape, adhesive backed one side only; recommended by manufacturer for exterior applications with nominal pressure in glazing channel.
 - .2 Acceptable *Products*: As recommended by manufacturer suitable for conditions of application and use.
- .8 Silicone glazing (Weatherseal) sealant:
 - .1 Non-staining, low dirt pick-up, medium-modulus, neutral-curing silicone sealant; complying with ASTM C920-14, Type M or S, Grade NS, Class 50.
 - .2 SWRI Validation.
 - .3 Colour: to later selection by *Consultant* from full range.

2.6 Fire Rated Glazing Accessories

- .1 Glazing tape; fire-rated glass (non-wired):
 - .1 Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air and vapour seal.
- .2 Silicone sealant: One-part neutral curing silicone, medium modulus sealant, to ASTM C920-11, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.
 - .1 Acceptable *Products*:
 - .1 DOWSIL '795'.
 - .2 Momentive 'Silglaze-II 2800'.

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.3 Tremco 'Spectrem 2'.

- .3 Setting blocks: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.
- .4 Cleaners, primers, and sealers: Type recommended by manufacturer of glass and gaskets.

2.7 Fabrication of Glazing Units

- .1 Fabricate glazing units in sizes required to fit openings, 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 system performance requirements.
 - .1 Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - .2 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.
 - .3 Grind smooth and chamfer, and polish exposed glass edges and corners, unless otherwise indicated.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine framing, glazing channels, and stops, with glazing installer present, for compliance with the following:
 - .1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - .2 Inspect butt and mitre joints in framing. Seal joints found to be open with a compatible sealant prior to glazing.
 - .3 Glazing pockets and surfaces are free of dust, construction debris, and contaminants.
 - .4 Presence and functioning of weep systems.
 - .5 Minimum required face and edge clearances as per FGIA and GANA standards.
 - .6 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 will leave visible marks in the completed work.

Glass and Glazing

- .3 Clean contact surfaces with solvent and apply primers to surfaces to receive tapes and sealants in accordance with the manufacturer's requirements. Ensure surfaces are free of moisture and frost.

3.3 Glazing - General

- .1 Comply with combined written requirements 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 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 is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- .4 Clean glazing rebate surfaces of traces of dirt, dust, or other contaminants.
- .5 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- .6 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- .7 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- .8 Provide spacers for glass lites where length plus width is greater than 1270 mm (50").
 - .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 3.2 mm (1/8") minimum bite of spacers on glass and use thickness equal to sealant width.
- .9 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel.
- .10 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- .11 Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- .12 Glaze hollow metal doors and frames specified under work of Section 08 11 13 using tape glazing installation.
- .13 Install fire rated glazing in accordance with fire rated glazing *Product* manufacturer's written requirements and with current fire-resistance listing for each *Product*. Field cutting or tampering is not permissible.

Glass and Glazing

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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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 Centre 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 centres of openings.

3.5 Gasket Glazing (Dry)

- .1 Allow gaskets to relax and cut compression gaskets to lengths recommended by gasket manufacturer to fit openings to suit frame dimensions.
- .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: Centre 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 centres 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: Centre 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 Sealant Glazing (Wet)

- .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.

Glass and Glazing

3.7 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
 - .1 Performing random testing on:
 - .1 Argon gas concentration within insulating glass units.
 - .2 Surface compression tests on heat strengthened and tempered glass.
- .2 Manufacturer's field review to be in accordance with Section 01 45 00.

3.8 Adjusting and Cleaning

- .1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.
- .2 Final cleaning of glass in accordance with Section 01 78 00.

END OF SECTION

Applied Films

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Translucent film; applied to interior glazing.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Samples:
 - .1 Submit 3 - 200 mm x 200 mm (8" x 8") samples of each specified film type, pattern, colour, and transparency.

1.3 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for incorporation into operating and maintenance manuals.
 - .2 Instruct *Owner's* representative on proper care and maintenance for work of this section.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*: Shall have 5 years' experience, minimum, in application of *Products* specified.

1.5 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Applied film shall function as intended, and exhibit none of the following:
 - .1 Bubbling.
 - .2 Cracking.
 - .3 Crazing.

Applied Films

- .4 Delamination.
- .5 Discolouration.
- .6 Peeling.

2.2 Materials

- .1 Applied films; translucent:
 - .1 Acceptable *Products*:
 - .1 3M 'Fasara Gradation Series'.
 - .2 Substitutions: in accordance with Section 01 25 00.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine glass surfaces to receive film and verify that they are free from defects and imperfections which will affect the final appearance of installed film. Correct such deficiencies before starting film application.

3.2 Preparation

- .1 Prepare surfaces for film application in accordance with film manufacturer's written requirements.
- .2 Window and window framing will be cleaned thoroughly with a neutral cleaning solution. Surface of glass shall be bladed with industrial razor to ensure the removal of any foreign contaminants in accordance with film manufacturer's instructions.
- .3 Towelling or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

3.3 Installation

- .1 Applied film; interior application:
 - .1 Apply film to inside of the room surface of glazing units in accordance with film manufacturer's written requirements, applied plumb, true and level over clean glazing, without air bubbles, wrinkles, blisters, and other defects.
 - .2 After installation, applied film shall be flat with no obvious concentrations of moisture, free of creases, free of tears, with no moisture dimples when viewed under normal conditions.
 - .3 Film edges shall be cut neatly and square at a uniform distance of 1.5 mm (1/16") to 0.79 mm (1/32") from frame.

3.4 Adjusting and Cleaning

- .1 Clean film and glass surfaces so they are free of foreign matter using cleaners recommended by film manufacturer.

Applied Films

3.5 Protection

- .1 Comply with manufacturer's written requirements respecting protection.

END OF SECTION

Metal Supports for Gypsum and Cement Board

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Metal support systems for interior gypsum board assemblies.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the *Work* of this section, including additional data as may be required to demonstrate compliance with the *Contract Documents*.
- .3 Submit engineered shop drawings for the following:
 - .1 Seismic connections and restraint of wall and ceiling systems.
 - .2 Interior locations.
- .4 Test and evaluation reports:
 - .1 Submit certified test results for each required fire resistance rated assembly for work of this section.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 *Subcontractor*: Shall have 5 years' experience, minimum, in application of *Products*, systems, and assemblies specified.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements - Engineered Interior Metal Support Systems

- .1 Design system members to withstand own dead load and super-imposed dead loads to maximum allowable deflection of L/240 without permanent deformation.
- .2 Loads on walls acting as guards: Where the floor elevation on one side of a wall, including a shaftwall, is more than 600 mm (24") higher than the elevation of the floor or ground on the other side, design the wall to resist the lateral design loads prescribed in the building code or 0.5 kPa (0.07 PSI), whichever produces the greatest effect.
- .3 Metal support systems shall be engineered". Horizontal framing of ceilings shall be engineered. Indicated framing depths are maximum permitted unless approved otherwise by *Consultant*.
- .4 Seismic design: Design and install suspended ceiling system to withstand the effects of earthquake motions in accordance with ASTM E580/E580M-17.

Metal Supports for Gypsum and Cement Board

- .5 Seismic design requirements for partition and ceiling assemblies shall comply with building code requirements.

2.2 Performance/Design Requirements - Fire Resistance Rated Assemblies

- .1 Where gypsum board systems with fire resistance ratings are indicated or required, provide materials and installations that are identical with those of applicable assemblies tested by fire testing laboratories acceptable to authorities having jurisdiction.

2.3 Materials - General

- .1 For sheet metal *Products*: Sheet metal thickness indicated herein pertains to the minimum base steel thickness exclusive of coating.
- .2 Protective coatings for metal supports and framing:
 - .1 Minimum corrosion protection: Z120 (G40) ASTM A653/A653M-13.
- .3 Sheet metal screws shall have a minimum coating thickness of 0.008 mm (0.0003") of zinc. Other coatings providing equal or better corrosion protection may be used, subject to acceptance of *Consultant*.
- .4 Screws:
 - .1 Steel screws shall be equal to or exceed minimum diameter indicated on shop drawings.
 - .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
 - .3 Thread types and drilling capability shall conform to manufacturer's recommendations.

2.4 Partition Support Materials

- .1 Interior non-loadbearing channel stud framing: to ASTM C645-18; roll formed from 0.455 mm (0.0179") minimum thickness unless otherwise indicated or as recommended by gypsum board manufacturer, galvanized steel sheet. Provide service holes starting at 450 mm (18") from bottom, then 914 mm (36") on centre to top of studs.
 - .1 Steel studs at door jambs and where indicated: 1.720 mm (0.0677") minimum thickness.
 - .2 Steel studs; at backer plate locations: 0.836 mm (0.0329") minimum thickness.
- .2 Interior engineered metal stud framing: in accordance with ASTM C645-18; as indicated; roll formed from galvanized steel sheet, thickness as indicated on reviewed shop drawings but no less than 0.836 mm (0.0329"). Provide service holes starting at 450 mm (18") from bottom, then 914 mm (36") on centre to top of studs.
 - .1 Steel studs at door jambs and where indicated: 1.720 mm (0.0677") minimum thickness.
- .3 Interior floor and ceiling tracks (runners): to ASTM C645-18; in widths to suit stud sizes.
 - .1 Metal thickness: to match studs.

Metal Supports for Gypsum and Cement Board

- .2 For openings wider than 914 mm (36"), provide 0.836 mm (0.0329") minimum thickness for header.
- .4 Deflection track; for non-fire-rated assemblies: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in metal thickness not less than indicated for studs and in width to accommodate depth of studs.
- .5 Interior floor and ceiling track (runner) fasteners:
 - .1 To concrete and masonry: Use stub nails or power-driven fasteners.
 - .1 Power actuated fastening systems are not permitted.
 - .2 To suspended acoustic ceiling tile grid: Manufactured to fit applicable ceiling grid profile; CGC 'Partition Clip'.
- .6 Bracing channels: Minimum 19 mm x 10 mm x 1.087 mm (3/4" x 3/8" x 0.0428") cold rolled galvanized steel.

2.5 Ceiling Support Materials and Systems

- .1 General: Size ceiling support components to comply with ASTM C754-20 unless otherwise indicated, and as required for seismic design, connections and restraint of wall and ceiling assemblies.
- .2 Main runners: Steel channels, hot or cold rolled; Z180 (G60) galvanized.
- .3 Hanger wire: in accordance with ASTM A641/A641M-19, soft, Class 1 galvanized, minimum 4.064 mm (0.160", 8 AWG).
- .4 Hanger rods and flats: Mild steel with zinc coating, galvanized for exterior applications.
 - .1 General: Size devices for load imposed by completed system as determined in accordance with ASTM E488/E488M-22 and as required for seismic loading and restraint in accordance with engineered shop drawings.
 - .1 Power actuated fastening systems are not permitted.
 - .2 Screws, clips, bolts, concrete inserts or other devices for ceiling hangers whose suitability for use intended has been proven through standard construction practices or by certified test data.
 - .3 Fasteners exposed to weather, condensation, and corrosion: Zinc-plated or stainless steel fasteners in applicable product lines specified in preceding paragraphs.
 - .4 Hangers: in accordance with ASTM C754-18 for maximum ceiling area and loads to be supported.
 - .5 Interior concrete ceiling anchors:
 - .1 Acceptable *Products*:
 - .1 ITW Ramset/Red Head 'Dynabolt Sleeve Anchor TW-1614' or 'Redi-Drive Tie Drive' or 'Redi-Drive' with angle clip.

Metal Supports for Gypsum and Cement Board

- .2 ITW Ramset/Red Head 'Trubolt' or 'Dynabolt' anchors complete with galvanized angle clip.
- .3 Hilti 'Kwik-Bolt 3' and 'HHDCA 1/4 Ceiling Hangers'.
- .5 Tie wire: 1.19 mm (0.047", 18 AWG) minimum zinc coated, soft-annealed wire, to ASTM A641/A641M-19.
- .6 Furring anchorages: 1.62 mm (0.0637", 16 AWG) galvanized wire ties, manufacturer's standard wire type clips, bolts, nails or screws as recommended by furring manufacturer and complying with ASTM C754-20.
- .7 Runner (carry) channels: 1.367 mm (0.0538") thick cold rolled steel, primer painted or zinc coated for interior locations, to ASTM C754-20, with minimum 228 MPa yield strength:
 - .1 38 mm x 12.7 mm (1-1/2" x 1/2") where supported at centres of 914 mm (36") maximum.
 - .2 38 mm x 19 mm (1-1/2" x 3/4") where supported at centres of 1220 mm (48") maximum.
- .8 Provide compression posts and other system components as required for seismic anchorage, connections and restraint.

2.6 Furring

- .1 Furring channels: 0.836 mm (0.0329") minimum typical thickness, cold rolled steel, wiped coated, nominal size of 22 mm (7/8") depth x 35 mm (1-3/8") face, hat type with knurled face.
- .2 Z-furring members: Galvanized steel z-shaped furring members; ASTM A653/A653M-13, G60, 0.836 mm (0.0329") minimum thickness of base metal, of depth indicated, designed for mechanical attachment of insulation boards or blankets.
- .3 Fasteners for furring members: Type and size recommended by furring manufacturer for substrate and application indicated load rating and spacing to support materials carried by assembly as required for seismic loading and restraint in accordance with engineered shop drawings.

2.7 Accessories

- .1 Backer plates:
 - .1 Metal backer plates: Steel, galvanized; fastened to studs for attachment of surface mounted fittings and accessories minimum 150 mm (6") wide x length and width to suit size of items to be attached; x minimum base metal thickness as follows:
 - .1 0.836 mm (0.0329").
 - .2 1.087 mm (0.0428").
 - .3 1.367 mm (0.0538").
 - .2 Elimination of backer plates or direct attachment of accessories or equipment to studs will not be permitted.

Metal Supports for Gypsum and Cement Board

PART 3 - EXECUTION

3.1 Installation General

- .1 Comply with ASTM C754-20 and manufacturer's requirements, except as modified herein. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.
- .2 Provide and install studs, framing, shimming, and furring to provide proper support for gypsum board to achieve the following installation tolerances:
 - .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane.
 - .2 Do not exceed 10 mm (3/8") from drawings locations.
 - .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
 - .4 Install each framing member so fastening surfaces vary not more than 3.2 mm (1/8") from the plane formed by faces of adjacent framing.
 - .5 In double stud walls, do not bridge across studs on opposite sides of wall with gypsum board or metal cross bracing.
- .3 Give complete cooperation and direction to trades erecting framing and furring over which this work is applied. Coordinate finished joint location with framing.
- .4 Coordinate installation and cooperate with mechanical and electrical work to accommodate mechanical electrical items and any other work required to be incorporated into or coordinated with the partitions, ceiling and soffit systems.
 - .1 Where the presence of suspended ductwork or other mechanical or electrical services or devices above ceiling framing conflicts with ceiling framing suspension points from structure above, provide bridging framing below conflicting work as required to support ceiling framing on specified intervals.
 - .2 Do not suspend ceiling framing from mechanical or electrical suspension systems unless agreement is obtained in writing from engineer for *Subcontractor* installing such framing that additional imposed loads are acceptable; obtain *Consultant's* acceptance before proceeding.
- .5 Provide clearances between work of this section and structural elements to prevent transference of structural loads.
- .6 Do not bridge building expansion joints with steel framing or furring members. Independently frame both sides of joints with framing of furring members or as indicated.
- .7 Size framing systems according to manufacturer's engineered load tables, to meet allowable deflection without permanent deformation.
 - .1 Maximum allowable deflection: L/240.

3.2 Blocking

- .1 Attach to framing adequate backer plates to support the load of, and to withstand the withdrawal and shear forces imposed by, items installed upon the work of this section.

Metal Supports for Gypsum and Cement Board

3.3 Furring - General

- .1 Furring indicated in *Contract Documents* is schematic. Do not regard as exact or complete. Provide all necessary framing and furring to support gypsum board in accordance with manufacturers' specifications.
- .2 Shim furring as required to achieve required installation tolerances.
- .3 Leave finished work rigid, secure, square, level, plumb, curved to detailed radius and erected to maintain finish gypsum board line dimensions and contours. Make allowance for thermal movement.
- .4 Thermally separate metal studs from exterior concrete or masonry.

3.4 Suspended and Furred Ceilings

- .1 Arrange hangers for suspended gypsum board ceilings to provide support independent of walls, columns, pipes, ducts; erect plumb, and securely anchored to structural frame, or embed in concrete slabs.
- .2 Keep lateral braces at hangers back 450 mm (18") minimum unless otherwise noted.
- .3 Space hangers at 914 mm (36") on centre maximum along runner channels, and not more than 150 mm (6") from ends.
- .4 Space runner channels at 1220 mm (48") on centre, maximum, and not more than 150 mm (6") from boundary walls, interruptions of continuity, and changes in direction. Run channels transversely to structural framing members.
- .5 Where splices are necessary, lap members at least 200 mm (8") and wire each end with 2 loops. Avoid clustering or lining up of splices.
- .6 Attach to rod hangers by bending hanger sharply under bottom flange of runner, and securely wiring in place with saddle tie.
- .7 Erect cross furring channels transversely across runner channels at 400 mm (16") on centre maximum, 305 mm (12") on centre at fire rated assemblies, at not more than 150 mm (6") from boundary wall openings, interruptions in ceiling continuity, and changes in direction.
- .8 Secure furring channels to each support with purpose-made slips or wire tie. Splice joints by lapping channels and tying together.
- .9 Level cross furring channels to maximum tolerance of 3 mm in 3 m (1/8" in 10 ft).

3.5 Wall Furring

- .1 Install steel furring for braced walls, free standing walls, walls that are furred out as indicated.
- .2 Frame openings and around built-in equipment, cabinets, access panels, on 4 sides, with channels. Extend furring into reveals. Check clearances with equipment suppliers.
- .3 Provide bulkheads and boxed-in duct shafts, for beams, columns, pipes and around exposed services where indicated. Install 19 mm (3/4") channels at corners and at 305 mm (12") on centre.

Metal Supports for Gypsum and Cement Board

3.6 Metal Stud Partition Framing

- .1 Provide partition tracks (runners) at floor and underside of structural assembly and as follows:
 - .1 Align accurately and lay out according to partition layout.
 - .2 Secure runners to concrete, access flooring and to concrete slabs, as applicable, with screwed or shot fasteners located 50 mm (2") from each end and spaced at maximum 610 mm (24") on centre.
 - .3 At partition corners, extend one runner to end of corner and butt other runner to it, allowing necessary clearance for gypsum board thickness. Runners should not be mitred.
- .2 Unless otherwise indicated, place interior studs vertically at centres as follows:
 - .1 Provide studs at 400 mm (16") on centre, and as specially spaced in accordance with details indicated.
 - .2 Provide studs not more than 50 mm (2") from abutting walls, openings and each side of corners.
 - .3 Provide freedom for 19 mm (3/4") deflection under beams, structural slabs and the like to avoid transmission of structural loads to studs, or install 50 mm (2") leg ceiling tracks.
- .3 Install studs in tracks at floor and ceiling.
- .4 Where horizontal runs of service lines are scheduled to be installed, arrange with applicable trades and install studs simultaneously with services.
- .5 At openings in stud walls, erect track at head and sills to accommodate intermediate studs. At each end of track, cut out flanges, turn up web, and fasten to studs. Install intermediate studs above and below openings in same manner and spacing as wall studs. Install double studs at each jamb, and double tracks at head of door openings.
- .6 At partitions requiring fire rating, erect in accordance with requirements of listing.
- .7 Size studs, connections, and runners to carry loads according to stud manufacturer's load tables, at 24 kg/m² (5 lb/ft²) live load to meet maximum allowable deflection limits. Where depth of stud is indicated, size metal thickness to meet allowable deflection limits.
- .8 Provide three studs at corner and intermediate intersections of partitions.
- .9 Coordinate work with others installing horizontal runs of service lines so that work is done simultaneously. Where standard holes are too small for installed services, notch studs, and splice notched flanges with splice pieces 305 mm (12") longer than notches, each fastened with 2 screws.
- .10 Coordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .11 Coordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other sections.
- .12 Unless otherwise indicated, partitions, together with gypsum board facings, shall extend above ceilings to underside of structure above.

Metal Supports for Gypsum and Cement Board

.13 Chase walls:

- .1 Provide chase walls consisting of two parallel steel stud partitions.
- .2 Provide cross bracing consisting of metal furring, located at quarter points on each pair of studs. Attach cross bracing to studs with metal screws.

.14 Lateral support bracing channels:

- .1 Stiffen partitions over 3 m (10') in vertical span, at mid-height to maximum vertical spacing of 2440 mm (8') on centre, with at least one 19 mm (3/4") horizontal bracing channel, extending full length of partition, overlapping at least two stud spaces at ends of bracing channels.
- .2 Stiffen partitions at not more than 150 mm (6") from the top and bottom of openings and across two full stud spaces at each side of openings with horizontal bracing channel.

- .15 Install steel stud reinforcement 1.720 mm (0.0677") at door frames and brace above ceiling. Secure to top and bottom structure with angle brackets and anchors.

3.7 Control Joints

- .1 Control joints: in accordance with Section 09 29 00.

3.8 Concrete Anchors

- .1 Provide anchors and anchorage points in reinforced concrete floor slab underside in accordance with gypsum board manufacturer's suspension requirements and in accordance with reviewed shop drawings. Drill holes with carbide-tipped drill bits in accordance with ANSI B212.15-1994 (R2000).
- .2 Provide anchors; minimum installation depth, and method of expansion as recommended by the anchor manufacturer.

3.9 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .1 Field tests and inspections:
 - .1 Independent inspection and testing company will perform random load tests for ceiling anchor installation.
 - .2 Allow for testing of 1 in 20 anchors.

END OF SECTION

Gypsum and Cement Board

PART 1- GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Gypsum board; fire-rated, glass scrim faced.
 - .2 Gypsum board; interior mould and moisture resistant; glass scrim.
 - .3 Gypsum board accessories and miscellaneous related materials.
- .2 Section excludes:
 - .1 Lead foil for gypsum board X-ray shielding: in accordance with Section 13 49 00.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Indicate control joint locations.
 - .2 Indicate access door and panel locations including sizes and finishing requirements.
- .4 Fire-rated assembly listings and STC assembly ratings:
 - .1 Submit fire-rated assembly listings for each required fire resistance rated assembly for work of this section.
 - .2 Submit STC assembly ratings for each required STC rated assembly for work of this section.

1.3 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 09 29 00.
- .2 Handle gypsum panel products and accessories in accordance with GA 216-2024 and GA 801-2023.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*: Shall have 10 years' experience, minimum, in successful installation of work of type and quality indicated and specified.

Gypsum and Cement Board

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Single source responsibility: Obtain gypsum board products from a single manufacturer.
- .2 Fire resistance rating:
 - .1 Construct fire resistance rated assemblies in accordance with listing and CAN/ULC S101-14.
- .3 Paper-faced gypsum board: in accordance with ASTM C1396/C1396M-17.
- .4 Glass scrim gypsum board: in accordance with ASTM C1658/C1658M-13.
- .5 Fire rated in accordance with listed assemblies where indicated: Type X or Type C.

2.2 Gypsum Board Panels

- .1 Gypsum board; fire-rated; glass scrim:
 - .1 Acceptable *Products*:
 - .1 CertainTeed 'GlasRoc Interior Type X'.
 - .2 CGC 'Sheetrock Brand Glass-Mat Panels Mold Tough Firecode X'.
 - .3 Georgia-Pacific 'DensArmor Plus Fireguard and Fireguard C'.
- .2 Gypsum board; interior mould and moisture resistant, glass scrim:
 - .1 Resistant to mould growth with highest level of performance (score of 10) when tested to ASTM D3273-16.
 - .2 Acceptable *Products*:
 - .1 CGC 'Sheetrock Brand Glass-Mat Panels Mold Tough Regular/Firecode X'.
 - .2 Georgia-Pacific 'DensArmor Plus Fireguard High-Performance Interior Panel'.
 - .3 Substitutions: in accordance with Section 01 25 00.

2.3 Attachment Materials

- .1 Screws; for gypsum board: bugle head, fine thread, self-tapping, Type G, Type W, Type S, or Type S-12 to suit framing type and metal gauge in accordance with GA 216-13, with corrosion resistant finish, and in accordance with ASTM C1002-07/ASTM C954-11.
 - .1 Screw sizing:
 - .1 #6 x 25 mm (1") for single thickness board fastening.
 - .2 #6 x 32 mm (1-1/4") for single thickness 15.9 mm (5/8") board fastening.
 - .3 #7 x 41 mm (1 5/8") for double thickness board fastening.
 - .4 25.4 mm (1"), 41 mm (1-5/8"), and 51 mm (2") for triple thickness board fastening, at stud locations, and 38 mm (1-1/2") Type G screws for attaching face sheet to base sheets, in accordance with board manufacturer's written requirements.

Gypsum and Cement Board

- .2 Laminating adhesive; for gypsum panels: in accordance with gypsum board manufacturer's written installation requirements, to suit application.
 - .1 Use adhesives that have a VOC content of 50 g/L (1.8 oz/gal) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 Accessories

- .1 Accessories: in accordance with ASTM C1047-19 unless otherwise indicated, maximum length pieces per location. Flanges shall be free from dirt, grease, or other material that adversely affects the bond of joint treatment or decoration.
- .2 Trims:
 - .1 Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
 - .1 Shapes, including:
 - .1 Corner bead.
 - .1 Mechanically fastened corner beads at impact resistant gypsum walls.
 - .2 Control joints, certified by manufacturer for use at fire resistance rated assemblies as required.
 - .3 Aluminum trims: extruded accessories of profiles and dimensions as indicated.
 - .1 Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.
 - .2 Shapes:
 - .1 Z reveal.
 - .2 Reveals and moldings at round columns.
 - .3 Acceptable manufacturers:
 - .1 Fry Reglet.
 - .2 Gordon Interior Specialties.

2.5 Related Support Assemblies and Backer Plates

- .1 Metal support systems and backer plates at interior assemblies: in accordance with Section 09 22 00.

2.6 Joint Treatment Materials

- .1 General: Comply with ASTM C475/C475M-17(2022).
- .2 Joint tape: in accordance with manufacturer's written requirements.
- .3 Joint compound for interior gypsum board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - .1 Prefilling: Use setting-type compound as recommended by panel board manufacturer.

Gypsum and Cement Board

- .2 Embedding and first coat: Use setting-type or taping compound as recommended by panel board and trim accessory manufacturers.
- .3 Fill and finish coats: Use sanding type setting-type or taping compound as recommended by panel board manufacturer.

2.7 Acoustic Wall Assembly Materials

- .1 Acoustic sealant; concealed locations: to meet material requirements as listed in Part 9 of ASTM C919-22, including ASTM C834-10 or ASTM C920-14:
 - .1 Acceptable *Products*:
 - .1 Hilti Canada Corp 'CS-S SA Light'.
 - .2 Owens Corning 'QuietZone Acoustic Sealant'.
 - .3 Pecora 'BA-98'.
 - .4 Pecora 'AC-20'.
 - .5 Tremco 'Tremflex 834'.
 - .6 Substitutions: in accordance with Section 01 25 00.
 - .2 Acoustic sealant; exposed locations, acrylic:
 - .1 Acrylic/latex acoustic sealant, Type S, Grade NS, Class 12.5 to ASTM C920-14, maximum VOC content 60 g/L, non-hardening or ASTM C834-10, Type OP, Grade -18° C.
 - .2 For exposed sealants use paintable sealant products, do use non-skinning type products where they are exposed to view or where sealant products may deteriorate (stain or bleed into) into painted surfaces.
 - .3 Acceptable *Products*:
 - .1 Hilti Canada Corp 'CS-S SA Light'.
 - .2 Master Builders Solutions Canada 'MasterSeal NP 520'.
 - .3 Owens Corning 'QuietZone Acoustic Sealant'.
 - .4 Pecora 'AC20'.
 - .5 Tremco 'Tremflex 834'.
 - .3 Smoke and acoustic sealant; concealed and exposed locations, non-fire-rated acoustic assemblies:
 - .1 Acrylic smoke and acoustic sealant, in accordance with ASTM C834-10 maximum VOC content 60 g/L, paintable, Flame Spread Value of maximum 25 to CAN/ULC-S102-10.
 - .2 Sealant shall not deteriorate (stain or bleed into) painted surfaces.
 - .3 Acceptable *Products*:
 - .1 Hilti Canada Corp 'CS-S SA Light'.
 - .2 Tremco 'Tremstop Smoke & Sound Sealant'.

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- .3 Substitutions: in accordance with Section 01 25 00.
- .4 Acoustic sealant for plenum locations: Smoke-seal sealant with flame-spread not more than 25 and smoke developed classification not more than 50 in accordance with CAN/ULC-S102-10, in accordance with Section 07 84 00.
- .5 Acoustic compound: premixed perlite plaster.
- .6 Acoustic (sound attenuation) insulation:
 - .1 Mineral-fibre formaldehyde-free sound attenuation batts: in accordance with CAN/ULC S702-09, Type 1, non-combustible in accordance with CAN/ULC-S114-05, formaldehyde-free.
 - .1 Acceptable *Products*:
 - .1 CertainTeed 'Sustainable Insulation NoiseReducer'.
 - .2 Johns Manville 'Sound-SHIELD'.
 - .3 Owens-Corning 'QuietZone'.
 - .4 Rockwool 'AFB evo'.
 - .5 Substitutions: in accordance with Section 01 25 00.
 - .2 Fasteners: use mechanical fasteners where required to secure insulation into position in accordance with insulation manufacturer.

2.8 Access Doors

- .1 Access doors: in accordance with Divisions 21, 22, and 23 and Divisions 26, 27, and 28.

PART 3 - EXECUTION

3.1 Installation

- .1 General:
 - .1 Comply with ASTM C840-18b, GA 216-24, GA 600-24, and manufacturer's written requirements, except as otherwise indicated.
 - .2 Do not bridge building expansion joints with support system.
 - .3 Frame both sides of joints with furring and other supports as indicated.
- .2 Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1.6 mm (1/16") open space between boards. Do not force into place.
- .3 Cover both faces of stud partition framing with gypsum board in concealed spaces (above ceiling, and the like) unless otherwise indicated, except in chase walls which are properly braced internally.
- .4 Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cut-outs.
- .5 Apply components of fire-rated assemblies in conformance with indicated designs.

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- .6 Do not apply gypsum board in close proximity to hot pipes or heating ducts.
- .7 Install materials with the minimum number of joints. Tightly butt joints, without force, and neatly align them.
- .8 Frame openings on every side. Provide clearances with services.
- .9 Work shall include bulkheads over doors, frames, screens, and changes in ceiling levels, pipe space and as indicated.
- .10 Provide clearances between work of this section and structural elements to prevent transference of structural loads in accordance with Section 09 22 00.
- .11 Locate gypsum panel product joints so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.
- .12 Tolerances:
 - .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane in exposed surfaces, except at end joint between gypsum board panels.
 - .2 Do not exceed 10 mm (3/8") from indicated location.
 - .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
 - .4 Surface flatness shall not exceed 1.5 mm (1/16") within 305 mm (12") straight edge. For non-tapered-edge end joints between boards, measure flatness tolerance with end of straight end at centreline of joint.

3.2 Accessories

- .1 At external corners install corner trim secured to framing at 230 mm (9-1/16") on centre on both flanges with screw fasteners or clinch tool.
- .2 Secure casing trim at board edges where exposed to view, where board butts against other materials with no trim to conceal junction, at perimeter of ceiling surfaces at tops of partitions where they stop against continuous ceiling surfaces, and where indicated.
- .3 Erect accessories straight, plumb or level, rigid and at proper plane.
- .4 Use full length pieces.
- .5 Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners, free from rough edges. Secure in accordance with manufacturer's specifications unless otherwise required.
- .6 Installation tolerances:
 - .1 Alignment with board panels shall not exceed tolerances specified above.
 - .2 End joints shall be flush aligned to maximum offset of 0.5 mm (0.020").

3.3 Board Application - General

- .1 Before installation of board commences, ensure that internal services have been installed, tested, and approved; conduits, pipes, cables, and outlets are plugged, capped, or covered; and that fastenings and supports installed by others are in place.

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- .2 Extend board into door, window, and other openings, reveals, behind fitments, and other applied items and on metal stud partitions to structure above unless indicated otherwise.
- .3 Apply board with long dimension perpendicular to supports, unless otherwise indicated.
- .4 Locate joints on opposite sides of partitions on different studs, and at least 305 mm (12") from opening jambs.
- .5 Install board to minimize joints, and align end joints to be the least objectionable (where they are unavoidable), according to the indicated lighting design. Locate joints in ceilings where least prominently discerned, and never line them up with opening edges.
- .6 Form smooth joints at ends and at field cut edges of board panels.
- .7 Fasten board to metal support members by metal gypsum board screws, 9.5 mm (0.374") minimum to, and 12.7 mm (1/2") maximum from, centre of joints.
 - .1 Space screws:
 - .1 At fire rated board as per fire-rated assembly.
 - .2 At typical board walls at 400 mm (16") on centre at edges and field unless otherwise required.
 - .3 At typical board ceilings at 305 mm (12") on centre at edges and field unless otherwise required.
- .8 Offset gypsum board joints 150 mm (6") minimum from corners of openings.
- .9 Locate gypsum panel product joints so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

3.4 Interior Mould and Moisture Resistant Gypsum Board Application

- .1 Apply water resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

3.5 Acoustic Wall Assemblies

- .1 Acoustical sealant and plaster:
 - .1 Apply acoustical sealant to seal gaps in accordance with ASTM C919-22 and in accordance with the STC rated assembly.
 - .2 Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919-22 and with manufacturer's written requirements for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
 - .3 Clean substrate, remove debris and deleterious substances.
 - .4 Apply sealant to close voids; no leaks around track and gypsum board.
- .2 Sound attenuation insulation:
 - .1 Install sound attenuation insulation to fill cavity unless otherwise indicated.

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- .2 Trim insulation to provide close-fit contact to framing assemblies and fill the partition cavity or acoustic insulation assemblies to thicknesses specified or indicated.
- .3 Maintain air space between backs of sound attenuation insulation and back of opposite partition face layer, as applicable.
- .4 Cut insulation to provide close-fit contact around electrical boxes, pipes, and other obstructions and penetrations through and within acoustic assemblies.
- .5 Extend acoustic partition assemblies to underside of structure. Incorporate approved provision to prevent transmittance of structural deflection to partition assembly.
- .6 Staple sound attenuation insulation where required by manufacturer's installation requirements.
- .7 Where studs are not faced with gypsum board on both sides, mechanically fasten wire mesh to non-faced side of stud to retain insulation.
- .8 Mechanically attach sound attenuation insulation in wall assemblies where cavity of wall assembly is greater than 150 mm (6").
- .9 Secure insulation in such a manner that it will not sag or settle away from required locations.
- .3 Sound flanking paths:
 - .1 Where sound rated partition walls intersect non rated gypsum board partition walls, extend sound rated construction to completely close sound flanking paths through non rated construction in accordance with ASTM C919-12(2017) and with manufacturer's written requirements.
 - .2 Seal joints between face layers at vertical interior angles of intersecting partitions.

3.6 Finishing

- .1 Provide levels of gypsum board finish for locations as follows, in accordance with GA 214-21.
 - .1 Level 1: Ceiling plenum areas and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
 - .2 Level 2: Gypsum board substrate at applied hard surfaces, except remove tool marks and ridges.
 - .3 Level 4: Exposed gypsum board surfaces, except where another finish level is indicated.
- .2 Interior gypsum board:
 - .1 Prefill:
 - .1 Use setting-type joint compound. Mix joint compound according to manufacturer's written requirements.
 - .2 Fill joints between boards flush to top of eased or beveled edge.

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- .3 Fill joints of gypsum board above suspended ceilings in fire rated partitions.
- .4 Wipe off excess compound and allow compound to harden.
- .5 Prefill joint gaps not greater than 3.2 mm (1/8") with either ready-mix or setting type joint compound; prefill joint gaps greater than 3.2 mm (1/8") with setting-type joint compound.
- .2 Taping (Level 1):
 - .1 Butter taping compound into inside corners and joints.
 - .2 Centre tape over joints and press down into fresh compound.
 - .3 Remove excess compound.
 - .4 Tape joints of gypsum board above suspended ceilings.
- .3 First coat (Level 2):
 - .1 Use taping or all-purpose drying-type compound.
 - .2 Immediately after bedding tape, apply skim coat of compound and allow to dry completely in accordance with manufacturer's written requirements.
 - .3 Apply first coat of compound over flanges of trim and accessories, and over exposed fastener heads and finish level with board surface.
 - .4 Cover fastener heads and accessories with 1 coat of joint compound.
- .4 Second coat (Level 3): After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 50 mm (2") beyond edge of first coat.
 - .1 Cover fastener heads and accessories with total of 2 separate coats of joint compound.
- .5 Third coat (Level 4):
 - .1 After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound 50 mm (2") beyond edge of second coat.
 - .2 Allow third coat to dry. Apply additional compound, and touch-up and sand, to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.
 - .3 Finished joints will be accepted with a camber not greater than 1 mm (1/32") and shall be seamless, plumb, true and flush and with square, neat corners.
 - .4 Cover fastener heads and accessories with total of 3 separate coats of joint compound.
 - .5 Where new partitions align with existing gypsum board, apply required amount of skim coats to make transition inconspicuous from a distance of 914 mm (36").
 - .6 Completed installation at interface between new and existing construction shall provide an inconspicuous joint.

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- .3 Interior mold and moisture resistant gypsum board: Treat fastener heads and joints with setting-type joint compound.
 - .1 For joints to be covered with tile, apply tape and joint compound bedding coat and skim coat only; do not apply finish coats.
 - .2 Do not crown joints or leave excess compound on panels.
 - .3 Remove tool marks and ridges.
 - .4 For fastener heads to be covered with tile, apply one coat of joint compound.
- .4 Joint compound:
 - .1 Apply finish coat of compound feathering 75 to 100 mm (3" to 4") beyond tape edges.
 - .2 Feather coats onto adjoining surfaces so that camber is maximum 0.79 mm (1/32").
- .5 Trim:
 - .1 Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
 - .2 Install metal corner beads at external corners.
 - .3 Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi exposed, and where gypsum base terminates against dissimilar material.
 - .4 Erect beads plumb or level, with minimum joints.
- .6 Control joints:
 - .1 Provide control joints set in board facing. Support control joints with studs or furring channels on both sides of joint.
 - .2 Provide control joints in required locations
 - .1 Review control joint locations with *Consultant* prior to installation.
 - .3 Install control joints where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the building structure.
 - .4 Install control joints where a wall or partition runs in an uninterrupted straight plane exceeding 9100 mm (30 linear feet).
 - .5 Install control joints in interior ceilings:
 - .1 With perimeter relief:
 - .1 Linear dimensions between control joints shall not exceed 15000 mm (50 ft) and total area between control joints shall not exceed 230 m² (2500 ft²).
 - .2 Without perimeter relief:
 - .1 Linear dimensions between control joints shall not exceed 9100 mm (30 ft) and total area between control joints shall not exceed 84 m² (900 ft²).

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- .6 Install control joints where ceiling framing members change direction.
- .7 Where a control joint occurs in an acoustical or fire-rated system, provide blocking behind the control joint by using a backing material such as 16 mm (5/8") Type X gypsum panel products, mineral fibre, or other tested equivalent. Construct through-wall control joints at fire-rated assemblies in accordance with assembly listing requirements.
- .8 Line up control joints with joints in other construction or with centre lines of mullions, columns, piers, or similar building elements, where accepted by *Consultant*.
- .9 Install control joints straight and true.
- .10 Ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners. If control joints are not used, additional reinforcement is required at corners to distribute concentrated stresses.
- .11 Locate board joints so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

3.7 Fire Separations

- .1 Install fire-rated assemblies in accordance with assembly listing requirements in order to obtain fire ratings indicated and as required by authorities having jurisdiction.
- .2 Vertical bulkheads in ceiling spaces over fire rated partitions, doors and the like shall have same fire rating as the partition over which they occur. Such bulkheads shall be of gypsum board construction unless otherwise indicated.
- .3 Use fire rated gypsum wallboard as specified.
- .4 Where lighting fixtures, diffusers, and the like are recessed into fire rated ceilings or bulkheads, provide enclosure to maintain required fire rating. Form removable panel to give access to fixture outlet box.
- .5 Where fire hose cabinets or other fixtures or equipment are recessed in fire rated walls or partitions, provide gypsum board enclosure or backing to maintain required fire rating, unless otherwise detailed.

3.8 Access Doors

- .1 Install access doors as supplied by Divisions 21, 22, and 23 and Divisions 26, 27, and 28.
- .2 Install access panels in locations to be determined by coordination with trades installing mechanical, electrical and other building services. Locations to be reviewed and confirmed by *Consultant*.
- .3 Rigidly secure frames to furring or framing systems.

3.9 Adjusting and Cleaning

- .1 Clean up and remove surplus materials and rubbish resulting from the work of this section upon completion.

Gypsum and Cement Board

- .2 Clean off beads, casings, joint compound droppings and the like, leave the work of this section ready for painting trades.

END OF SECTION

Gypsum Sheathing Board

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Gypsum sheathing board at exterior wall assemblies.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*: Shall have 10 years' experience, minimum, in successful installation of work of type and quality indicated and specified.

1.4 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 09 29 90.
- .2 Handle gypsum panel products and accessories in accordance with GA 253-21 and GA 801-2023.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Single source responsibility:
 - .1 Provide gypsum board *Products* from one manufacturer for the work of this section.
- .2 Fire resistance rating:
 - .1 Construct fire resistance rated assemblies in accordance with listing and CAN/ULC S101-14.

2.2 Sheathing Board Panels

- .1 Gypsum sheathing board:
 - .1 In accordance with ASTM C1177/C1177M-17.
 - .2 Exterior grade.

Gypsum Sheathing Board

- .3 Glass mat faced.
- .4 Fire rated in accordance with listed assemblies where indicated: Type X or Type C.
- .5 Acceptable *Products*:
 - .1 CertainTeed 'GlasRoc Sheathing'.
 - .2 CGC 'Securock UltraLight Glass-Mat Sheathing'.
 - .3 Georgia-Pacific 'DensGlass Sheathing'.

2.3 Fasteners

- .1 Screws: in accordance with exterior sheathing board manufacturer's installation requirements to comply with design wind loads.
 - .1 Provide thermoset polyester coated screws formulated to provide enhanced corrosion protection.

2.4 Accessories

- .1 Joint sealants; penetrations, cutouts, or other small openings: In accordance with Section 07 92 00.

2.5 Related Support Assemblies

- .1 Wind bearing metal studs at wind bearing exterior assemblies: in accordance with Section 05 41 13.

PART 3 - EXECUTION

3.1 Installation

- .1 Gypsum sheathing board: Install sheathing in accordance with manufacturer's written requirements and applicable instructions in GA 253-21, ASTM C1280-18(2023), and ASTM C1397-13(2019). Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.
- .2 Use maximum board lengths to minimize number of joints. Stagger sheathing joints, offset by at least one framing member. Offset board joints 150 mm (6") minimum from corners of openings.
- .3 Install sheathing with exterior board side facing exterior. Butt boards together for a light contact at edges and ends with not more than 1.6 mm (1/16") open space between boards. Do not force into place.
- .4 Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink.
- .5 Locate fasteners minimum 10 mm (3/8") from edges and ends of sheathing boards.
- .6 Provide fasteners in accordance with manufacturer's written requirements to comply with design wind loads.

Gypsum Sheathing Board

- .7 Provide clearances between work of this section and structural elements to prevent transference of structural loads, and in no case less than 16 mm (5/8").
- .8 Sheathing shall not be continuous through building construction joints.
- .9 Replace damaged or weathered sheathing boards.

END OF SECTION

Acoustical Tile Ceiling Systems

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Acoustical tile ceiling systems; ACT.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Cooperate with mechanical and electrical *Subcontractors*.
 - .2 Coordinate layout and installation of acoustic ceiling units and suspension systems components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, partition system, fire suppression system components and other work required to be incorporated in or coordinated with the ceiling system.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings, including seismic design, connections and restraint.
 - .2 Submit manufacturer's standard details.
 - .3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines, and acoustical unit support at ceiling fixture.
 - .4 Submit reflected ceiling plans for special grid patterns as indicated.
- .4 Samples:
 - .1 Submit sample of each component of ceiling system. Samples shall fully represent materials to be supplied in colour, texture, finish and construction.
 - .2 Submit samples, load test data and design tables for each type of insert to be used in the *Work* for hanger supports.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Maintenance data:

Acoustical Tile Ceiling Systems

- .1 Submit maintenance and cleaning instructions for acoustical ceiling systems for incorporation into the maintenance manuals.
- .3 Maintenance materials:
 - .1 Deliver for maintenance use, 2% of each type and colour of suspension components and acoustical tiles used in the *Work*.
 - .2 Pack panels in suitable containers, clearly dated and identified as to type and location of installation in the *Work*, and store where directed by *Owner*.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

1.6 Site Conditions

- .1 Interior temperature of building shall be between 15°C and 30°C, and relative humidity shall be not more than 70% before and during installation. Maintain uniform temperatures for 72 hours prior to commencement of the work of this section and maintain temperature until completion of the work of this section.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Design suspension systems for a maximum mid-span deflection not exceeding L/360 in accordance with ASTM C635/C635M-22 deflection test.
- .2 Seismic design: Design and install suspended ceiling system to withstand the effects of earthquake motions in accordance with ASTM E580/E580M-22.
- .3 Design suspension system to support safely, and without distortion, the superimposed loads of:
 - .1 Air supply diffusers and return grilles.
 - .2 Lighting fixtures.

2.2 General

- .1 Single source responsibility: Obtain each type of acoustical ceiling unit and suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the *Work*. Products installed as part of the work of this section shall be from same production run.

Acoustical Tile Ceiling Systems

2.3 Acoustical Tiles; ACT

- .1 Lay-in acoustical tiles:
 - .1 Classification: Type A, Form A2.3, Pattern G in accordance with ASTM E1264-23.
 - .2 Size: 610 mm x 1220 mm (24" x 48").
 - .3 NRC: 0.75.
 - .4 Material: Mineral wool with factory applied water-based paint on glass scrim surface.
 - .5 Surface texture: Smooth.
 - .6 Edge: Square lay-in.
 - .7 Colour: White.
 - .8 Flame spread:
 - .1 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): 25.
 - .2 Smoke Developed Value (SDV): 50.
 - .9 Acceptable *Products*:
 - .1 Rockfon 'Artic 601'.
 - .2 Substitutions: in accordance with Section 01 25 00.

2.4 Metal Suspension Systems

- .1 Hanger anchorage devices: Screws, clips, bolts, concrete inserts or other devices applicable to the indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data. Size devices for 3 x calculated load supported except size direct pull-out concrete inserts for 5 x calculated loads.
- .2 Concrete hanger anchors; post installed: Steel eye bolts and nuts to suit ceiling hangers with capability to sustain, without failure, a load equal to 4 times that imposed by ceiling construction, as determined by testing per ASTM E488/E488M-22, conducted by a qualified independent testing laboratory.
 - .1 Dynabolt Sleeve Anchor 'TW-1614' or Rendi-Tie-Drive 'TD4-112' tie wire anchor by ITW Ramset/Red Head.
 - .2 Kwik-Bolt III 'HHDCA 1/4' tie wire anchor by Hilti Corporation.
 - .3 Fasteners exposed to weather, condensation, and corrosion: Zinc-plated or stainless steel fasteners in applicable product lines specified in preceding paragraphs.
- .3 Hangers and tie wire: Galvanized wire, recommended by manufacturer of suspension system, minimum 2.66 mm (0.1") (12 gauge).
- .4 Suspension system accessories:

Acoustical Tile Ceiling Systems

- .1 Splices, clips, and perimeter moulding, of manufacturer's standard type to suit the applicable conditions unless special conditions and access area are shown or specified.
- .2 Angle wall mouldings; hemmed with prefinished exposed flanges:
 - .1 For 24 mm (15/16") grid applications; angle moulding with exposed bottom flange of 22 mm (7/8").
 - .1 Rockfon '1430.01'.
 - .2 Armstrong '7803'.
- .3 Stepped wall mouldings; hemmed with prefinished exposed flanges:
 - .1 For 24 mm (15/16") grid applications; shadow moulding with exposed bottom flange and reveal of 19 mm (3/4").
 - .1 Rockfon '1461.01'
 - .2 Armstrong '7871'.
 - .3 CGC 'MS154'.
- .4 Compression posts: galvanized steel telescoping compression posts to attached to main tees at each splayed wire location preventing upward movement of the ceiling grid system, designed for seismic applications, size to suit ceiling assembly, injection-moulded high impact clip snaps onto main tee for secure positive locking, spring steel top clip attaches to hanger wire, ICBO (International Conference of Building Officials) listed, tested and certified to a minimum compressive load of 408 kg (900 lb); DONN Compression Post as manufactured by CGC Interiors or approved alternative.
- .5 Seismic clips: Ceiling system manufacturer's standard seismic clips designed and spaced to secure tiles in place.
- .5 Standard suspension system, non fire-rated:
 - .1 Heavy duty in accordance with ASTM C635/C635M-22, 24 mm (15/16") interlocking tee system, designed to support acoustical panels in patterns indicated with deflection of main tees less than L/360, consisting of main tees and cross tees. The system shall provide lock joint intersections of cross and main tees.
 - .2 Acceptable *Products*:
 - .1 Rockfon 'Chicago Metallic 1200'.
 - .2 Substitutions: in accordance with Section 01 25 00.

2.5 Miscellaneous Materials

- .1 Acoustical sealant: Non-drying, non-hardening, non-skinning, non-staining, non-bleeding, gunnable sealant complying with requirements specified in Section 07 92 00.

Acoustical Tile Ceiling Systems

2.6 Metal Finish

- .1 Metal exposed in finished work shall have a pre-coated baked enamel finish in non-yellowing colour. Submit paint formulation of grid system to lighting fixture, speaker grille, sprinkler and diffuser manufacturers to ensure consistency of colour, sheen and texture of exposed metal components in the ceiling assemblies.
 - .1 Colour: Flat white.

PART 3 - EXECUTION

3.1 Installation - General

- .1 Install ceiling panels and metal suspension system in accordance with manufacturer's directions. Where manufacturer's directions are at variance with *Contract Documents*, notify *Consultant* before proceeding with installation.
- .2 Do not commence installation until work above suspended ceiling has been completed, inspected and accepted.

3.2 Installation - Suspension System

- .1 Install suspension system rigid, secure, square, level and plumb, framed and erected to maintain dimensions and contours indicated, and in accordance with ASTM C636/C636M-19, ASTM E580/E580M-22, Cisca installation standards, and any other applicable national or local code requirements. Make allowance for thermal and structural movement.
 - .1 Install acoustical ceiling suspension system to resist seismic disturbance in accordance with ASTM E580/E580M-22.
 - .2 Coordinate work of this section with work of the mechanical and electrical trades for seismic restraint. Install seismic fixture clamps, supplied by Divisions 21, 22, and 23 and Divisions 26, 27, and 28.
- .2 Attach hangers to structure with inserts and hanger supports. Do not use powder activated fasteners.
- .3 Support hangers for suspended ceiling grid independent of walls, columns, pipes and ducts.
- .4 Space hangers for ceilings at maximum 1220 mm (48") on centre in both directions. Provide additional hangers as required to comply with manufacturer's written installation requirements.
- .5 Locate hangers at not more than 150 mm (6") from ends of main tee members.
- .6 Seismic clips: Install seismic clips to secure tiles in place in accordance with ceiling system manufacturer's written requirements.
- .7 Install exposed tee members to pattern indicated. Securely attach hangers to main tee members.
- .8 Exposed tees shall be as long as possible to minimize joints. Make joints square, tight, flush and reinforce with splines. Distribute joints to prevent clustering in one area.

Acoustical Tile Ceiling Systems

- .9 Space tee bars to suit ceiling panels and as detailed, and to accommodate lighting fixtures, diffusers and return grilles.
- .10 Cooperate in the installation of ceiling systems, making adjustments where required to ensure that the lighting fixtures, supply diffusers, exhaust grilles and other built-in items properly fit into ceiling module and finish flush with rest of ceiling.
- .11 Restrict creep inside module panels so that strips are centred on module lines.
- .12 Install edge moulding as detailed where ceiling abuts vertical surfaces. Lap corners, use maximum lengths to minimize joints. Make joints square, tight and flush.
 - .1 Screw attach mouldings to substrates at intervals not more than 400 mm (16") on centre and not more than 210 mm (8") from ends, levelling with suspension system. Lap corners accurately and connect securely.

3.3 Installation - Tiles

- .1 Take precautions during installation to ensure tile edges are not chipped or otherwise damaged.
- .2 Minimize field cutting. Rectify cut tile edges of tile to match factory cut edge profile and colour.
- .3 Install acoustical tiles to form horizontal and level ceiling with parts flush and joints butted tightly to hairline appearance.
- .4 Distribute variations in colour and texture of panels to obtain a uniform appearance.

3.4 Installation - Tolerances

- .1 Allowable tolerances: in accordance with ASTM C636/C636M-19.
- .2 Install suspension systems level to tolerance of 1:1200.
- .3 Install edge mouldings level to tolerance of 3 mm in 3660 mm (1/8" in 12'-0").

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.

3.6 Adjusting and Cleaning

- .1 Replace uneven, defective or damaged materials and finishes, eliminate waves, remove soiled or stained areas.
- .2 Clean dirty and discoloured surfaces of acoustical units and suspension system according to manufacturer's recommendations.

END OF SECTION

Vinyl Sheet Flooring

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Vinyl sheet flooring; RSF-1.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Show sheet flooring roll and width layout as related to *Consultant's* floor pattern including borders and accents including where flooring materials meet other floor materials.
 - .2 Show locations of seams, floor drains, floor plates, and where flooring meets other flooring.
- .4 Samples:
 - .1 Selection samples:
 - .1 Submit manufacturer's range of pattern and colours available for *Consultant's* selection.
 - .2 Samples for verification:
 - .1 Submit sample of vinyl sheet flooring, minimum 150 mm (6") x 150 mm (6") of each different colour and pattern of vinyl sheet flooring.
 - .2 Submit sample of heat-welding bead, minimum 150 mm (6") length of each colour.
 - .3 Submit seam samples for each vinyl sheet flooring product and colour with heat-welded seam. Sample shall be a minimum of 150 mm (6") x 254 mm (10") and shall be adhered to a rigid backing material with the seam running lengthwise and in the center of the sample.
 - .4 Submit sample of fillet support at integral site formed flash cove bases,
- .5 Test and evaluation reports:
 - .1 Submit moisture, alkalinity, and adhesive bond test results.

Vinyl Sheet Flooring

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials:
 - .1 Submit 2% of each colour in full running length, pattern and type flooring material required for this project for maintenance use.
 - .2 Maintenance materials to be same production run as installed materials.
 - .3 Suitably package for protection and storage, each identified with name of manufacturer and flooring material.
 - .4 Tag and store where directed by *Owner*.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers:
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified.

1.6 Site Conditions

- .1 Install materials of this section only when surfaces and air temperatures have been maintained between 18.4°C and 29.4°C for 48 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13°C after above period. Relative humidity shall be 50 +/- 10%.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 Duration: 2 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Slip resistance (SCOF): ≥ 0.5 in accordance with ASTM D2047.
- .2 Vinyl sheet flooring shall not:
 - .1 Become stained or discoloured due to slab markings.
 - .2 Delaminate from substrates.
 - .3 Have welded seams which separate.

Vinyl Sheet Flooring

2.2 General

- .1 Single source responsibility: Obtain each *Product* from a single source with resources to provide products of consistent quality in appearance and physical properties, same production run. Products installed as part of the work of this section shall be from same production run.

2.3 Vinyl Sheet Flooring

- .1 Vinyl sheet flooring:
 - .1 In accordance with ASTM F1913.
 - .2 Thickness: 2 mm (0.08").
 - .3 Colour: Warm Light Grey 0234.
 - .4 Acceptable *Products*:
 - .1 Johnsonite (Tarkett) 'IQ Optima'.
 - .2 No substitutions.

2.4 Miscellaneous Materials

- .1 Seam construction:
 - .1 Hot welded joints, provide welding rod matched to floor pattern/colour selected.
 - .2 Colours: To later selected by *Consultant* from manufacturer's full colour range.
- .2 Primer/adhesives:
 - .1 Types as recommended by resilient flooring manufacturer compatible with materials and to suit substrate types and to comply with warranty requirements.
 - .2 Adhesives shall be appropriate for equipment, cart, and patient bed/stretchers rolling load traffic where applicable.
- .3 Patching and levelling compound:
 - .1 Trowel applied Portland cement based, moisture, mildew, and alkali-resistant.
 - .2 Minimum compressive strength after 28 days shall be minimum 3,500 psi when tested in accordance with ASTM C109/C109M-23 or ASTM C472.
 - .3 Gypsum based compounds are not acceptable.
 - .4 Acceptable manufacturers:
 - .1 Ardex.
 - .2 Mapei.
 - .3 Substitutions: in accordance with Section 01 25 00.
 - .5 Acceptable *Product*: type as recommended by flooring manufacturer.
- .4 Cleaning solution:
 - .1 Acceptable *Products*: type as recommended by flooring manufacturer.

Vinyl Sheet Flooring

- .5 Site fabricated flash cove base accessories:
 - .1 Plastic filler:
 - .1 Filler shall be used for sealing joints between top of integral cove wall base or integral cove cap and irregular wall surfaces.
 - .2 Filler shall be type as recommended by vinyl sheet flooring manufacturer.
 - .2 Fillet cove support strip:
 - .1 Minimum radius of 25 mm (1").
 - .2 Fillet support shall be approved by vinyl sheet flooring manufacturer and approved by *Consultant*.
 - .3 Supply in product manufacturer's longest lengths available.
- .6 Floor transition strips:
 - .1 Metal transition trim:
 - .1 Acceptable *Product*:
 - .1 Schluter-Schiene-E, stainless steel E30.
- .7 Sealant: Mildew resistant sealant in accordance with Section 07 92 00.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that site conditions have been provided as requested and specified.
- .2 Verify that substrates have been provided as specified without holes, protrusions, cracks greater than 1.6 mm (0.06") wide, unfilled control joints, depressions greater than 3 mm (1/8") deep, or other major defects.
- .3 Substrates shall be firm, structurally sound, sufficiently porous, and dry.
- .4 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .5 Examine floors in advance of application of flooring to ensure that floors are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.
- .6 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .7 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .8 Defective work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.

Vinyl Sheet Flooring

3.2 Preparation

- .1 Comply with recommendations of ASTM F710-22.
- .2 Allow products to acclimatize in installation area for a minimum 24 hour prior to installation.
- .3 Substrates shall be free of wax, oil, silicone, soap, grease, dust, solvents, sealers, curing compounds, hardeners, alkaline salts, excessive carbonation or laitance, mould, mildew, paints, varnish, asphalt, residual adhesives, adhesive removers, or other contaminants or deleterious material that may inhibit bond strength or act as a bond breaker. Remove such contaminants and deleterious material using mechanical methods recommended by manufacturer. Do not use chemical abatement methods.
- .4 Concrete substrates that are loose, sandy, scaly, or have a white powdery surface are not acceptable. Substrates shall be mechanically prepared.
- .5 Flooring substrates shall be smooth and level within a tolerance of 3 mm (1/8") in a 3 m (10'-0") radius.
- .6 Fill surface cracks, holes, score marks, depressions, and grooves, and repair surface spalls with Portland cement patching or levelling compound.
- .7 Expansion joints, isolation joints, and other movement joints in substrates shall not be filled with patching or levelling compound.
- .8 Remove bumps, high spots, peaks and ridges to produce a uniform and smooth substrate.
- .9 Prepare substrates so that installation of flooring shall not show telegraphing of substrate.
- .10 Remove chalking and dusting and loose material from concrete surfaces with wire brushed or by scraping.
- .11 Sweep and vacuum clean substrates minimum 24 hours prior to alkalinity, moisture, and adhesion testing. Do not use sweeping compounds.
- .12 Notify *Consultant* of any substrate or levelling compound defects or installation conditions that may result in unsatisfactory performance.
- .13 Prepared concrete substrate shall have a finish equivalent to a magnesium trowel finish. Shiny, slick, non-porous, or overly porous substrates are not acceptable and shall require additional preparation prior to installation of flooring products. Prepared concrete substrates shall have a Concrete Surface Profile #3 to #5 in accordance with International Concrete Repair Institute (ICRI).
 - .1 Substrate to be approved in writing by flooring manufacturer prior to application of flooring.
 - .2 Submit written report to *Consultant* following procedures for manufacturer's field review in accordance with Section 01 45 00.
- .14 Alkalinity, moisture, and adhesion bond testing:
 - .1 Test substrates in accordance with Field Quality Control paragraphs of Section 09 65 16 after mechanically preparing subfloor or applying patching and levelling compounds.
 - .2 Proceed with installation only after substrates pass testing. Document tests performed and submit in writing to *Consultant*.

Vinyl Sheet Flooring

- .15 Do not install floor coverings until they are same temperature as space where they are to be installed.
 - .1 Move floor coverings and installation materials to acclimatize in spaces where they will be installed at least 48 hours in advance of installation.
- .16 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. Do not use sweeping compounds.
- .17 Where flooring adjoins thicker floor materials, apply levelling screed, feather out to make up difference in level between materials to achieve flush floor finish between adjacent flooring materials unless otherwise indicated.
- .18 Spray paints, permanent markers and other indelible ink markers shall not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and permanently stain the flooring material. If such contaminants are present on the substrate they shall be mechanically removed prior to the installation of the flooring material.

3.3 Flooring Installation

- .1 Verify product type, size, thickness, and colour prior to commencing installation. Do not install flooring with visual imperfections, colour variations or apparent defects.
- .2 Allow material to relax unrolled overnight, minimum 12 hours in installation areas.
- .3 Install rolls and cuts in sequence following manufacturer's installation requirements/diagrams.
 - .1 Lay flooring with joints parallel to building lines to produce symmetrical pattern and minimum joints.
 - .2 Place seams in inconspicuous and low-traffic areas, at least 150 mm (6") away from parallel joints in levelling underlayment, concrete joints, saw cuts and other type of joints.
 - .3 Avoid cross seams.
 - .4 Lay sheet flooring centered in corridors, with equal sized sheet to either side of center sheet.
 - .5 Mitre intersections at corridors typically. "T" type corridors shall be butt type installation.
 - .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
 - .7 Layout seaming uniformly, using full length flooring typically, minimum flooring size of not less than roll width. Limit quantity of less than full length floor pieces at corridors to maximum of 1.
 - .8 Layout flooring to match reviewed shop drawings floor pattern including borders and accents.
 - .9 Match edges of floor coverings for colour shading at seams.
- .4 Cutting and fitting sheets:

Vinyl Sheet Flooring

- .1 Cut pieces to length allowing approximately 75 mm (3") to 150 mm (6") excess for trimming.
- .2 Remove 12.7 mm (1/2") off the factory seam edge using an edge trimmer or straight edge and knife.
- .3 Cut sheet and fit neatly around fixed objects without gaps.
- .4 Position remaining sheets so that the top sheet overlaps the previous sheet by 12.7 mm (1/2") to 19 mm (3/4").
- .5 Install one sheet at a time in wet adhesive.
- .6 Roll the flooring immediately in both directions using 45 kg (100 lb) three-section roller.
- .7 After the material has been laid and rolled in wet adhesive, underscribe the seam using the short scribes with a scribed pin right away.
- .8 Cut the material along the scribe line using a hooked blade knife and holding it at an angle so to slightly undercut the material.
- .9 Roll the seam with a hand roller.
- .10 Cross seams:
 - .1 Straight edge and undercut at an angle the end of the first sheet.
 - .2 Spread adhesive and lay in wet adhesive.
 - .3 Roll the flooring immediately in both directions using 45 kg (100 lb) three-section roller.
 - .4 Overlap the second sheet at butt seam approximately 25 mm (1").
 - .5 Adhere second sheet except for last 450 mm (18") of butt seam; wait 20 – 30 minutes.
 - .6 Spread the adhesive for the last 450 mm (18"), lay in material, underscribe the seam to a neat, fit cut, and roll flooring immediately in both directions using 45 kg (100 lb) three-section roller.
- .5 Install drain clamping rings.
- .6 As installation progresses, roll flooring with 45 kg (100 lb) three-section roller to ensure full adhesion, remove adhesive ridges, and entrapped air.
- .7 Where cove base is not required, seal joint at wall with manufacturer's approved sealant.
- .8 Apply adhesive uniformly and at spreading rates in accordance with adhesive manufacturer's requirements. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .9 Obtain 100% adhesive coverage to flooring backing.
- .10 Install flooring to entire area indicated or scheduled, including coverplates occurring within finished floor areas. Maintain overall continuity of colour and pattern with pieces of flooring installed on cover plates. Tightly butt edges to perimeter of floor around cover plates and to cover plates. Cut flooring to floor drains occurring within finished floor areas.

Vinyl Sheet Flooring

.11 Heat-welded seams:

- .1 Weld seams in accordance with ASTM F1516-13(2018).
- .2 Wait minimum of 24 hours after flooring installation before grooving and heat welding seams.
- .3 Prepare, weld, and trim seams to produce flat surfaces flush with adjoining floor covering surfaces.
- .4 Rout joints to approximately 2/3 of the thickness of the material and use welding bead to permanently fuse sections into a seamless floor covering. Groove shall be between 3 mm (0.118") and 3.5 mm (0.138") wide.
- .5 Using a weld plate and skiving knife to make first cut and allow weld rod to fully cure to room temperature.
- .6 Using a skiving knife only, finish the trimming of the remainder of the weld. The finish should be smooth and on the same level as the flooring.
- .7 Trimming of welded joint while warm is not permitted unless final trimming is performed after weld has cooled to flooring temperature. Excess weld shall be removed using a heated standard putty knife.
- .8 Roll the seam area with 45 kg (100 lb) three-section roller.
- .9 Maximum variation of welds from plane or from straight: 6 mm (1/4") in 3 m (10 ft) length using a 3 m (10 ft) straight edge.

- .12 Flooring installation shall not show telegraphing of substrate. Flooring installation shall be homogenous free of substrate lines, pockets, bumps and unevenness.

3.4 Site Fabricated Flash Cove Wall Base Installation

- .1 Filler shall be used for sealing joints between top of integral cove wall base or integral cove cap and irregular wall surfaces such as masonry.
- .2 Supply and install continuous fillet cove support strip without gaps. Mitre fillet cove support strip at corners.
 - .1 Install straight and level to variation of 1:1000.
 - .2 When fillet cove is installed, there shall be no gaps between fillet cove support and floor substrate.
 - .3 Joints shall be straight and vertical and not less than 610 mm (2'-0") from corners.
 - .4 Taper/trim cove former to reduce radius to less than 12.7 mm (1/2") at door frame or similar conditions to ensure that cove radius is concealed at locations where cove base terminates at projections.
 - .5 Seal cove to wall substrate with sealant bead.

3.5 Installation - Transition Trim

- .1 Protect exposed edges of flooring, where finished and unfinished areas adjoining, by means of a transition trim butting to and flush with the finished surface of the flooring covering material and securely adhered to the substrate material.

Vinyl Sheet Flooring

- .2 Coordinate transitions with work of other sections.
- .3 Set to ensure installation is free of gaps.
- .4 Install in longest lengths possible.
- .5 Install straight to maximum allowable variation of 3 mm (1/8") over 3 m (10'-0").
- .6 Scribe and fit to obstructions.
- .7 Fit joints tightly, straight and vertical as applicable and not less than 610 mm (24") from corners.
- .8 Mitre corners.

3.6 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
 - .1 Field tests and inspections:
 - .1 Moisture and alkalinity:
 - .1 Test for moisture vapour transmission in accordance with ASTM F710-22 and ASTM F1869-22 or ASTM F2170-19a in accordance with manufacturer's written flooring installation requirements. Results must not exceed 170 µg/m² (3 lb per 1,000 ft²) in 24 hours when tested to ASTM F1869-22, or exceed 75% when tested to ASTM F2170-19a.
 - .2 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 F710-22.
 - .3 For each test type: Conduct 3 tests for flooring applications up to 93 m² (1000 ft²) in area, and 1 additional test for each additional 93 m² (1000 ft²) of flooring area.
 - .2 Adhesion bond test:
 - .1 Proceed with bond test after substrates have been prepared and alkalinity and moisture test have been completed.
 - .2 Using the specified adhesive, glue down each panel using adhesive manufacturer's recommended trowel.
 - .2 Manufacturer's field review to be in accordance with Section 01 45 00.

3.7 Adjusting and Cleaning

- .1 Remove excess adhesive from surfaces of the sheet flooring and base as work progresses.
- .2 Thoroughly clean surfaces in accordance with manufacturer's recommendations.

Vinyl Sheet Flooring

3.8 Protection

- .1 Prohibit foot traffic on installed flooring for a period of 24 hours after installation. No heavy traffic, rolling loads, or furniture placement are permitted for a minimum of 72 hours after installation.
- .2 Protect new floors from time of final set of adhesive until final inspection.
- .3 Install floor protection in areas where work, repairs and installation of equipment, and foot traffic will occur.

3.9 Maintenance

- .1 Perform initial maintenance in accordance with the manufacturer's written requirements.
- .2 Allow flooring to dry prior to applying protection.

END OF SECTION

Hygienic Wall Panel System

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Hygienic wall panel system (HWS).

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordination of work: coordinate layout, penetrations and installation of work of this section with work of other sections.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data:
 - .1 Submit *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit shop drawings to show layout, treatment at walls, and other objects. Indicated details of proposed treatment where materials meet other materials.
- .4 Samples:
 - .1 Submit sample panels in triplicate on 305 mm x 305 mm (12"x 12") showing each finish and colour.
 - .2 Submit samples of each accessory type product specified.
 - .3 Identify each sample as to project, finish, colour name, number.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

Hygienic Wall Panel System

1.6 Site Conditions

- .1 Maintain surface and air temperatures between 18°C and 26°C for twenty four (24) hours preceding installation, during installation, and for forty eight (48) hours thereafter.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2- PRODUCTS

2.1 Performance/Design Requirements

- .1 Flammability:
 - .1 Flame spread rating of less than 25, Smoke developed less than 300, in accordance with CAN/ULC-S102-10.

2.2 Hygienic Panel Wall System

- .1 HWS:
 - .2 Description:
 - .1 Hygienic, impact resistant, water-resistant, low VOC, antimicrobial, PVC wall system.
 - .2 Surface: smooth.
 - .3 Antimicrobial: HACCP certified.
 - .4 Impact resistance: in accordance with ASTM D5420-21, exceeds 160 inch lbs.
 - .5 Fungi resistance: zero, in accordance with ASTM G21-15(2021)e1.
 - .6 Mold resistance: 10, in accordance with ASTM D3273-21.
 - .7 UV exposure: in accordance with ASTM G154-23.
 - .8 Colours:
 - .1 WP1: Linen.
 - .2 WP3: White.
 - .9 Acceptable *Products*:
 - .1 Altro 'Whiterock'.
 - .2 Substitutions: in accordance with 01 25 00.
 - .3 Panel fixing method: As recommended by panel manufacturer.
 - .4 Welding rod: as recommended by panel manufacturer.
 - .5 Sealant: as recommended by panel manufacturer.
 - .6 Panel cleaning materials: as recommended by panel manufacturer.

Hygienic Wall Panel System

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that specified site conditions exist before commencing the work of this section.
- .2 Examine surfaces to receive wall panel system. Report unsatisfactory conditions immediately to *Consultant*. The work of this section shall not proceed until unsatisfactory conditions have been corrected.
- .3 Substrate surface shall be straight to tolerance of ± 3 mm (± 0.12 ") over 3000 mm (118").
- .4 Ensure that environmental conditions have been provided as requested and specified.
- .5 Defective *Work* resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the *Work* of this section.

3.2 Preparation

- .1 Store materials for a minimum of 8 hours before installation on a solid flat surface and preconditioned for approximating the operating environment of the finished room.

3.3 Installation - Adhesive Method Application

- .1 Cut and fit sheet as required. Clean back of panel using safe solvent cleaner. Avoid the use of ketones, acetones or any solvents that may cause damage to panel.
- .2 Apply double sided adhesive tape to top and bottom of sheet.
- .3 Apply adhesive tape to window and door openings where sheet has a tendency to pull away from substrate prior to adhesive cure.
- .4 Prime wall on area directly corresponding to tape position using a non-flammable contact adhesive.
- .5 Apply adhesive to back of sheet using trowel as recommended by panel manufacturer.
- .6 Apply sheet to wall and line up any reference marks before pressing into place.
- .7 Use a white rubber mallet for initial contact with adhesive tape.
- .8 Ensure adequate adhesive transfer by thoroughly rolling entire panel surface using a wall roller.
- .9 Allow 3 mm (1/8") gap at ceiling, door and window frames, pipes, and projections to accommodate panel expansion. Seal gaps with sealant.
- .10 Seal transition strip to flash-coved sheet vinyl with silicone sealant. Allow required gap between top of flash-coved flooring and panels to accommodate expansion.
- .11 Maintain at least 80% coverage of direct transfer of adhesive between panels and wall substrate.

3.4 Installation - Pin Fix Method

- .1 Cut and fit sheet as required.
- .2 Bevel edges to receive jointing or edge strips.

Hygienic Wall Panel System

- .3 Mark out for rivets and pre-drill using a 9 mm (3/8") drill bit.
- .4 Clean back of sheet with safe solvent cleaner and remove protective film from sheet face for inserting the pins.
- .5 Apply anti-static agent for front of sheet to prevent dust/static build-up.
- .6 Apply recommended adhesive to the back of the sheet.
- .7 Position the sheet on the wall, drill through one of the center holes using a 6.5 mm (5/16") masonry bit.
- .8 Place the rivet in the hole and drive home the center pin with a hammer.
- .9 When installing always work from the center of the board outward to the sides.

3.5 Sheet to Sheet Jointing

- .1 Joint strip:
 - .1 Fit joint strip to the panel edge and knock fully over until the division bar rests against the panel edge.
 - .2 Place the edge of the next sheet snugly against the front edge of the "H" section and roll the sheet into the adhesive.
 - .3 Knock the "H" section back towards the second sheet leaving a 3 mm (1/8") gap on both sides of the division bar.
- .2 Silicone joint:
 - .1 Use a manufacturer recommended scraper to remove the burrs from the panel edge.
 - .2 Leave a 3 mm (1/8") gap between sheets.
 - .3 Mask both panel edges leaving the gap exposed.
 - .4 Fill the gap fully with silicone sealant.
 - .5 Smooth the sealant flush to panel surface and remove tape before sealant skins over.
- .3 Heat welding:
 - .1 Apply double-sided adhesive tape flush to panel edges.
 - .2 Remove burrs from panel edges.
 - .3 Place each successive panel allowing for a 1.5 mm (1/16") gap between each panel.
 - .4 Clean both the seam area and the weld rod with safe solvent cleaner - one that will not attach the vinyl or leave a film.
 - .5 Test weld on a scrap piece of panelling before proceeding.
 - .6 Proceed only when temperature and speed have been satisfied.
 - .7 The weld may be trimmed flush when semi-cooled using the round part of the trimming spatula.

Hygienic Wall Panel System

3.6 Jointing Sheet to Coved Vinyl Flooring

- .1 High impact transition strip:
 - .1 The vertical joint strip should finish 9 mm (3/8") short of the bottom sheet.
 - .2 The back of the joint strip must be cut away.
 - .3 The transition strip should then be installed when all the panels have been installed.
 - .4 A bead of clear silicone sealant should then be applied between the flooring material and the bottom edge of the transition strip.
 - .5 Notch the transition strip for the thermoformed internal and external corners.
- .2 Overlapping:
 - .1 Extend the panel down a minimum of 25 mm (1") past the top of the flooring material.
 - .2 Use extra adhesive to fill the gap.
 - .3 Apply a bead of recommended sealant along the bottom edge of the panel.

3.7 Field Quality Control

- .1 Manufacturer's field review to be in accordance with Section 01 45 00.

3.8 Adjusting and Cleaning

- .1 Remove the protective film from the panels, clean panels with an anti-static solution.
- .2 Wash with water or a diluted neutral soap/detergent solution. Do not use materials containing abrasives or solvents.

3.9 Protection

- .1 After materials have set, and until completion, co-ordinate *Work* to ensure that panels are not damaged by traffic or adjacent work.
- .2 At completion of panel installation, install protection in areas where finishing *Work*, repairs and installation of equipment will occur.

END OF SECTION

Painting

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Painting of interior paintable surfaces.
 - .2 Repainting of interior surfaces.
- .2 Paintable and non-paintable surfaces:
 - .1 Paint and finish paintable surfaces included in the *Work*, except where excluded by the *Contract Documents*.
 - .2 The following surfaces are considered non-paintable, except as otherwise indicated or scheduled:
 - .1 Material and equipment furnished prime and finish painted.
 - .2 Internal surfaces of steel tanks and stacks.
 - .3 Sprayed fire-resistive materials.
 - .4 Stainless steel, weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered or mill finished aluminum, Monel metal.
 - .5 Metallic and mastic insulation finishes.
 - .6 Abrasive material finishes on floors, stair treads, stair nosing and landings.
 - .7 Insulated electric cables.
 - .8 Machined parts of machinery and equipment.
 - .9 Concealed surfaces.
 - .10 Manufactured finish materials.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.
 - .1 Agenda shall include review of preparation requirements for surfaces to be repainted, including clear identification of responsibility for preparation of DSD-4 surfaces. *Contractor* shall be solely responsible for determining which *Subcontractor* shall prepare of each DSD-4 surface.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:

Painting

- .1 Submit manufacturer's *Product* data sheets and list of *Products* proposed for use in the work of this section as identified in 'Approved Product List' section of the MPI (Master Painters Institute) Architectural Painting Specification Manual and the MPI Maintenance Repainting Specification Manual (MPI Repainting Manual), as applicable. Correlate *Products* to Schedule furnished by *Consultant*.
- .3 Samples:
 - .1 Samples for initial paint colour and finish selection:
 - .1 Submit manufacturer's colour charts showing full range of colours available, including light and deep dark tones, for each type of finish material indicated for colour selection by *Consultant*.
 - .2 *Consultant* shall have complete freedom in choice of colours in compiling colour schedule and will not necessarily select colours from standard colour charts of manufacturer of *Products* specified.
 - .3 Submit 3 drawdowns of each selected colour for review by *Consultant* and resubmit to *Consultant* as required to obtain approval. Drawdown to be of specified colour, sheen, and paint formula for applicable surface.
 - .2 Samples for verification:
 - .1 Submit 3 samples on 200 mm x 305 mm (8"x 12") material of same type as that on which coating is to be applied, for *Consultant's* approval, at least 30 days before materials are required.
 - .2 Identify each sample as to *Project*, finish, formula, colour name, number, gloss name and number, date and name of *Contractor* and painting *Subcontractor*.
 - .3 Resubmit as required until colours and gloss value are approved.
- .4 MPI (Master Painters Institute) Manual:
 - .1 Provide and maintain 1 copy of MPI Manual, latest edition, at site office for reference.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials:
 - .1 Provide 2 sealed containers, each of 4 litres (1 gallon) capacity of each paint product in each colour used in the *Work* for *Owner's* maintenance use. Containers shall be new, clearly labelled with manufacturer's name, type of paint, colour and colour number. Store at *Place of the Work* where directed by *Owner*.

1.5 Quality Assurance

- .1 Qualifications

Painting

- .1 Manufacturers:
 - .1 Paint manufacturers and *Products* used shall be as listed under the Approved Product List section of the MPI Painting Manual.
- .2 Installers / applicators / erectors:
 - .1 Applicators: Shall have minimum 5 years proven satisfactory painting experience of projects of similar size and class subject to *Consultant's* approval.
 - .2 Only qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices shall work under the direct supervision of a qualified journeyman in accordance with trade regulations.

1.6 Product Handling

- .1 Product handling shall be in accordance with Section 01 60 00 as supplemented by the requirements of Section 09 91 00.
- .2 Deliver painting materials in sealed, original labelled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
- .3 Store paint *Products* and materials in original labelled containers in secure (lockable), dry, heated and well ventilated single designated area meeting minimum requirements of both paint manufacturer and authorities having jurisdiction, and at a minimum ambient temperature of 7°C.
- .4 Protect floor and wall surfaces of storage area. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out.

1.7 Site Conditions

- .1 Comply with environmental requirements of MPI Manual.
- .2 Perform no painting work when ambient air and substrate temperatures are below 10°C for both interior and exterior work, unless suitable weatherproof covering and sufficient heating and ventilation facilities are in place in accordance with MPI Manual.
- .3 Perform no painting work when relative humidity is above 85% or when dew point is less than 3°C (5°F) variance between air/surface temperature.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Except where more stringent requirements are specified, the following reference standard shall govern the work of this section:

Painting

- .1 Master Painters Institute (MPI) Architectural Painting Specification Manual (MPI Manual) and the MPI Maintenance Repainting Specification Manual (MPI Repainting Manual), as applicable, including Identifiers, Evaluation, Systems, Preparation and Approved Product List, latest edition, and referenced herein as the MPI Manual, as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .2 Materials, preparation and workmanship shall conform to requirements of latest edition of Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .3 Painting systems:
 - .1 Shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.
 - .2 Presence of any of following shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.

2.2 Materials

- .1 *Products* listed in MPI Manual shall be used in the *Work*, unless specified otherwise.
- .2 Paint and materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, and the like) shall be in accordance with the MPI Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .3 Other paint materials, such as linseed oil, shellac, and the like, shall be highest quality *Products* of an approved manufacturer listed in the MPI Manual and shall be compatible with other coating materials as required.
- .4 Paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags.
- .5 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by building code requirements and/or authorities having jurisdiction.

2.3 Equipment

- .1 Painting and coating equipment in accordance with written requirements of MPI Manual.

2.4 Mixing and Tinting

- .1 Unless otherwise specified, paints shall be ready-mixed. Re-mix prior to application to ensure colour and gloss uniformity.
- .2 Paste, powder or catalysed paint mixes shall be mixed in accordance with manufacturer's written requirements.
- .3 Perform colour tinting operations prior to delivery of paint to *Place of the Work*.
- .4 Where thinner is used, addition shall not exceed paint manufacturer's recommendations.

Painting

2.5 Colours and Gloss Levels

- .1 Paint colours and gloss levels shall be as selected by the *Consultant*. Locations as indicated or scheduled.
- .2 Colour and gloss schedule: as indicated.
- .3 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 maximum
G2	Velvet finish	0 to 10	10 to 35
G3	Eggshell finish	10 to 25	10 to 35
G4	Satin finish	20 to 35	35 minimum
G5	Semi-gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that specified site conditions exist before commencing the work of this section.
- .2 Prior to commencement of work of this section, examine surfaces scheduled to be painted.
 - .1 For surfaces to be repainted, the degree of surface deterioration (DSD) shall be assessed using assessment criteria in accordance with the MPI Repainting Manual.
- .3 Check moisture content and alkalinity of surfaces to be painted in accordance with Field Quality Control paragraphs of Section 09 91 00.
- .4 Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.
- .5 Report in writing any condition adversely affecting work of this section.
- .6 Proceed with work only when surfaces and conditions are satisfactory. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from surfaces which could be detrimental to a satisfactory and acceptable finish.

3.2 Preparation

- .1 Comply with manufacturer's written requirements and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- .2 Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

Painting

- .1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- .3 Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, mildew, grease, and incompatible paints, encapsulants, and other deleterious materials.
- .4 Paint surfaces when moisture content or alkalinity of surfaces to be painted comply with Field Quality Control paragraphs in Section 09 91 00.
- .5 ZF75 and ZF120 galvanized-metal substrates: Remove grease and oil residue from galvanized sheet metal by methods to produce clean surfaces that promote adhesion of subsequently applied paints.
- .6 Z275 galvanized-metal substrates: 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.
- .7 Substrates to be repainted:
 - .1 Prepare surfaces for repainting in accordance with MPI Repainting Manual requirements.

3.3 Installation

- .1 Do not paint unless substrates are acceptable and/or until Field Conditions (heating, ventilation, lighting and completion of work of other sections) are acceptable for applications of *Products*.
- .2 Apply primer, paint or stain in accordance with MPI Manual finish requirements based on Grade specified below in Section 09 91 00.
- .3 Schedule application of paints and coatings after cleaning to prevent field conditions causing flash-rusting, rusting, weathering or water damage to substrate, or other contamination of the substrate. Comply with MPI manual, MPI Repainting Manual, and manufacturer's written requirements, the most stringent of which shall govern.
- .4 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- .5 Tint each coat of paint progressively lighter to enable confirmation of number of coats.
- .6 Unless otherwise approved by *Consultant*, apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.
- .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 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
- .9 Prime coat of stain or varnish finishes may be reduced in accordance with manufacturer's directions.

Painting

- .10 Paint finish shall continue through behind wall-mounted items (i.e. chalk and tack boards) and exposed/ visible in complete work including interiors of cupboards and closets, tops of doors, trim, and the like, whether in sight line or not, including behind surface mounted fixtures and heating units.
- .11 *Consultant* shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to *Owner*.
- .12 Access doors, prime coated butts and other prime painted hardware, registers, radiators and covers, exposed piping and electrical panels shall be painted to match adjacent surfaces in terms of colour, texture and sheen, unless otherwise indicated.

3.4 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
 - .1 Field tests and inspections:
 - .1 Paint and Coating Quality Assurance Inspections:
 - .1 Field quality control shall be in accordance with Section 01 45 00.
 - .2 Moisture and alkalinity testing:
 - .1 Check moisture content of surfaces to be painted using properly calibrated electronic moisture meter approved by paint manufacturer and *Consultant*, or other approved method. Maximum moisture contents shall be in accordance with manufacturer's recommendations and as follows:
 - .1 Concrete and concrete masonry (clay and concrete brick/block): Maximum 12%.
 - .2 Gypsum board and plaster: Maximum 12%.
 - .3 Wood: Maximum 15%.
 - .2 Conduct moisture tests on concrete floors using cover patch test method.
 - .3 Test concrete, masonry and plaster surfaces for alkalinity.
 - .3 Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the *Consultant*:
 - .1 Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - .4 Damage due to application on moist surfaces or caused by inadequate protection from weather.
 - .5 Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

Painting

- .4 Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces to the *Consultant*:
 - .1 Visible defects are evident on vertical and horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 - .2 Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 - .3 When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area.
- .5 Painted surfaces rejected by the *Consultant* shall be made good at the expense of the *Subcontractor*. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.
- .6 Painting *Subcontractor* shall obtain from *Contractor* written confirmation of specific surface preparation procedures and primers used for fabricated steel items from the fabricator/*Supplier* to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

3.5 Adjusting and Cleaning

- .1 Promptly as work proceeds and on completion of *Work*, remove paint where spilled, splashed or spattered during the progress of the *Work*. Keep the premises free from unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises clean.

3.6 Interior Paint Systems

- .1 System references listed are based on MPI Manual and are Premium Grade, unless otherwise indicated:
 - .1 Galvanized metal: (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.)
 - .1 INT 5.3M High performance architectural latex (over water based galvanized primer); gloss level G5.
 - .2 Plaster and gypsum board: (gypsum wallboard, drywall and textured finishes)
 - .1 INT 9.2B High performance architectural latex finish (over latex primer/sealer):
 - .1 Gloss level:
 - .1 Walls, except as otherwise indicated: G3.
 - .2 Ceilings, except as otherwise indicated: G1.
 - .3 Wet and service areas; walls and ceilings: G5.
 - .2 Use high-hide primer sealer type at glass mat finished gypsum board.

Painting

3.7 Interior Repaint Systems

- .1 System references listed are based on MPI Repainting Manual and are Premium Grade, unless otherwise indicated:
 - .1 Structural steel and metal fabrications (columns, beams, joists, etc.)
 - .1 RIN 5.1RR High performance architectural latex.
 - .2 Galvanized metal: (doors, frames, etc.)
 - .1 RIN 5.3J High performance architectural latex (do not use flat finish on doors and door frames).
 - .3 Plaster and gypsum board: (gypsum wallboard, drywall and textured finishes)
 - .1 RIN 9.2B High performance architectural latex finish:

END OF SECTION

Cubicle Compartments

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Dressing compartment partitions (change cubicles).

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Show plan layout, elevations, hardware items, anchorage devices, dimensions, description of materials and finishes, and all other pertinent information.
- .4 Samples:
 - .1 Submit 3 samples of each colour of panel and samples of hardware items, and a typical base mounted sample of a pilaster and shoe.

1.3 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*:
 - .1 Has been regularly engaged in the assembly and installation of toilet partition systems.
 - .2 Shall demonstrate to the acceptance of the *Consultant* that they have successfully performed on comparable projects over the previous 5 years.

1.5 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

Cubicle Compartments

PART 2 - PRODUCTS

2.1 Basis of Design

- .1 Manufacturers:
 - .1 PP-1: Bobrick Washroom Equipment of Canada Ltd.
 - .2 Substitutions in accordance with Section 01 25 00.

2.2 Performance/Design Requirements

- .1 Fire resistance:
 - .1 Toilet partition panels shall have the following fire resistance characteristics in accordance with CAN/ULC S102 and high building requirements in the building code:
 - .1 Flame Spread Classification: 25 maximum.
 - .2 Smoke Developed: 100 maximum.

2.3 Materials

- .1 Mounting configuration:
 - .1 Partitions: Ceiling hung.
- .2 Panels:
 - .1 Solid colour reinforced composite:
 - .1 Solidly fused fibrous material reinforced with polycarbonate and phenolic resins; colour-through core with clear matte-finish melamine surface. Scratch, dent, moisture and impact resistant.
 - .1 Finished thicknesses:
 - .1 Pilasters, stiles and doors shall be 19 mm (3/4").
 - .2 Panels shall be 13 mm (1/2").
 - .2 Colour:
 - .1 PP-1: Shadow.
- .3 Hardware:
 - .1 Fabricate from heavy gauge, Type-304 stainless steel with satin finish.
 - .2 Conceal hardware inside compartments with the exception of out-swinging doors.
 - .3 Hardware of chrome-plated "Zamac" or aluminium is not acceptable.
 - .4 Latch: Heavy duty (vandal resistant).
 - .5 Hinges: Barrel type.
 - .6 Emergency access door lifts.

Cubicle Compartments

- .7 Manufacturer's standard coat hook.
- .8 Manufacturer's standard door bumper.
- .4 Overhead support steel framing: in accordance with Section 05 50 00.
- .5 Metal support systems and blocking: in accordance with Section 09 22 00.

2.4 Fabrication

- .1 Fabricate partitions and screens to layout dimensions shown.
- .2 Conceal and protect floor fastening with die formed stainless steel pilaster shoe cap, complete with concealed hold-in-place clips. Exposed screws are not to be permitted.
- .3 Reinforce doors, panels and pilasters to accept hardware, tissue holders and fittings.
- .4 Reinforce pilasters and doors of barrier free cubicles to support the wider door without deformation.

PART 3 - EXECUTION

3.1 Installation

- .1 Install toilet partitions and urinal screens in accordance with manufacturer's written installation requirements.
- .2 Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - .1 Maximum clearances:
 - .1 Pilasters and panels: 12.7 mm (1/2").
 - .2 Panels and walls: 25.4 mm (1").
- .3 Stirrup brackets: Secure panels to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel.
 - .1 Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - .2 Align brackets at pilasters with brackets at walls.
- .4 Ceiling-hung units: Secure pilasters to supporting structure and level, plumb, and tighten. Hang doors and adjust so bottoms of doors are level with bottoms of pilasters when doors are in closed position.
- .5 Install hardware components and partitions with fastenings and screws to manufacturer's written requirements. Attach panel and pilasters to brackets with through type sleeve bolt and nut.
- .6 Secure wall brackets to blocking in steel stud walls.
- .7 Erect enclosures accurately to dimensions shown, set plumb and level, and anchor in position. Hang doors; adjust hinges to perform as specified. Re-check doors for emergency feature. Install latch and hooks. Tighten pilaster shoes.
- .8 Make good finished surfaces damaged during shipment or installation.

Cubicle Compartments

- .9 Installed system shall be free of rattles and reverberations during usage.

3.2 Installation Tolerances

- .1 Install plumb, level, tight and secured. Comply with the following maximum tolerances:
 - .1 Plumb and level: 3 mm (1/8").
 - .2 Variation from indicated position: plus/minus 3 mm (1/8").

3.3 Adjusting and Cleaning

- .1 Hardware adjustment:
 - .1 Adjust hardware so that latches operate smoothly and without binding. Lubricate hardware if required by *Supplier's* requirements.
 - .2 Hinges:
 - .1 Barrel: Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.
- .2 Clean exposed surfaces using materials and methods recommended by manufacturer. Provide protection during remainder of construction period.

END OF SECTION

I.V. Tracks

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 I.V. tracks.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Submit shop drawings showing details of items to be provided, including quantity, sizes, arrangement, trim, fastenings, materials, thicknesses and gauges, finishes and other pertinent data, including seismic design, connections and restraint.
 - .3 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.
- .4 Samples:
 - .1 Submit 2 samples, 300 mm (12") long or size as applicable, for each *Product* in specified finish.
- .5 Templates:
 - .1 Submit templates to *Contractor* for use by installers and fabricators as required for proper location and installation of hardware.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 Installation to be performed by track fabricator or factory authorized installer.

PART 2 - PRODUCTS

2.1 General

- .1 Incorporate reinforcing, fastenings and anchorage required for building in of products as recommended by manufacturer.

I.V. Tracks

2.2 IV Track

- .1 Half rounded profile anodized aluminum, heavy duty, ceiling mounted cubicle curtain track, can be curved on both sides and outside, to a minimum radius of 457mm.
- .2 Track mounted directly to the ceiling with hidden swing clamps mounted at 610 mm o.c.
- .3 Self-cleaning, gliding channels.
- .4 Dimensions of 32mm width by 18.5mm height.
- .5 All parts shall be made of 6.6 polyamide, Delrin, powder coated steel, or aluminum.
- .6 Aluminum and finish: 6063-T6 extruded aluminum, clear anodized.
- .7 Acceptable manufacturer and product:
 - .1 Light Harvesting Shading Solutions Inc 'Heavy Duty Ceiling Mount Cubicle / I.V. Track System - LHSS 700', complete with LHSS 704 height adjustable I.V. pole.
 - .1 Substitutions: in accordance with Section 01 25 00.

2.3 Fabrication

- .1 Fabricate work of this section using skilled craftsmen in accordance with the best practice in the shops of companies specializing in the work specified.
- .2 Fabricate work true to dimensions, square, plumb and level in accordance with final reviewed shop drawings. Accurately fit joints and intersecting members with adequate fastenings.
- .3 Provide finished work free from distortion and defects detrimental to appearance and performance.
- .4 Verify dimensions at the *Place of the Work* before preparing shop drawings or proceeding with shop work. Fit, shop assemble, and deliver to *Place of the Work* in the largest practicable sections.

PART 3 - EXECUTION

3.1 Installation

- .1 Provide manufacturer's information and templates required for installation of work of this section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this section in order that they function as intended.
- .2 Install work to meet manufacturers' specifications and installation requirements, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .3 Include reinforcing, anchorage and mounting devices required for the installation of each product.
- .4 Fit joints and junction between components tightly and in true planes, conceal and weld joints where possible.

I.V. Tracks

- .5 Fabricate products with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that Work will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.

3.2 Adjusting and Cleaning

- .1 Verify under work of this section that installed *Products* function properly, and adjust them accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective *Work* so that no variation in surface appearance is discernible.

END OF SECTION

Corner Guards and Handrails

PART 1- GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Corner guards; CG1.
 - .2 Handrails.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Samples:
 - .1 Submit 3 samples, 300 mm (12") long or 300 x 300 mm (12 x 12") in size as applicable, for each *Product* in specified finish.
- .4 Shop drawings:
 - .1 Include plans, elevations, hardware, and installation details.
 - .2 Show seam locations.
- .5 Templates:
 - .1 Submit templates to *Contractor* for use by installers and fabricators as required for proper location and installation of hardware.

1.3 Site Conditions

- .1 Install materials of this section only when surfaces and air temperatures have been maintained between 18°C and 24°C for 48 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13°C after above period. Relative humidity shall be 50% +/- 10%.

1.4 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 General

- .1 Incorporate reinforcing, fastenings and anchorage required for building-in of *Products*.
- .2 Heights of corner guards are to be full wall heights.

2.2 Corner Guard Protection

- .1 Corner guard; CG-1:

Corner Guards and Handrails

- .1 Material: Vinyl.
- .2 Colour/finish: to later selection by *Consultant* from manufacturer's full range.
- .3 Angle: 90 degrees.
- .4 Leg length: 76.1 mm (3").
- .5 Mounting method: mechanically fastened.
 - .1 Fasteners: in accordance with corner guard manufacturer's written requirements.
- .6 Acceptable *Products*:
 - .1 C/S Construction Specialties 'SM-20N', with colour matched ends.
 - .2 Substitutions: in accordance with Section 01 25 00.

2.3 Handrails

- .1 Colour: to later selection by *Consultant* from manufacturer's full range.
- .2 Acceptable *Product*:
 - .1 C/S Construction Specialties 'HRB-4C'.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .3 Sealants: in accordance with Section 07 92 00.

PART 3- EXECUTION

3.1 Installation

- .1 Install work to meet manufacturer's written requirements, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .2 Clean substrates to remove dirt, debris and loose particles prior to installation.
- .3 Fit joints and junction between components tightly and in true planes.
- .4 Install units on solid backing as indicated, and erect with materials and components straight, tight and in alignment.
- .5 Installation for handrails:
 - .1 Mechanically fasten with top surface parallel to finished floor line to height indicated.
 - .2 Install straight and level to a tolerance of plus or minus 3 mm (1/8") over 3000 mm (10') straight edge, non-cumulative.
- .6 Corner guards:
 - .1 Corner guard edges shall be smooth.
 - .2 Mechanically fasten corner guards in accordance with guard manufacturer's written requirements. Fasteners shall be aligned and equally spaced.
 - .3 Visible fasteners are not permitted.

Corner Guards and Handrails

- .4 Install corner guard shall be tightly fitted without gaps.

END OF SECTION

Washroom Accessories

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Washroom accessories.
 - .2 Coordination and installation of washroom accessories as supplied by *Owner*.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Supply manufacturer's handling instructions, anchorage information, roughing-in dimensions, templates, and service requirements for installation of the work of this section, and assist or supervise, or both, the setting of anchorage devices and construction of other work incorporated with *Products* specified in this section in order that they function as intended.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Samples:
 - .1 Submit 3 samples of each finish specified.
- .4 Shop drawings:
 - .1 Include plans, elevations, hardware, and installation details.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 Accessories

- .1 Incorporate reinforcing, fastenings and anchorage required for building-in of *Products*.
- .2 Washroom accessories acceptable *Products*; locations as indicated or scheduled:
 - .1 Grab bars:
 - .1 GB1; Straight grab bars:

Washroom Accessories

- .1 Bobrick 'B-6806.99'.
- .2 GB2; L-shaped grab bars:
 - .1 Bobrick 'B-6898.99'.
- .2 MIR; Mirror with shelf:
 - .1 Bobrick 'B-292 2436'.
- .3 Sanitary napkin disposal:
 - .1 Bobrick 'B-270'.
- .4 Coat hook:
 - .1 Kingsway 'KG180 Anti-Ligature Single Coat Hook'.
- .5 Substitutions: in accordance with Section 01 25 00.
- .3 Washroom accessories supplied by *Owner*, locations as directed by *Owner*.
 - .1 Sharps container brackets.
 - .2 Hand sanitizer dispensers.
 - .3 Disinfectant wipe brackets.
 - .4 Glove dispenser boxes.
 - .5 Toilet paper holder.
 - .6 Soap dispenser.
 - .7 Paper towel dispenser.
- .4 Galvanic/dissimilar metal corrosion inhibitor (isolation coating): in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.

2.2 Fabrication

- .1 Fabricate *Products* with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that washroom accessories will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.

PART 3 - EXECUTION

3.1 Preparation

- .1 Verify that rough-in dimensions and blocking or back-up has been provided to comply with product manufacturer's written requirements.

3.2 Installation of Washroom Accessories

- .1 Comply with product manufacturers written requirements.
- .2 Install and secure fixtures rigidly in place using expansion shields in solid masonry or concrete, toggle bolts in hollow masonry or sheet metal screws at metal studs.

Washroom Accessories

- .3 Provide galvanic/dissimilar metal corrosion inhibitor (isolation coating) in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.
- .4 Install on built-in concealed solid backing materials. Grab bar installation shall be able to withstand 250 kg downward force.
- .5 Verify locations and mounting heights with *Consultant* before roughing-in.

3.3 Barrier Free Installation Heights

- .1 Install accessories to permit operable parts and controls to be accessed in accordance with authorities having jurisdiction.

3.4 Installation Tolerances

- .1 Install accessories plumb, level, straight, tight and secured, centred between joints on masonry and tile walls to the following maximum tolerances:
 - .1 Plumb and level: 3 mm (1/8").
 - .2 Variation from indicated position: 3 mm (1/8").

3.5 Adjusting and Cleaning

- .1 Verify under work of this section that installed *Products* function properly and adjust them accordingly to ensure satisfactory operation. Test mechanisms, hinges, locks, and latches and adjust and lubricate to ensure washroom accessories are in perfect working order.
- .2 Do not remove protective coatings until final cleaning, or earlier if directed by *Consultant*.
- .3 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at *Place of the Work* only if approved.

END OF SECTION

Solid Phenolic Lockers

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Solid phenolic lockers.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Indicate thicknesses of panels, fabricating methods, assembled banks of lockers, bases, trim, numbering, filler panels, end panels, sloped tops and manufacturer's installation instructions.
- .4 Samples:
 - .1 Submit sample of colour and finish.

1.3 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Materials

- .1 Lockers:
 - .1 Type: 6-tier locker.
 - .2 Size: 305 mm (wide) x 457 mm (deep) x 1828 mm (high).
 - .3 Solid phenolic:
 - .1 Decorative papers impregnated with the melamine resin on faces with a clear protective overcoat and integrally compression molded within a core consisting of solid phenolic impregnated kraft papers.
 - .2 Thicknesses; solid phenolic panels:
 - .1 Doors and frames: 12.7 mm (1/2").
 - .2 Tops, bottoms, and shelves: 10 mm (3/8").
 - .3 Backs: 6 mm (1/4").
 - .4 Sides: 8 mm (5/16").
 - .5 Filler and end panels: 12.7 mm (1/2").

Solid Phenolic Lockers

- .6 Sloped top: 6 mm (1/4").
- .3 Colours: To later selection by *Consultant*. from manufacturer's standard range.
- .4 Locking system: Hasp latch suitable for padlocks.
- .5 Hinges: constructed of stainless steel Type 304, provide 2 per door for multi-tier units and 3 for full height doors.
 - .1 Through-bolted hinges.
- .6 Number plates: Each door shall have a number plate riveted onto body or engraved on door pull, numbered sequentially starting at "1" for each locker Type as directed by the *Consultant*.
- .7 Ventilation: Airflow shall be achieved through louvers or perforates in the vertical frame members or door.
- .8 Base:
 - .1 Manufacturer's standard, 100 mm (4") high, fabricated from solid phenolic, colour to match lockers.
- .9 Acceptable *Products*:
 - .1 Spectrum 'Phenolic Lockers, Classic Locker'.
 - .2 Substitutions in accordance with 01 25 00.

PART 3 - EXECUTION

3.1 Installation

- .1 Assemble and install lockers complete with bases in accordance with manufacturer's written installation requirements.
- .2 Securely fasten at least every third locker through to wall studs, masonry or concrete substrate.
- .3 Install trim and filler panels where required for continuous appearance and where obstructions occur. Specific conditions as indicated.
- .4 Install finished end panels to exposed ends of locker banks.

3.2 Installation Tolerances

- .1 Install plumb, level, tight and secured.
- .2 Comply with the following maximum tolerances:
 - .1 Plumb and level: Maximum 3 mm (1/8").
 - .2 Variation from indicated position: plus/minus 3 mm (1/8").

END OF SECTION

Healthcare Equipment

PART 1- GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Healthcare equipment types as follows (supply and installation by *Contractor*):
 - .1 Patient lift and track system; ceiling-mounted.
 - .2 Horizontal service strip (medical service console); surface-mounted.
 - .3 Folding screen.
 - .2 Related sections:
 - .1 Wood blocking - under Section 06 10 53.
 - .2 Metal support systems - under Section 09 22 00.
 - .3 Mechanical – under Divisions 21, 22, and 23.
 - .4 Electrical - under Divisions 26, 27, and 28.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordinate with mechanical, electrical, and other *Subcontractors* for installation and connections.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit equipment manufacturer's handling and installation instructions, anchorage information, roughing-in dimensions, service requirements for installation of the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings for the following:
 - .1 Patient lift and track systems, and track support framing assemblies, including anchoring and connections for work of this section.
 - .2 Seismic design, connections and restraint.
 - .2 Clearly indicate, materials, finishes, fabrication details, dimensions, thicknesses, plans, elevations, hardware, fastenings, service connections and installation details.
 - .3 Indicate termination/connection points of services.

Healthcare Equipment

.4 Indicate proposed site connections, fasteners and methods.

.4 Samples:

.1 Submit duplicate samples of each finish specified.

.5 Templates:

.1 Submit templates to *Contractor* for use by installers and fabricators as required for proper location and installation of equipment.

1.4 Closeout Submittals

.1 Submit closeout submittals in accordance with Section 01 78 00.

.2 Operation and maintenance data:

.1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.5 Quality Assurance

.1 Qualifications:

.1 Installers:

.1 Shall have 5 years' experience, minimum, in the application of the *Products*, systems, and assemblies specified and with approval and training of *Product* manufacturers.

.2 Manufacturer:

.1 Shall have 10 years of continued experience, minimum, having successfully completed other projects of similar or greater magnitude.

1.6 Warranty

.1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Patient Lift and Track System (Ceiling-Mounted)

.1 Basis-of-design:

.1 Fixed ceiling lift:

.1 Maximum load capacity: 272 kg (600 lb).

.2 2286 mm (7.5') foot strap to allow vertical lift movement from floor.

.3 Vertical lift movement:

.1 Power operation:

.1 Battery powered; rechargeable: 24VDC lift motor.

.2 Batteries: Quick charge lithium ion batteries, as recommended by lift manufacturer.

Healthcare Equipment

- .3 Audible low battery indicator and visual battery/charge level display.
- .4 Auto shut-off when not in use to conserve battery life.
- .5 Emergency stop and emergency power lowering, with emergency manual raising or lowering.
- .6 Handset control.
- .4 Traverse lift movement:
 - .1 Power operation:
 - .1 Battery powered; rechargeable: 24VDC traverse motor.
 - .2 Automatic lift docking function; 'Return-to-Charge'.
 - .5 Battery charger; wall-mounted:
 - .1 Input: 120 VAC, 50-60 Hz.
 - .2 Output: 29.4 VDC, 1 A.
 - .6 Acceptable *Products*:
 - .1 Savaria 'M-Series Essential' with track bridging, distributed by Handicare.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .2 Track system; fixed track: Track system as recommended by patient lift manufacturer.
 - .1 Prefinished extruded aluminum track profile, including extruded aluminum ceiling brackets and white moulded styrene track end caps:
 - .1 Accurately formed, extruded aluminum alloy AA-6063-T6 to ANSI H35.1/H35.1M-2017 minimum, free from defects impairing appearance, strength and durability.
 - .2 Finish: Powder coat finish, white colour.
 - .2 Fastenings and connectors: Types as recommended by ceiling lift manufacturer.
 - .1 Prepainted fasteners, with finish/colour to match prefinished track for exposed locations.
 - .3 Provide track lift gate where indicated.
 - .4 Provide framing and suspension system components as recommended by ceiling lift manufacturer, for a complete track system installation, compatible with and to suit finished ceiling assemblies.
 - .5 Galvanic/dissimilar metal corrosion inhibitor (isolation coating): in accordance with Section 01 73 00 and written requirements of manufacturers of metals affected.

2.2 Medical Services Console

- .1 Basis of design manufacturer: Interspec.

Healthcare Equipment

- .1 Material and configuration: Refer to drawings.

2.3 Folding Screen

- .1 Wall mounted, folding screen.
- .2 Height: 1.85 m.
- .3 Length: 2.25 m.
- .4 Folded size: 0.25 m x 0.18 m.
- .5 Number of panels: 9.
- .6 Fold configuration: left or right as indicated on drawings.
- .7 Colour: White.
- .8 Acceptable *Products*:
 - .1 Silentia Inc. Model '06309' Folding Screen.
 - .2 Substitutions: in accordance with Section 01 25 00.

PART 3- EXECUTION

3.1 Installation

- .1 Install equipment in accordance with equipment manufacturer's written requirements and in accordance with reviewed shop drawings.
- .2 Submit manufacturer's information and templates required for installation of work of this section. Assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with *Products* specified in work of this section in order that they function as intended.
- .3 Include reinforcing, anchorage and mounting devices required for the installation of each *Product*.
- .4 Verify locations and mounting heights with *Consultant* before roughing-in.
- .5 Electrical *Subcontractor* shall be responsible for final electrical hook-up at service connection locations. Coordinate work of this section with work of Divisions 26, 27, and 28.

3.2 Installation – Service Console

- .1 Install equipment in accordance with equipment manufacturer's written requirements and in accordance with reviewed shop drawings.
- .2 Submit manufacturer's information and templates required for installation of work of this section. Assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with *Products* specified in work of this section in order that they function as intended.
- .3 Include reinforcing, anchorage and mounting devices required for the installation of each *Product*.

Healthcare Equipment

- .4 Verify locations and mounting heights with *Consultant* before roughing-in.

3.3 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Manufacturer's field review to be in accordance with Section 01 45 00.

3.4 Adjusting and Cleaning

- .1 Upon completion of installation, inspect finishes and materials for damage and faulty installation. Make good or replace damaged finishes and materials as directed by *Consultant* at no cost to *Owner*.
- .2 Verify under work of this section that installed *Products* function properly, and adjust accordingly to ensure satisfactory operation.
- .3 Do not remove protective coatings until final cleaning in accordance with Section 01 78 00, or earlier if directed by *Consultant*.

3.5 Closeout Activities

- .1 Testing:
 - .1 Test and commission equipment in accordance with equipment manufacturer's written requirements.
- .2 Demonstration:
 - .1 Before acceptance of system, arrange for demonstration of equipment with authorized representatives of *Owner*, to be performed by competent representative of equipment manufacturer to assure proper function, operation and explanation. Give *Owner's* representative a minimum of 48 hours advance notice in writing of demonstration date.
 - .2 Conduct comprehensive demonstration for *Owner's* staff on operation and care of equipment.

END OF SECTION

Roller Window Shades

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Roller window room darkening (black-out) shades at interior locations; RS-2.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit flammability performance data.
 - .3 Submit manufacturers' installation instructions.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Submit shop drawings or fully dimensioned catalogue cuts.
 - .3 Window treatment schedule: Use same designations indicated on *Contract Documents*.
 - .4 Clearly indicate general construction, configurations, jointing methods and locations, fastening methods, handing of controls, required blocking locations, banding (tandem shades), and installation details, including seismic design, connections and restraint.
- .4 Samples:
 - .1 Submit samples of each material and finish colour selected and each accessory.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers:

Roller Window Shades

- .1 Company specializing in manufacturing the *Products* specified in this section, with 10 years' experience minimum.
- .2 Installers / applicators / erectors:
 - .1 Work of this section shall be by forces in the direct employ or under control of the system manufacturer, skilled, trained, and experienced in work of similar scope and complexity.
- .2 Mock-ups:
 - .1 Erect 1 full size mock-up each roller shade type at the *Place of the Work* for review. Completed and accepted mock-up shall act as the standard to which balance of the work of this section will be judged.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Manufacturers

- .1 Acceptable *Products*:
 - .1 Legrand Global 'Teleshade Series'.
 - .2 Substitutions: in accordance with Section 01 25 00.

2.2 Performance/Design Requirements

- .1 Manual operation:
 - .1 Every part of a corded window covering that is accessible to a child and is small enough to be totally enclosed in a small parts cylinder in accordance with 'Corded Window Coverings Regulations - SOR/2019-97' must be affixed to the corded window covering so that the part does not become detached when it is subjected to a force of 90 N applied in any direction.
 - .2 Unreachable cords:
 - .1 A cord that is not reachable must remain so, whether the corded window covering is fully opened, fully closed or in any position in between, throughout the useful life of the corded window covering.
 - .3 Reachable cord with one free end; length:
 - .1 A reachable cord with one free end must not exceed 220 mm in length when it is pulled in any direction by the gradual application of force attaining 35 N.
 - .4 Reachable cord between two consecutive contact points; length:
 - .1 A reachable cord with no free end must not exceed 220 mm in length between two consecutive contact points when it is pulled in any direction by the gradual application of force attaining 35 N.
 - .5 Loop created by a reachable cord; perimeter:

Roller Window Shades

- .1 If a reachable cord is pulled in any direction by the gradual application of force attaining 35 N, the perimeter of any loop, whether it is existing, created or enlarged, must not exceed 440 mm.
- .6 Two reachable cords:
 - .1 If two reachable cords with one free end each can be connected to one another, end to end, after each has been pulled in any direction by the gradual application of force attaining 35 N, the following criteria must be met:
 - .1 The length of the resulting cord must not exceed 220 mm.
 - .2 The perimeter of the loop that is created must not exceed 440 mm.

2.3 Hardware - Manual Controlled Shades

- .1 Shades shall be operated to permit infinite positioning. Left or right hand operation and banding as applicable to suit *Place of the Work* condition.
 - .1 Drive assembly:
 - .1 Allow finger tip control and include a built in shock absorber system to prevent cord breakage under normal operating conditions;
 - .2 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.
 - .2 Provide chain clip, type to later selection by *Consultant*.

2.4 Assembly

- .1 Provide fully factory assembled shade unit consisting of 2 shade brackets, one piece extruded aluminum shade tube, extruded aluminum fascia, aluminum profile hembars, extruded vinyl fabric spline, and fabric as specified.
- .2 Fabric shall hang straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.
- .3 Factory modify housings where necessary to bypass columns.
- .4 End brackets: a two piece moulded ABS construction with nylon drive sprocket. Bracket colour shall coordinate with the fascia colour.
- .5 Shade tube: Minimum 1.52 mm (0.060") thick extruded aluminum with three equally spaced continuous stiffening fins, non-sag design, maximum deflection under full load of fabric L/700.
- .6 Fascia: Minimum 1.5 mm (1/6") thick extruded aluminum.
- .7 Hembar: Extruded aluminum with matching plastic end finials.
- .8 Mounting: Removal of shade system shall not require the disassembly of the shade unit.

2.5 Shade Mounting System

- .1 Design extruded aluminum bracket to accept preassembled shade system.
 - .1 Use brackets to facilitate the alignment with shade opening.

Roller Window Shades

- .2 Modular construction: Shades shall be removable as a complete modular unit without any component disassembly required.
- .3 Room darkening (black-out) shade features: 13 mm (1/2") pile mounted in prefinished 38 mm x 28 mm (1-1/2" x 1-1/8") extruded aluminum side and bottom channels finished to match mullions. Include Dynamic hembar to allow for variance in window sill level.

2.6 Aluminum Finish

- .1 Exposed aluminum: Baked enamel, colour to match window mullion finish.
- .2 Unexposed aluminium: Mill finish.

2.7 Shade Fabric Types

- .1 Room darkening (black-out) fabric; dimensionally stable fabrics:
 - .1 Acceptable *Products*:
 - .1 To later selection by *Consultant*.
 - .2 Substitutions: in accordance with Section 01 25 00.
 - .2 Colour: to later selection by *Consultant* from manufacturer's full range.
- .2 Fabric:
 - .1 Hang flat, without buckling or distortion. Edge, where trimmed, shall hang true and straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.
 - .2 Colour fast, retain its shape, and not be affected by moisture or heat.
- .3 Flammability performance:
 - .1 Certified by an independent laboratory, shade fabric shall pass CAN/ULC S109-14.

2.8 Fabrication

- .1 Finished assemblies: Square, true to size and free from distortion, twist, or other defects that could affect their strength, operation or appearance.
- .2 Factory applied finish: Uniform, smooth and without blemishes.

PART 3 - EXECUTION

3.1 Installation

- .1 Install shade systems in plumb, squared, adequately anchored, maintaining uniformed clearances, accurate alignment levels, and parallel with the window plane. Fabric shall not travel more than 3 mm (1/8") in either direction within channels after installation.
- .2 Fabric shall be pre-measured and manufactured off-site.
- .3 Shades shall be snapped into place without screws or visible fasteners.
- .4 Incorporate reinforcing, fastening and anchorage required for installation of shades.

Roller Window Shades

- .5 Securely attach installation fittings to their mounting surfaces with stainless steel or hardened aluminum screws of proper length and type, and durable anchors.
- .6 Install shade roller true and level, and with cloth to hang flat without buckling or distortion.
- .7 Room darkening shades (black-out) to be installed to eliminate passage of light from exterior.

3.2 Adjusting and Cleaning

- .1 Verify that installed shade system functions properly, and adjust it accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible.

3.3 Closeout Activities

- .1 Demonstration:
 - .1 Before acceptance of system, arrange for demonstration of equipment with authorized representatives of *Owner*, to be performed by representative of shade manufacturer to assure proper function, operation and explanation.
 - .2 Conduct comprehensive demonstration for *Owner's* staff on operation and care of interior window treatments.

END OF SECTION

Radiation Protection

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Lead sheet.
 - .2 Lead lined gypsum board.
 - .3 Lead lined steel screen frames.
 - .4 Lead lined steel window frame.
 - .5 Lead lined wood doors; plastic laminate faced.
 - .6 Leaded glass.

1.2 Administrative Requirements

- .1 Coordination
 - .1 Refer to mechanical, electrical and plumbing drawings for utility penetrations and shielding.
 - .2 Items furnished by other sections for installation into this section shall be installed in accordance with the requirements of such other sections, providing such requirements do not violate the shield.
 - .3 Items furnished by this section for installation into the work of other sections shall be furnished sufficiently early to the proper section for timely installation.
 - .4 Perform work of this section in proper sequence with the work of other sections and trades and in strict conformance with the reviewed shop drawings.
 - .5 Coordinate as required with other trades to assure proper and adequate provision in the work of those trades that interface with the work of this section.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.
 - .1 Independent inspection and testing company shall attend the pre-installation meeting.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Indicate dimensions, materials, layout, attachment methods, trims and locations of openings, and related work, including seismic design, connections and restraint.

Radiation Protection

- .3 Indicate layout of radiation-protected areas.
- .4 Indicate lead thickness or lead equivalencies of components.
- .5 Indicate anchorage, wall support and framing systems.
- .4 Certificates:
 - .1 Submit written certification of source of supply (including purchase orders and chain of supply/custody), as well as physical properties of materials (from a third party testing laboratory) for confirmation and review of authorities having jurisdiction and Physicist of Record.
 - .2 Submit written certification from leaded glass manufacturer certifying that the equivalent lead thickness of the glass provided meets or exceeds the minimum lead equivalency requirements specified in this section.
- .5 Photographic record:
 - .1 Submit complete photographic record of each type of lead material installation.
 - .2 Photographic record shall be done prior to installation of finish materials or covering of the work of this section.
 - .3 Submit 3 copies of photographic record of finished installation in each location.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Maintenance Instructions:
 - .1 Submit maintenance instructions for incorporation in operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 *Subcontractor*:
 - .1 Has adequate plant, roll forming machinery, equipment, and skilled workers to perform it expeditiously.
 - .2 Has successfully completed installations similar to that specified during a period of at least the immediate past 5 years.
- .2 Mock-ups:
 - .1 Construct mock-ups in locations as indicated by *Consultant*, provide typical installation of each type, complete with lead shielding, including door/window frame and partition junction, and electrical box and pipe intrusions. Modify mock-ups as directed and as required to obtain approval by *Consultant*.
 - .2 Do not proceed with remainder of installation until mock-up installation has been reviewed and accepted by *Consultant*.

Radiation Protection

- .3 Accepted mock-up may become a part of the final *Work*, subject to approval by the *Consultant*.

1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 Duration: 5 years.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers

- .1 Acceptable manufacturers: Unless otherwise indicated.
 - .1 MarShield - Division of Mars Metal Company.
 - .2 Mayco Industries, Inc.
 - .3 Nelco.
 - .4 Pitts Little Corporation.
 - .5 Ray-Bar Engineering Corporation.

2.2 Performance/Design Requirements

- .1 Radiation shielding shall meet the requirements of the *Contract Documents*, of authorities having jurisdiction, and of Physicist of Record.
- .2 Supports and support framing for lead *Products* shall be designed to withstand loads, without deflection that might impair the continuity of radiation protection.
 - .1 Supports and support framing shall maintain lead *Products* in place without any vertical slip movement or displacement of the lead *Products* due to the weight of the lead.
- .3 Design radiation shielding to provide equivalent thickness in any straight line with no gaps in system.
- .4 Seismic restraint: Design and install radiation protection systems, including support framing, and fastening and anchoring systems, to withstand the effects of earthquake motions in accordance with building code.
- .5 Lead lining at electrical boxes, penetrations and the like shall be the same thickness as lead in the walls.

2.3 General

- .1 Provide reinforcing, fastenings, and anchorage required for building-in of *Products*.
- .2 Specified materials are minimum acceptable quality. Manufacturer's standards exceeding specified quality shall be accepted.

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2.4 Lead Materials

- .1 Rolled lead sheet: 99.9% pure unpierced virgin lead, free from dross, oxide inclusions, scale, laminations, blisters, and cracks, to ASTM B749-14.
 - .1 Thickness: 1.6 mm (1/16").
 - .2 Variation in thickness: Not to exceed 3%.
- .2 Lead plate: 99.9% pure virgin lead, free from dross, oxide inclusions, scale, laminations, blisters and cracks, ASTM B749-14.
 - .1 Thickness: 1.6 mm (1/16").
 - .2 Variation in thickness: Not to exceed 3%.
- .3 Lead castings/fabrications and lead pigs: As indicated.
- .4 Lead foil for gypsum board:
 - .1 Lead foil: ASTM B29-14, conductive, 1.6 mm (1/16") thick minimum complete with discs to cover screw heads, pure lead.

2.5 Radiation-Shielded Doors, Frames, Windows, and Screens

- .1 Lead lined wood doors: Doors to meet requirements specified in Section 08 14 00, supplemented by material requirements specified below in this section.
 - .1 Solid core, high pressure decorative laminate, particleboard core, lead lined:
 - .1 Solid particle board core, laminate faced, lead lined, non fire rated and fire rated wood door construction to Architectural Woodwork Standards Manual, Section 9 and as follows:
 - .1 Type PC-HPDL-5-LL, particle board core to ANSI A208.1-2009 LD-1, with rolled pure sheet lead meeting ASTM B749-14, total 1.6 mm (1/16") minimum thickness, bonded to core under faces on both sides.
 - .2 For vertical edges (stiles) and exposed horizontal edges (rails). (Exposed horizontal edges are those edges that can be viewed from floors above.):
 - .1 High pressure decorative laminate finish edgeband, face, and cross bands are covered.
 - .2 Total lead lining thickness: 1.6 mm (1/16") mm minimum, unless otherwise indicated.
 - .3 Flush wood door construction using single layer of sheet lead in centre of door. Laminate wood cores under hydraulic pressure on each side of lead.
 - .4 Extend sheet lead lining to door edges providing radiation protection equal to partition in which door occurs.
 - .2 Lead lined steel window frames:
 - .1 Steel frames in accordance with Section 08 11 13.
 - .2 Fabricated from: 16 gauge steel.
 - .3 For frames with lead thickness of 3.2 mm (1/8") or greater:

Radiation Protection

- .1 Provide steel angle reinforcing, spot welded at 152 mm (6") on centre, with anchor bolts to secure frame.
- .4 Design lead lined window frames to accommodate lead lining.
- .5 Frame supports: minimum 57 mm (2-1/4") steel angle.
- .6 Securely install lead lining to inside of frame profile from jamb return to jamb stop on the door side of frame only where indicated on drawings.

2.6 Lead Glass

- .1 X-ray protective glass or leaded glass; laminated lead glass:
 - .1 Glass units shall display label indicating equivalent lead thickness meeting or exceeding the lead equivalency requirements specified in this section and matching the lead equivalency values specified in manufacturer's certification.
 - .2 Lead equivalency thickness: equivalent to 3.2 mm (1/8") thick sheet lead.
 - .1 Laminated leaded glass.
 - .3 Acceptable manufacturers:
 - .1 A&L Shielding.
 - .2 Marshield.
 - .3 Nelco.
 - .4 Ultraray.
 - .5 Substitutions: in accordance with Section 01 25 00.

2.7 Lead Laminated Gypsum Board

- .1 Lead laminated gypsum board; fire-rated:
 - .1 Single unpierced layer of sheet lead laminated to back of gypsum board, paper faced gypsum core panel with a specially formulated core for use in fire-resistive Type X or Type C designs, ASTM C1396/C1396M-17.

PART 3 - EXECUTION

3.1 Examination

- .1 Verification of conditions:
 - .1 Examine areas and conditions under which work of this section is to be performed and identify conditions detrimental to proper or timely completion.
 - .2 Do not proceed until unsatisfactory conditions have been corrected.

3.2 Installation

- .1 Shielding shall be continuous within its limits, with soldered seams, where other work, materials or accessories penetrate the shielding, all penetrations must be approved by shielding *Subcontractor*.

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- .2 Installation shall be by the manufacturer's field installation technicians.
- .3 *Supplier* shall provide information and templates required for installation of the work of this section, and assist or supervise, of both, the setting of anchorage devices, and construction of other work incorporated with products specified in this section in order that they function as intended.
- .4 Install work to meet manufacturer's recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .5 Provide lead sheet envelope to enclose back and sides of all items and equipment recessed in solid masonry walls, and in locations so noted. Form lead so as not to reduce the effective thickness at any location. Lead shall not be pierced for fastenings unless essential and pierced areas shall be covered with sheet lead lapped to ensure continuity of protection.
- .6 Shield cabinets, pipes, conduits or any other materials built-in to, or projecting through, lead lining with 1.6 mm (1/16") thick sheet lead. Overlap sheets a minimum of 50 mm (2").
- .7 Complete room installation shall provide a continuous uninterrupted membrane protection to heights and areas indicated and be free of holes, cracks or areas of penetration by radiation.
- .8 Lead sheet on steel stud framing:
 - .1 Install lead sheets vertically on steel stud framing in strips extending across face of stud flanges and wrapped around flange and secured with screws to throat of steel studs; continue application in this fashion for length of protection desired as indicated. Each strip shall overlap previous strip by at least 50 mm (2") at vertical and horizontal joints. Use sheet lead to seal voids to provide a complete uninterrupted barrier.
 - .2 Secure lead sheet to steel stud with gypsum board screws at a maximum 152 mm (6") on centre.
- .9 Lead lined gypsum partitions:
 - .1 Erect lead-lined partitions at areas as shown on drawings, ensuring complete continuity of lead envelope.

3.3 Installation - Frame and Screen

- .1 Lead lined frames:
 - .1 Install lead lined steel window and screen frames in accordance with Section 08 11 13.
 - .1 For lead lining less than 3.2 mm (1/8") thick:
 - .1 Secure frames with steel stud anchors.
 - .2 For lead lining 3.2 mm (1/8") thick or greater:
 - .1 Provide door frame supports in accordance with Section 05 50 00:
 - .1 Run steel angle supports full height on each door frame jamb to structure above.

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- .2 Secure supports to structure.
- .3 Spot-weld supports at 152 mm (6") along jambs and at corners of jambs and head frame.
- .4 Anchor frame to substrate with fasteners appropriate for substrate.
- .5 Apply coating of asphalt mastic or paint to lead lining in door frames where lead will come in contact with masonry or grout.
- .2 Provide minimum 3 anchors per jamb, located adjacent to hinge on hinge jamb, and at corresponding heights on strike jamb.
- .3 In metal stud construction, use wall anchors attached to studs with screws.
- .4 Lap lead lining of frames over lining in walls at least 25 mm (1").
- .5 Lead lining of frames:
 - .1 Line inside of frames with lead of thickness not less than that required in doors and walls in which frames are used. Form lead to match frame contour, continuous in each jamb and across head, lapping stops. Form lead shields around areas prepared to receive hardware. Lap lead lining over lining in walls by minimum 25 mm (1").
- .2 Lead lined doors:
 - .1 Install lead lined wood doors in accordance with Section 08 14 00.
 - .2 Install doors in frames level and plumb, aligned with frames and with uniform clearance at edges.
- .3 Hardware:
 - .1 Install finish hardware in accordance with Section 08 71 00.
 - .2 Line covers, escutcheons, and plates to provide effective shielding at cutouts and penetrations of frames and doors.
 - .3 Coordinate with requirements of Section 08 71 00 for other installations requirements.

3.4 Installation - Penetration Items

- .1 Provide lead shields to maintain continuity of protection at penetrations of lead linings.
- .2 Provide lead linings, sleeves, shields, and other protection in thickness not less than that required in assembly being penetrated.
- .3 Cut wall penetration covers from lead sheet of equal or greater thickness than backing on adjacent wall panels. Cut wall penetration covers to size required to cover wall penetrations with laps 25 mm (1") minimum wide and as indicated.
- .4 Adhesive-apply lead sheet penetration covers on penetrating boxes and raceways and return penetration covers to backside of lead-backed wall panels with 25 mm (1") minimum laps.
- .5 Do not use penetrating fasteners unless indicated otherwise.

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- .6 Outlet boxes and conduit: Install between studs using steel telescoping mounting brackets. Cover or line with lead sheet lapped over adjacent lead lining at least 25 mm (1"). Wrap conduit with lead sheet for a distance of 250 mm (10") from box.

3.5 Installation - Wall Penetration Covers

- .1 Duct penetrations; with 8 psf or less of lead sheet:
 - .1 Wrap ducts with wall penetration covers, lapping lead joints 25 mm (1") minimum.
 - .2 Secure lead sheet in place with 25 mm (1") minimum width steel bands spaced not more than 305 mm (12") on centre.
 - .3 Do not cut into lead sheet with tightening steel bands.
- .2 Duct penetrations; with greater than 8 psf of lead sheet and where duct shielding exceeds 610 mm (24") in width:
 - .1 Laminate wall penetration covers to plywood or other similar structural panels conforming to shape of duct, lapping lead joints 25 mm (1") minimum.
 - .2 Secure lead laminated panels to ducts with mechanical fasteners located at duct seams and corners.
 - .3 Where necessary to prevent lead laminated panels from overloading duct supports, independently suspend panels from hangers secured to overhead building structure.
 - .4 Cover fastener heads with lead sheet matching thickness of adjacent lead.
- .3 Piping: Unless indicated otherwise, wrap piping with lead sheet for 250 mm (10") from point of penetration.

3.6 Installation - Lead-Laminated Gypsum Board

- .1 Installation to comply with gypsum board manufacturer's written recommendations and with Section 09 29 00.
- .2 Adhere lead strips on face of studs at joints in lead-laminated gypsum board, including inside and outside corners. Use 50 mm (2") wide strips by same thickness as sheet lead laminated on gypsum board.
- .3 Shim studs and other framing members as necessary to provide flat, flush finished surfaces.
- .4 Install lead-laminated gypsum board on framing with screws spaced not more than 203 mm (8") on centre along edges of board and 305 mm (12") on centre in field of board.
- .5 Adhere lead discs to fastener heads. In each case, use method that provides continuous radiation shielding.
- .6 Where lead-laminated gypsum board is final substrate, apply joint treatment on fasteners and joints in accordance with Section 09 29 00.
- .7 Where second layer of gypsum board occurs over lead-laminated gypsum board, comply with Section 09 29 00 for application of second layer gypsum board.

Radiation Protection

3.7 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Coordinate field reviews of installations for review by *Consultant* and the Physicist of Record before building-in finishes, enclosing, or covering the work of this section.
- .3 The *Owner* will initiate radiation leakage testing by Ministry of Health, Radiation Inspection Service, Institutional Services Branch.
- .4 If tests reveal radiation leakage, *Contractor* shall make remedial repairs to ensure a leak-free installation.

3.8 Adjusting and Cleaning

- .1 Immediately remove spots, smears, stains, residues, adhesives, etc., from work of this section and/or upon adjacent areas or surfaces which result from the work of this section.
- .2 Upon completion of the work of this section, dispose of debris, trash, containers, residue, remnants and scraps which result from the work of this section.
- .3 Check and readjust operating hardware items, leaving doors and frames undamaged and in proper operating condition.
- .4 Leave exposed surfaces ready for site finishing.

3.9 Protection

- .1 Exercise care in handling and protecting materials and finishes during fabrication, shipment, erection and finishing, as necessary to prevent damage to finished surfaces and shielding linings.
- .2 Protect work of this section against damage, should damage occur prior to *Substantial Performance of the Work*, it shall be removed and replaced at no additional expense to the *Owner*.
- .3 Lock radiation-protected rooms once doors hardware is installed. Limit access to only those persons performing *Work* in radiation-protected rooms or as directed by *Consultant*.
- .4 Tape temporary paper signs on radiation-resistant walls with the following text:
 - .1 "Radiation Shielded Assembly - Do not make penetrations or mount equipment on this wall without prior approval by *Consultant*".

END OF SECTION

Chain Link Fences and Gates

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Chain link fences and gates.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Shop drawings:
 - .1 Drawings to indicate: materials, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, dimensions, details and accessories.

1.3 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance requirements for inclusion in the operation and maintenance manuals.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified.

PART 2 - PRODUCTS

2.1 Chain Link Fabric

- .1 Steel chain link fabric:
 - .1 3.76 mm diameter (No. 9 gauge) steel wire woven in a 50 mm (2") mesh, hot dipped galvanized after weaving and knuckled finish top and bottom selvage edges.
 - .2 Zinc-Coated Steel Fabric: in accordance with ASTM A392 hot dip galvanized before or after weaving.
 - .1 Class 2 - 610 g/m² (2.0 oz/ft²).
 - .3 Fabric selvage:
 - .1 Standard fabric selvage for 50 mm (2") mesh 1830 mm (6 ft) high and over is knuckle finish at one end and twist at the other, K&T.
 - .2 Fabric less than 1830 mm (6 ft), knuckle finish top and bottom, K&K.

Chain Link Fences and Gates

2.2 Steel Fence Framework

- .1 Round steel pipe and rail: Round steel pipe and rail: in accordance with ASTM F1043 Group IA Table 3 Heavy Industrial Fence Framework, schedule 40 galvanized pipe per ASTM F1083. Exterior zinc coating Type A, interior zinc coating Type A. Regular Grade.
- .1 Posts: CLFMI (Chain Link Fence Manufacturer Institute) Type 1, standard butt-welded Schedule 40, in accordance with ASTM F1083-18 standard weight, galvanized pipe. Supply according to the following height schedule:
 - .1 1800 mm (6') and under fabric height:
 - .1 Line posts: 50 mm (2") outside diameter, 850mm (34") longer than fabric, nominal weight 4.0kg/m (2.72lb/ft).
 - .2 Terminal, corner and gate posts: 60 mm (2.375") outside diameter, 1075 mm (42") longer than fabric, nominal weight 5.4kg/m (3.65lb/ft).
 - .2 Over 1800 mm (6') fabric height:
 - .1 Line posts: 60mm (2.375") outside diameter, 1075mm (42") longer than fabric, nominal weight 5.4kg/m (3.65lb/ft).
 - .2 Terminal, corner and gate posts: 73 mm (2.875") outside diameter, 1220mm (48") longer than fabric.
- .2 Gate posts: in accordance with CLFMI Product Manual Guidelines.
- .3 Top, brace, bottom and intermediate rails: 42 mm (1.660 in.) OD, 3.38 kg/m (2.27 lb/ft).
- .2 Post tops: non-decorative aluminum caps or approved equal, securely attached to eliminate removal by hand and allowing for the inserting of 45 mm (1-3/4") top rail in a horizontal position for fencing over 2400 mm (8') height and 32 mm (1-1/4") top rail for fences under 2400 mm (8') height.
- .3 Gates: swing type, with frames constructed of 45 mm (1-3/4") outside diameter standard butt-welded Schedule 40, ASTM A53/A53M-18 pipe, joints electrically welded, and hot dipped galvanized after fabrication, complete with galvanized hardware.
- .4 Tension wire:
 - .1 Metallic Coated Steel Marcellled Tension Wire: 4.50 mm (7 gauge, 0.177 in.) marcellled wire complying with ASTM A824.
 - .2 Type II Zinc-Coated Class 5 - 610 g/m² (2.0 oz/ft²).
- .5 Tie wire and hog rings:
 - .1 Tie wire and hog rings: Galvanized minimum zinc coating 366 g/m² (1.20 oz/ft²) 3.76 mm (9 gauge, 0.148") steel wire in accordance with ASTM F626.
- .6 Concrete:
 - .1 20 MPa strength at 28 days; slump 100 mm (4") maximum at point of deposit ready mixed at plant and transported to the site by truck in accordance with CAN/CSA A23.1/A23.2-19.

Chain Link Fences and Gates

- .2 Concrete mixed on site will not be accepted unless approved in writing by the *Consultant* prior to use.

PART 3 - EXECUTION

3.1 Preparation

- .1 Clearing: surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence
- .2 Stake out: prior to proceeding with fence installation, obtain the approval of the *Consultant*, in writing, of fence location stake out.

3.2 Framework Installation

- .1 Set posts in concrete footings to the height required in Sonotube forms. Top of footings is to be 150 mm (6") below finished grade and crowned to shed water away.
 - .1 Provide post footings according to the following schedule minimum dimensions:
 - .1 Under 1800 mm (6') fabric height:
 - .1 Line posts: 200 mm (8") diameter x 1075 mm (42") depth.
 - .2 End, corner and gate posts: 305 mm (12") diameter x 1220 mm (48") depth.
 - .2 Over 1800 mm (6') fabric height:
 - .1 Line posts: 200 mm (8") diameter x 1220 mm (48") depth.
 - .2 End, corner and gate posts: 350 mm (14") diameter x 1525 mm (5') depth.
 - .2 Maximum line post spacing:
 - .1 2134 mm (7').
- .2 Rails:
 - .1 Top rail: Install 6400 mm (21 ft.) lengths of rail continuous thru the line post or barb arm loop top. Splice rail using top rail sleeves minimum 152 mm (6 in.) long. The rail shall be secured to the terminal post by a brace band and rail end.
 - .2 Bottom rail: Field cut and secured to the line posts using boulevard bands or railends and brace bands.
- .3 Terminal posts: End, corner, pull and gate posts shall be braced and trussed for fence 1830 mm (6 ft) and higher and for fences 1525 mm (60") in height not having a top rail. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.
- .4 Tension wire: Shall be installed 100 mm (4") up from the bottom of the fabric. Fences without top rail shall have a tension wire installed 100 mm (4") down from the top of the fabric. Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using brace band. Secure the tension wire to the chain link fabric with a 9 gauge hog rings 450 mm (18") on centre and to each line post with a tie wire.

Chain Link Fences and Gates

3.3 Chain Link Fabric Installation

- .1 Install fabric to side of the framework as per drawings or to later instruction by *Consultant*.
- .2 Attach fabric to the terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post with tension bands and 8 mm (5/16") carriage bolts spaced no greater than 305 mm (12") on centre.
- .3 Small mesh fabric less than 25.4 mm (1"), attach to terminal post by sandwiching the mesh between the post and a vertical 50 mm (2") wide by 4.76 mm (3/16 in.) steel bar using carriage bolts, thru bolted thru the bar, mesh and post spaced 381 mm (15 in.) on centre.
- .4 Chain link fabric to be stretched taut free of sag. Fabric to be secured to the line post with tie wires spaced no greater than 305 mm (12") on centre and to rail spaced no greater than 450 mm (18") on centre.
- .5 Secure fabric to the tension wire with hog rings spaced no greater than 450 mm (18") apart. Excess wire shall be cut off and bent over to prevent injury.
- .6 The installed fabric shall have a ground clearance on no more than 50 mm (2").
- .7 Ensure space between bottom of fabric and solid surface is no greater than 50 mm (2") in any location.

3.4 Gate Installation

- .1 Swing gates:
 - .1 Installation of swing gates and gateposts in accordance with ASTM F567. Direction of swing shall be as per drawings or to later instruction by *Consultant*.
 - .2 Gates shall be plumb in the closed position having a bottom clearance of 75 mm (3") grade permitting.
 - .3 Hinge and latch offset opening space from the gate frame to the post shall be no greater than 75 mm (3") in the closed position.
 - .4 Double gate drop bar receivers shall be set in a concrete footing minimum 150 mm (6") diameter 610 mm (24") deep.
 - .5 Gate leaf holdbacks shall be installed for all double gates.

3.5 Nuts and Bolts

- .1 Carriage bolts used for fittings shall be installed with the head on the secure side of the fence.
- .2 Bolts shall be peened over to prevent removal of the nut.

END OF SECTION