

Senior Services and Long-Term Care
City Of Toronto

CASTLEVIEW WYCHWOOD TOWERS
Interior Upgrades

PROJECT MANUAL
VOLUME 1
(1 OF 2)

ISSUED FOR TENDER
December 2024

ISSUED FOR MLTC REVIEW
November 2024

MSA PROJECT NO: 21503.F03

MONTGOMERY SISAM ARCHITECTS INC.
CROSSEY ENGINEERING LTD.
CROSSEY ENGINEERING LTD.

ARCHITECTURAL
MECHANICAL
ELECTRICAL

NO	1
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Design Discipline

Documents prepared by the respective Consultants are designated by the following discipline symbols:

- Owner (O)
- Structural Consultant (S)
- Architect (A)
- Hardware Consultant (H)
- Mechanical Consultant (M)
- Electrical Consultant (E)

VOLUME 1

(Divisions 0-11)

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

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DIVISION 02 - EXISTING CONDITIONS

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DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

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DIVISION 09 - FINISHES

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DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

Section	Title	Discipline	Pages
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1 SUMMARY OF WORK

1.1 Work under this Contract covers the following major items.

1.2 The Scope of Work for this Project is to include, but not be limited to the following:

.1 Demolition:

- .1 Reception: Removal of bench and knee wall in preparation for new interior glazing; removal of acoustical ceiling in preparation for new gypsum board ceiling; and all as indicated on Drawings and Specifications for the Work.
- .2 Washroom cores: Removal of all accessories, flooring and wall base, partition walls, counters, water closets, showers, tubs, ceilings in preparation for new work. Remove mechanical and electrical items in preparation for new work; and all as indicated on Drawings and Specifications for the Work.
- .3 All work indicated by the Drawings and Specifications as required for a complete replacement.

.2 New work:

- .1 Reception: Interior glazing, millwork, bi-folding security shutter gate, gypsum board ceiling, light fixtures, space heater, door release and security hardware; and all as indicated on Drawings and Specifications for the Work
- .2 East and West washroom cores: Interior partitions, wall protection, gypsum board and acoustical ceilings, epoxy floor and wall base, floor drains, corner guards, washroom accessories, barrier free showers, tubs, sinks, toilet partitions, millwork, doors, ceiling lifts, lighting, ADO doors, mechanical and electrical items; and all as indicated on Drawings and Specifications for the Work.
- .3 Parking access control: One-way entry gate and one-way exit gate with card access, emergency access, intercom; and all as indicated on Contract Drawings and Specifications for the Work.

2 ALTERNATIVES

2.1 All alternatives must be submitted with the bid using Appendix SA. Complete and submit form appended to this Section.

3 PHASING OF THE WORK

3.1 The Work of this Contract shall be performed in phases. All Phasing will be subject to approval from the Supervisor of Facility and Mechanical Services and as identified in the Ministry of Health Operational Plan for the Work.

4 **WORK RESTRICTIONS**

4.1 Contractor's Use Of Site

- .1 Use of site is limited to immediate areas of work. Areas designated for storage of material and equipment where specific to the project, are to be coordinated with the Owner and Supervisor of Facility and Mechanical Services.
- .2 Do not unreasonably encumber site with materials or equipment. Move stored products or equipment which interfere with operations of Owner and Supervisor of Facility and Mechanical Services, or other Contractors. Obtain and pay for use of off-site additional storage, or work areas as required by the Work.
- .3 Sign-in procedures: All Contractors/Subcontractors should sign-in daily meeting City of Toronto standards and CAN/CSA Z317.13 -12 - Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities.

4.2 Coordination with Occupants

- .1 Coordinate performance and sequencing of the Work with the Owner. Notify the Owner 48 hours in advance of noise-generating activities or interruption of any building services which may disrupt normal operations. Do not interrupt building services without Owner's and Supervisor of Facility and Mechanical Services's permission.

4.3 Hours of Work

- .1 Hours of work for this contract are generally confined to 8:00 am to 5:00 pm Monday to Friday. Where required by sequencing of the Work, or where shutdown of building services is required, portions of the Work may be required to be performed outside of regular daily business hours, or on weekends. All Hours of Work permitted will be subject to approval from the Supervisor of Facility and Mechanical Services and will be as identified in the Ministry of Health Operational Plan for the Work.

4.4 Allowances

- .1 Include all allowances listed below in the Bid Price. Expend Cash Allowances as directed by the Consultant. Each Cash Allowance will be adjusted to actual cost as defined hereunder and Contract Price will be amended accordingly by written order. Progress payments for work and material authorized under Cash Allowances will be made in accordance with the Contract. Cash allowances do not include H.S.T. Contractor to include all overhead and profit mark-ups associated with Material (Supply Only) or Assembly (Supply and Install) Cash Allowances.
 - .1 Include the following Allowances in the Bid Price:
 - .1 Amount for the Cash Allowance will be defined in the Bid Sheet.

5 **CONTRACT MODIFICATIONS**

- .1 Supplemental Instruction: as issued by the Consultant, consistent with the intent of the Contract Documents, and will not involve an adjustment in Contract Price or Contract Time.
- .2 Proposed Change: as issued by the Consultant, will notify the Contractor of an impending or proposed change to the Work, and will require submission of a quotation from the Contractor and all affected Subcontractors for each item noted. Submit quotation within the time period stipulated on the form, and indicate separate line items for labour and materials in each case. Work outlined in a Proposed Change must not proceed without the issuance of a Change Order signed by the Owner.
- .3 Change Order: will be issued by the Consultant upon review and approval of quotations for a Proposed Change, or a Change Directive, and authorizes the Contractor to proceed with the change(s) proposed. A Change Order will amend the Contract Price, and/or the Contract Time.
- .4 Fees For Changes to The Work
 - .1 The following fees will apply to the Contract Price for changes to the Work and shall include all statutory charges, applicable duties and taxes, charges required by labour agreements in force, charges related to site and/or office overhead, project management and administration, all shop and field supervision, clerical, drafting, bonding costs, permits, associated payroll costs, and other charges incidental to the work including but not limited to handling, equipment warranty, identification, coordination, scheduling, Bill 208 and WHMIS.
 - .2 The Fees For Changes In The Work shall apply only to extras to the Contract. Contractor or Subcontractor mark-up will not be applied to credits.
 - .3 For all Changes to the Work which may be ordered by the Owner, the following maximum net mark-ups for overhead and profit by the Contractor will be permitted for adjustments in Contract Price in accordance with the General Conditions:

Contractor's Mark-up on Work by Own Forces	Contractor's Mark-up on Subcontracted Work
5%	5%

- .4 For all Changes to the Work which may be ordered by the Owner, the following maximum net mark-ups for overhead and profit by Subcontractors will be permitted for adjustments in Contract Price in accordance with the General Conditions:

Contractor's Mark-up on Work by Own Forces	Contractor's Mark-up on Subcontracted Work
5%	5%*

- .5 (*) Aggregate total of overhead and profit for ALL subtrades within the Subcontractor's Contract.

6 APPLICATIONS FOR PAYMENT

- 6.1 Applications for payment on account may be made monthly as the Work progresses, and shall be preceded by the submission of a Schedule of Values for review by the Consultant.
- 6.2 The second and all subsequent applications for payment shall include a statement based on the Schedule of Values, a statutory declaration (CCDC 9B), and a standard Workers Compensation Certificate of Clearance.
- 6.3 The General Contractor to provide cash flow projection for the Work at the project kick-off meeting and maintain the cash flow projection for the duration of the Work with additional submissions monthly with each progress draw.
- 6.4 Schedule Of Values
- .1 Complete Schedule of Values must be submitted at the Project Pre-Construction Meeting. For Phased Work, the Schedule of Values shall identify value of the work by Phase and the value of all Phases must be submitted at the Project Pre-Construction Meeting.
- .2 Submit Schedule of Values in spreadsheet form acceptable to the Consultant.
- .3 List items of work as separate line items.
- .4 The values of the Work shall be listed as to the aggregate percentage and dollar value completed, under the following major headings:
- .1 Initial contract amounts for each line item,
 - .2 Progress to Date,
 - .3 Percent Complete,
 - .4 Current Invoice,
 - .5 Previous Billings,
 - .6 Contract Balance

- .5 Final totals shall identify:
 - .1 Total amount
 - .2 Holdback deducted
 - .3 Holdback released
 - .4 Amount invoiced to date
 - .5 Net amount
 - .6 HST
 - .7 Amount due this Certificate

7 PROJECT MANAGEMENT & COORDINATION

7.1 Project Coordination

- .1 The Contractor is responsible for the overall coordination of the Work. Coordinate the work of all subcontractors, and provide such assistance as is necessary, including but not limited to;
 - .1 Providing site dimensions and layout,
 - .2 Providing temporary facilities and controls,
 - .3 Scheduling subcontractors work to prevent conflicts,
 - .4 Scheduling and administering regular subtrade scheduling and coordination meetings throughout progress of the Work.
 - .5 Scheduling and administering regular subtrade safety meetings throughout progress of the Work.
- .2 The Contractor shall facilitate production of interference drawings where necessary for coordination of the Work. Provide such interference drawings to the Consultant for review.
- .3 Coordinate with Owner as required for any Owner supplied and installed items required by this Project. Provide miscellaneous blocking and mounting as required for intended items.

7.2 Project Supervision

- .1 The Contractor shall provide and maintain full-time supervision from their own staff on site. The supervisor shall be responsible for the overall day-to-day coordination on site between subtrades.
- .2 The supervisor shall coordinate the work of all subcontractors, and provide such assistance as is necessary.

7.3 Project Meetings

- .1 Schedule and administer regular project progress meetings throughout progress of work. Frequency of meetings as agreed by Owner Consultants and Contractor at start-up meeting. The minimum for progress meeting shall be bi-weekly.
- .2 Distribute written notice of each meeting to Owner & Consultants four days in advance of meeting date. Indicate full agenda of coming meeting.
- .3 The Contractor shall submit meeting notes within 24 hours of the meeting and from these records and other notes the official minutes can be prepared. Itemize significant proceedings and decisions. Identify 'action by' appropriate parties. Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants and affected parties not in attendance.
- .4 Standard Templates for Minutes of Meeting will be distributed for the Contractors use at the Pre-Construction Meeting.
- .5 Contractor to provide Project Contact List within 4 days following the Pre-Construction Meeting. Standard templates for the Contact List will be distributed for the Contractors use at the Pre-Construction Meeting.

7.4 Project Site Administration

- .1 Contractor to maintain at the Jobsite - 1 - 8.5" x 11" Binder containing the following:
 - .1 Contract Documents.
 - .2 Building Permit & all other required permits
 - .3 Building Permit Review Documents
 - .4 Addenda.
 - .5 Reviewed shop drawings.
 - .6 Change Orders and other Contract modifications.
 - .7 Field test and inspection reports.
 - .8 Approved schedules.
 - .9 MSDS Sheets and relevant Product Data.
 - .10 Contact List.
 - .11 Notice of Project.
 - .12 Rform correspondence.
 - .13 All additional items requested as per the Owners Pre-Construction List.

7.5 Construction Progress Schedule.

- .1 Prepare schedule in horizontal chart form, with weekly horizontal time scale identifying first/last work day of each week and separate line for each trade or operation of the Work. Schedule must utilize "critical path" method. Schedule to be MS Project format.
- .2 Project Schedules shall identify all long lead delivery items and shop drawing time requirements.

- .3 Identify projected major milestones in the course of the Work such as completion of foundation work, structure, closing in, major inspections by building officials, Substantial Performance, etc.
 - .4 Submit one copy of preliminary Progress Schedule for review at the Project Pre-Construction Meeting. Amend and update schedule on a regular basis or as requested by the Consultant.
 - .5 All project Schedules will be reviewed by the Consultant based on the time commitment identified in the RFQ documents.
- 7.6 Submittal Schedule
- .1 Provide schedule for submittal of all Shop Drawings, Product Data and Samples at the Project Pre-Construction Meeting.
 - .2 Provide complete list of all manufactured products to be used in the course of the Work, including those amended by addenda.
- 7.7 Additional Documents
- .1 Consultant may issue additional documents in the form of drawings, specifications, schedules, or written instructions to assist proper execution of the Work. These documents shall take the form of either a Supplemental Instruction or Change Order.
- 7.8 Submittals
- .1 Submit to Consultant, all items specified for review, at least 10 days before reviewed submissions will be needed, and in orderly sequence so as to not cause delay in the Work. Do not proceed with work affected by the submittal until review is complete.
 - .2 Review all submittals prior to submission to the Consultant. Submittals not stamped, signed, and dated will be returned without review.
 - .3 Verify field measurements and affected adjacent work are coordinated. Contractor's responsibility for errors and omissions in submission, or deviations from requirements of Contract Documents, is not relieved by Consultant's review of submittals.
 - .4 A 2 week standard timeframe is assumed for the preparation and submission of Sample, Shop Drawings, and Product Data. All Samples, Shop Drawings and Product Data which do not meet this criteria must be identified at the project Pre-Construction Meeting.

7.9 Submission Requirements

- .1 Submit digital copies of all submittals. Submittals by Email, or as copies of an email transmissions are not acceptable and will not be reviewed. Shop drawings and product data sheets not submitted in the scale type of the contract documents (ie. metric for metric drawings) will not be reviewed.
- .2 Accompany submissions with transmittal letter containing date, Project title and number, Contractor's name and address, drawing/page numbers of each shop drawing or data sheet, identification (ie. "structural steel shop dwgs."), and number of copies submitted.

7.10 Return of Submissions

- .1 If no errors are discovered or only minor corrections are made, one copy of the submission will be returned. If shop drawings or data sheets are rejected, noted copy will be returned and resubmission of corrected shop drawings or data sheets through the same procedure indicated above, shall be made.

7.11 Distribution of Submittals after Review

- .1 Distribute copies of shop drawings and product data which carry Consultant's stamp to all affected parties.

7.12 Shop Drawings

- .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work.
- .2 Adjustments made on shop drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the Work.
- .3 Reproductions of Consultants' drawings are not acceptable for the purpose of creating Shop Drawings.

7.13 Product Data Sheets

- .1 Manufacturer's standard schematics, catalogue sheets, diagrams, schedules, performance charts, illustrations and other descriptive data are acceptable in lieu of shop drawings, where specified.
- .2 Submit product data sheets or brochures requested in specification Sections, and as the Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
- .3 Submit copies of all WHMIS Data Sheets.

7.14 Samples

- .1 Submit duplicate samples for review, in sizes requested in respective specification sections. Label samples as to origin and intended use in the Work. Where colour, pattern or texture is criteria, submit full range of samples.
- .2 Deliver samples prepaid to Consultant's office.
- .3 Reviewed samples will become standards of work and material against which installed work will be checked on project.

8 CONTRACT ADMINISTRATION

- 8.1 The Contract Administration office functions performed by the Consultant will generally be done through the web based contract administration software "Rform" by Re Form Technologies Ltd. (www.rform.ca).
- 8.2 The Contractor will be required to participate with the balance of the project team by using Rform for the duration of the project. Rform is a free service to the Contractor and does not require the Contractor to pay any setup or usage fees.
- 8.3 The Contractor will be provided with instructions on the access and operation of Rform in the event they are not familiar with it's function or operation. The Contractor's staff involved in the project will be provided with access to Rform at no cost to the Contractor.
- 8.4 Suppliers and Subcontractors will not be provided with access to Rform. The distribution of information issued by the Consultant, and coordination of that information, remains the responsibility of the Contractor.
- 8.5 Rform will be used for issuing electronic project related documents, including Requests for Information, Supplemental Instructions, Proposed Change Orders, Change Orders, Change Directives, Progress Claims, Certificates of Payment, Submittal Reviews, and other forms as may be required. At the discretion of the Consultant, Rform may also be used for the distribution and filing of other project related documents, including but not limited to Field Review Reports, Test Reports, Meeting Minutes, and so on. Rform will also provides automatically generated logs of documents issued within Rform.
- 8.6 The Contractor will be required to print hard copies of all project related documents issued through Rform, and to maintain files of those documents on site at all times.
- 8.7 Notwithstanding that Rform does not require signatures for the issuance and approval of documents, adjustments to the Contract Price and Contract Time in a Change Order shall only be deemed to be agreed to by the Owner and Contractor when executed by hand, and that electronic acceptance does not satisfy the conditions of agreement under GC 6.2.2 of the CCDC2 2008 Stipulated Price Contract.

9 CONSTRUCTION PHOTOGRAPHS

- .1 General
 - .1 Provide construction photographs in accordance with procedures and submission requirements specified in this section.
 - .2 Photographs shall be taken using a digital camera.
 - .3 Photo Print Size: minimum 100 x 150mm.
- .2 Progress Photographs
 - .1 Provide construction photographs, documenting progress of the Work. Submit one digital set, with each monthly progress draw.
 - .2 Submit progress photographs with each monthly progress draw, documenting the following milestones;
 - .3 Completion of excavation and pouring of footings,
 - .4 Completion of foundations prior to backfilling,
 - .5 Completion of structural frame,
 - .6 Completion of rough-in of mechanical and electrical services before concealment.
 - .7 Completion of building veneers.
 - .8 Completion of each interior finish material.
 - .9 Orientation of Photographs: provide photos from at least 2 general viewpoints, as well as specific views as required by milestones specified above, and as determined by Consultant prior to first Progress Draw.
 - .10 Identification: legible identification on 20 x 50mm white label on top left corner of all photographs indicating the following:
 - .1 Project name and number,
 - .2 Orientation,
 - .3 Date of exposure.
- .3 Final Photographs
 - .1 In addition to progress photographs, provide 1 digital set of images, of final photographs of the completed project.
 - .2 Orientation of Photographs: provide final photos as follows:
 - .1 General viewpoints as defined above,
 - .2 Views of all exterior elevations,
 - .3 Views of site showing paved and landscaped surfaces,
 - .4 Interior views of all spaces,
 - .5 Specific views as determined by Consultant .
 - .3 Identification: legible identification on 20 x 50mm white label on top left corner of all photographs indicating the following:
 - .1 Project name and number,
 - .2 Orientation,
 - .3 Date of exposure.

10 **QUALITY CONTROL**

10.1 Independent Inspection and Testing

- .1 Independent Inspection and Testing Consultants will be engaged by the Owner for the purpose of inspecting and/or testing individual portions of the Work. The initial cost of such services will be borne by the Owner, as allocated under Allowances.

10.2 Access To Work

- .1 Allow inspection & testing companies access to the Work, as well as off site manufacturing and fabrication plants.

10.3 Reports

- .1 Submit one digital copy of inspection and test reports to the Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested. Submit one copy of inspection and test reports to the Building Official having jurisdiction, where required by that official.
- .3 The cost of tests beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

10.4 Inspection and Testing - General

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

10.5 Inspection and Testing - Procedures

- .1 Notify the appropriate agency and Consultant in advance of the requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store, cure and inspect test samples.

10.6 Quality Of The Work

- .1 Quality of the Work shall be first class, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the site, of workers deemed incompetent, careless, insubordinate or otherwise objectionable.

10.7 Defective Materials and Work

- .1 Where evidence exists that defective work has occurred, or that work has been carried out incorporating defective products, the Consultant may have independent tests, inspections, or surveys performed in order to determine if work is defective.
- .2 Tests, inspections, or surveys carried out under these circumstances will be made at the Contractor's expense in the event of defective work, or at the Owner's expense where work is in conformance. This does not include re-testing of soil compaction during placement, where evidence exists of non-conformance with the Contract documents, but rather only if re-testing is called for after completion of compaction.

11 **TEMPORARY FACILITIES AND CONSTRUCTION CONTROLS**

- 11.1 Provide temporary utilities, facilities and controls in order to execute the work expeditiously. Remove from site all such work after use.

11.2 Vehicular Access & Parking

- .1 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads. Maintenance shall include regular snow removal, and regular power washing to remove mud and dirt.
- .2 Where site access for construction vehicles necessitates use of public roads, remove mud and dirt from such roads where contaminated by construction vehicles.
- .3 Traffic Control: Provide and maintain flagpersons, traffic signals, barricades and flares, lights, or lanterns as required to perform the work and protect the public.
- .4 Provide and maintain adequate access to project site.
- .5 Build and maintain temporary access roads where indicated or required, and provide snow removal during period of work.

- .6 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads. Maintenance shall include regular snow removal if not provided under separate contract, and regular power washing to remove mud and dirt.
 - .7 Where site access for construction vehicles necessitates use of public roads, remove mud and dirt from such roads where contaminated by construction vehicles.
 - .8 Traffic Control: Provide and maintain flag persons, traffic signals, barricades and flares, lights, or lanterns as required to perform the work and protect the public.
- 11.3 Construction Parking
- .1 Parking for construction equipment vehicles will be limited to the site or immediate areas of work.
 - .2 Parking for Contractors' and Subcontractors' personal vehicles will not be permitted on site unless authorized by the Owner and Supervisor of Facility and Mechanical Services.
- 11.4 Temporary Utilities
- .1 Temporary Electricity and Lighting
 - .1 Connect to existing power supply in accordance with Canadian Electrical code.
 - .2 Install temporary facilities for power such as pole line and underground cables to approval of local power supply authority.
 - .3 Electrical power and lighting systems installed under this contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used more than a period of 3 months.
 - .4 Provide temporary lighting in all areas of construction, to the minimum requirements of the Occupational Health and Safety Act, and minimum requirements specified herein.
 - .2 Temporary Water Supply
 - .1 Water supply is available in existing building and will be provided for construction usage at no cost.
 - .2 Permanent water supply system installed under this contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage.
 - .3 Temporary Heating and Ventilating
 - .1 Provide and maintain all temporary heat and ventilation necessary during construction, including cost of installation, fuel, operation, attendance and maintenance. Use of direct-fired heaters discharging waste products into work areas will not be permitted unless prior approval is given by Consultant.
 - .2 Prevent hazardous accumulation of dust, fumes, mists, vapours or gases in areas occupied during construction.

- .3 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .4 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .5 Ventilate storage spaces containing hazardous or volatile materials.
- .6 Maintain strict supervision or operation of temporary heating and ventilating equipment.
- .7 Conform to the requirements of CAN/CSA Z317.2-01 – Special Requirements for Heating Ventilating and Air Conditioning (HVAC) Systems in Health Care Facilities.

- .4 The permanent HVAC systems of the building, or portions thereof, may not be used for construction purposes.

11.5 Construction Facilities

- .1 Temporary Telephone and Facsimile
 - .1 Provide and pay for temporary telephone. Cellular telephones are acceptable.
- .2 Equipment, Tools and Materials Storage
 - .1 On site storage of materials and equipment is not permitted unless authorized by the Supervisor of Facility and Mechanical Services. Provide adequate weathertight enclosures with raised floors, for storage of materials, tools, and equipment which are subject to damage by weather.
 - .2 Temporary enclosures required by subtrades as workshops shall be provided by those trades.
 - .3 Confine the Work and the operations of employees to limits indicated by the Contract Documents. Where on-site storage is authorized, do not unreasonably encumber the premises with Products.
 - .4 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .3 Site Storage and Overloading
 - .1 Confine the Work and the operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with products.
 - .2 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .4 Sanitary Facilities
 - .1 The Owner's existing facilities may not be used. Provide sanitary facilities for work force in accordance with governing regulations and ordinances. Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition. Where portable toilet facilities are provided, empty and sanitize such facilities on a weekly basis, or more frequently if required.

- .2 Owner's existing facilities may not be used, unless designated by the Supervisor of Facility and Mechanical Services. Use only those facilities when so designated. Maintain designated facilities in a clean and sanitary condition while in use by construction workers.
- .3 Permanent new facilities may not be used.

11.6 Construction Safety

- .1 Observe all construction safety measures as required by the General Conditions of the Contract, the Occupational Health and Safety Act and Regulations for Construction Projects, and by all authorities having jurisdiction, provided that in case of conflict or discrepancy, the more stringent requirements shall apply.
 - .2 Provide applicable spare safety equipment such as helmets, safety glasses, and harnesses, and enforce their use by Consultants, the Owner, their representatives and any authorized visitors to the site.
 - .3 Provide and maintain fences, gates and locks, covered walkways, guard rails, barriers, night lights, and appropriate warning signage as required for the protection of the public, and of public and private property; as required by the General Conditions of the Contract, the Occupational Health and Safety Act and Regulations for Construction Projects, and by all authorities having jurisdiction. Erect and maintain sturdy railings around shafts, and the like, to protect workmen and the public from injury.
 - .4 Contractors are to provide relevant certifications for all workers and sub-contractors at the pre-construction meeting. Copies shall be kept onsite in the Project Binder.
- 11.7 Workplace Hazardous Materials Information System

- .1 Comply with all requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets.
- .2 Include copies of all WHMIS data sheets in Operations and Maintenance Manuals.

11.8 Construction Aids

- .1 Falsework: Design and construct falsework in accordance with CSA S269.1.

11.9 Temporary Barriers & Enclosures

- .1 Dust Screens
 - .1 Provide dust tight screens or partitions to localize dust generating activities, and for the protection of workers, finished areas of Work and the public.
 - .2 Dust screens shall consist of, as a minimum, 0.15 mm thick polyethylene sheets secured to appropriate framing and sealed at all joints and at perimeter to prevent migration of dust.
 - .3 Maintain and relocate protection until such work is complete.

- .2 Temporary Partitions
 - .1 Provide temporary partitions to separate the work areas from occupied resident areas.
 - .2 Temporary partitions shall consist of 92mm steel studs with 16mm Type X gypsum board both sides. Partitions shall be constructed as fire separations having a 1 hour fire resistance rating. Provide 89mm thick sound attenuation batt insulation.
 - .3 Provide lockable fire-rated hollow metal doors and frames for access to work areas by workers, and to prevent access by resident or unauthorized personnel.
 - .4 Provide temporary windows.
- .3 Contractor to provide security until dust screens and temporary partitions are erected.
- .4 Dust Screen and Temporary partitions must be erected to the satisfaction of the Supervisor of Facility and Mechanical Services and the Consultant. A Dust Control/Temporary Partition Layout Proposal, must be submitted for review by the Supervisor of Facility and Mechanical Services and Consultant prior to the start of the Work.
- .5 Security
 - .1 Where security of an existing building has been reduced by the Work, provide temporary means to maintain security. Provide and pay for security service to patrol the site if building cannot be otherwise secured.
 - .2 Adhere to the Owner's policies for security and access to long term care centre.
- .6 Building Access
 - .1 Access existing building only at points designated by the Owner.
 - .2 When designated by the Owner, elevators assigned for Contractor's use may be used for moving workers and materials within building. Protect walls of elevators to approval of Consultant before use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .7 Site Signs and Notices
 - .1 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Consultant.
 - .2 No other signs or advertisements of any description except notices regarding safety and instruction, shall be put up around the building, or site, without the approval of the Consultant.
 - .3 Provide and install all temporary signage as required to direct interior and exterior traffic flows.

11.10 Permits

- .1 Owner to provide building permit. Contractor shall maintain all permits and provide close-out at project completion.
- .2 Contractor shall obtain and apply for all other permits (including scaffolding, hoist, trailer, temporary buildings etc.) licenses, deposits, and certificates of inspection as part of the Contract Price as per Conditions of the Contract. Ensure that permits, licences, deposits and certificates included under specific Sections are provided as specified.

12 **FIRE SAFETY**

12.1 Fire Fighting Equipment

- .1 Provide and maintain in working order, ULC labelled, 9kg 4A 60BC type fire extinguishers, and locate in prominent positions to approval of authorities having jurisdiction.

12.2 Fire Department Access

- .1 Construction activities must not obstruct access routes designated for fire department equipment. If necessary that existing access be obstructed or deleted, alternative access, acceptable to the fire department, must be provided prior to commencement of construction, in accordance with Ontario Building Code location and design criteria for required access routes.

12.3 Control of Combustible Materials

- .1 The stockpiling of construction materials adjacent to the existing building must be carefully controlled in accordance with the Ontario Fire Code. Materials stored, and their proximity to equipment used in construction, may create a fire hazard. Control of combustibles on a construction site is regulated under the Occupational Health and Safety Act.

12.4 Hot Work And Red Tag Permit Training

- .1 All Contractors including Sub-Contractors who are involved in this Project shall submit written certificates prior to commencement of work confirming that all staff performing work has successfully completed "Managing Impairments Using FM Global's Red Tag Permit System" and "Managing Hot Work Using FM Global's Hot Work Permit System".
- .2 In order to successfully complete the training, a grade of 80% is required. The contractor and sub-contractor's staff must be re-certified every three years.

- .3 The free online training session can be accessed through <http://training.fmglobal.com>. Each session takes less than one hour to complete and can be accessed 24 hour a day, seven days a week from any computer connected to the Internet.
- .4 Contractor shall coordinate with the City's Project Manager to obtain the login credentials. Authorization will be obtained by the Project Manager by sending an e-mail to onlinetraining@fmglobal.com with the name, company name and e-mail address of the person(s) requiring authorization. Please note that 24 hours is required to allow for confirmation of contractor authorization. Contractor is responsible for coordinating registration of the courses with the City's Project Manager.

13 **PRODUCT REQUIREMENTS**

13.1 Product Options

- .1 Provide products specified under individual specification sections. Where Specification lists two or more products, or two or more manufacturers of the same product, the Contractor may select one of the listed products or manufacturers. Confirm selection of products and manufacturers when requested by the Consultant.
- .2 When only one product or manufacturer is listed in the specifications, it is intended that only that product or manufacturer is acceptable.

13.2 Product Substitution Procedures During Construction

- .1 The Contractor shall identify all proposed product substitutions using Appendix SA - Suggested Alternatives. All Suggested Alternatives must be included with the bid submission at the time of Tender. Suggested Alternatives submitted after Tender will not be accepted.
- .2 Products may only be substituted during the Construction period for one or more of the following reasons:
 - .1 Insolvency of the product manufacturer.
 - .2 Inability of the manufacturer to provide the product(s) in the timeframe required to maintain the construction schedule.
 - .3 Product specified has been discontinued.
 - .4 Substitution proposed offers better performance than that specified, at no additional cost.
 - .5 Substitution offers equivalent performance to that specified, at a reduced cost to the Owner (reduction in Contract Price).
- .3 Items 1.2, and 1.3 will require a letter from the manufacturer, confirming their inability to provide the products specified, or inability to meet the schedule.
- .4 Items 1.4, and 1.5 will be at the discretion of the Owner.

13.3 Availability

- .1 Immediately upon signing Contract, review Product delivery requirements, and identify lead times for supply of all Products. If lead times in supply of Products may affect the Construction Schedule, notify the Consultant in order that appropriate action may be authorized in ample time to prevent delay in performance of the Work.
- .2 In the event of failure to notify the Consultant at commencement of Work, and should it appear that Work may be delayed for such reason, the Consultant reserves the right to substitute more readily available products of similar character, at no increase in Contract Price.

13.4 Reference Standards

- .1 Within the specifications, reference standards are identified. Conform to these standards, in whole or part, as specifically requested.
- .2 If there is question as to whether any product or system is in conformance with applicable standards, the Consultant reserves the right to have such products or systems tested to prove or disprove conformance. The cost for such testing will be born by the Contractor.

13.5 Product Transportation & Delivery

- .1 Transportation and delivery costs of Products required in the performance of the Work, are included in the Contract Price.
- .2 Products must be appropriately crated, skidded, boxed, shrink-wrapped, or otherwise packaged to protect such products from damage during shipment. Products which arrive at the site in a damaged condition must be rejected and returned to the supplier/manufacturer for immediate replacement.

13.6 Product Storage, Handling and Protection

- .1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions.
- .2 Store packaged or bundled Products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in the Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Remove and replace damaged Products at own expense and to the satisfaction of the Consultant.

13.7 Manufacturer's Instructions

- .1 Unless otherwise indicated in the specifications, install or erect Products in accordance with manufacturer's printed instructions. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between the specifications and manufacturer's instructions, so that Consultant may establish correct course of action.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes the Consultant to require removal, replacement where necessary, and re-installation at no increase in Contract Price.

13.8 Fastenings

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Space anchors within limits of load limit or shear capacity and ensure that they provide positive permanent anchorage. Wood or any other organic material plugs are not acceptable.
- .3 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .4 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

13.9 Quality Of Materials

- .1 Products, materials, equipment and articles (referred to as Products throughout the specifications) incorporated in the Work shall be new, not damaged or defective, and of the best quality (compatible with specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Defective products, whenever identified prior to the completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to the quality or fitness of Products, the Consultant may request additional testing based upon the requirements of the Contract Documents, to confirm acceptability of products or materials.
- .4 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the building.

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- .5 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.
- 13.10 Defective Materials and Work
- .1 Where evidence exists that defective work has occurred, or that work has been carried out incorporating defective products, the Consultant may have independent tests, inspections, or surveys performed in order to determine if work is defective.
 - .2 Tests, inspections, or surveys carried out under these circumstances will be made at the Contractor's expense in the event of defective work, or at the Owner's expense where work is in conformance. Where tests incorporate a number of samples, payment will be assessed, by the Consultant, based on the ratio of conforming to non-conforming results. This does not include re-testing of soil compaction during placement, where evidence exists of non-conformance with the Contract documents, but rather only if re-testing is called for after completion of compaction.
- 13.11 Warranties & Guarantees
- .1 Warrant all products and labour forming part of the Work for two (2) years except where individual sections identify greater warranty requirements.
 - .2 Warrant products and assemblies for the specified periods of time where in excess of the Contract Warranty, as specified within their respective sections.
 - .3 Guarantee aspects of the Work for the specified periods of time where in excess of the Contract Warranty, as specified within their respective sections.
 - .4 Warranties and Guarantees shall commence at Date of Substantial Performance of the Contract as certified by the Consultant.
 - .5 Warranties and Guarantees shall be original copies, printed on company letterhead, or on a standard company warranty certificate, bearing the name of the company.
 - .6 Warranties and Guarantees shall indicate:
 - .1 Name of the Principal (the Manufacturer/Subcontractor),
 - .2 Name of the Obligee (the Owner),
 - .3 Name and address of Project,
 - .4 Commencement date (Date of Substantial Performance),
 - .5 Duration of warranty or guarantee,
 - .6 Clear statement of what is included, and what if any exclusions there are, and
 - .7 Signature of Principal's representative having signing authority.

14 EXECUTION REQUIREMENTS

14.1 Examination

.1 Acceptance of Conditions

- .1 The General Contractor shall examine all existing or pre-determined conditions, prior to commencing work in that area, and report to the Consultant all conditions unacceptable for work to proceed. Commencement of work shall imply acceptance of conditions as is.
- .2 Subcontractors shall examine all existing or pre-determined conditions affecting their portion of the Work, prior to commencing such work, and report to the Contractor all conditions unacceptable for work to proceed. Commencement of work shall imply acceptance of conditions as is.

14.2 Preparation

.1 Field Engineering

- .1 Locate, confirm and protect control points prior to starting the Work. Preserve permanent reference points during construction.
- .2 Establish reference lines and elevations. Locate and lay out by instrumentation.

.2 Survey Requirements

- .1 A certified land survey prepared by a Registered Ontario Land Surveyor (OLSA member), acceptable to Owner, will be required under the following circumstances:
 - .1 Where the Work is an entirely new building,
 - .2 Where the Work is an addition to be constructed up to site setback line(s), as legislated by municipality, or
 - .3 Where the Work is a long term care centre or addition thereto.
- .2 Establish two new permanent bench marks on site, referenced to existing bench mark(s) by survey control points. Record locations, with horizontal and vertical data for inclusion in Operations and Maintenance Manual.

.3 Records

- .1 Maintain a complete, accurate log of control points and survey work as work progresses.
- .2 On completion of foundations and major site improvements, prepare certified survey showing dimensions, locations, angles and elevations of foundation work.

14.3 Cutting and Patching

.1 Submit a written request in advance, for approval of cutting or alteration which affects:

- .1 Structural integrity of any element of Project.
- .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 Work of Owner or separate contractor.

- .2 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .3 After uncovering, inspect conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.
- .4 Perform cutting, fitting and patching, including excavation and fill, to complete the Work. Perform work to avoid damage to other work.
- .5 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .6 Cut rigid materials using power saw or core drill. Pneumatic or impact tools not allowed.
- .7 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire stopping material, full thickness of construction element. Refer to 'Firestops and Smoke Seals Section' where provided. Maintain Fire Separation to code as required at no additional cost to the Owner.
- .8 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit to the satisfaction of the Consultant at no additional cost to the Owner.
- .9 Provide all openings greater than 200mm in non-structural elements of work for penetrations of mechanical and electrical work. Divisions 21, 22, 23 and 26 shall provide all sleeves and locations for sleeves. The cost of all cutting and patching required by Divisions 21, 22, 23 and 26 shall be paid for by those trades.
- .10 Ensure that all cutting and patching work, including that paid for under Divisions 21, 22, 23 and 26, is properly performed by the respective trades skilled in that line of work. Restore work with new products in accordance with Contract Documents.

14.4 Location Of Equipment and Fixtures

- .1 Location of mechanical and electrical equipment, fixtures and devices indicated or specified, are to be considered as approximate. Final location of such items will be determined on site, based on integration with structural and architectural elements, and as required by coordination with other trades. In the event of a conflict, final determination of location of these items rests with the Consultant at no additional cost to the Owner.
- .2 Prepare and submit for review by the Consultant, interference field drawings, to indicate relative position of various services and equipment, at the following locations as a minimum:
 - .1 Under all rooftop mechanical units.
 - .2 At locations of all major ductwork, piping, and conduit crossovers.
 - .3 Where ductwork passes under major structural elements.

- .3 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .4 Request a review of items by Consultant once rough-in is underway, prior to final installation, and obtain approval for actual locations.

14.5 Concealment

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

14.6 Lighting Fixtures at Suspended Ceilings

- .1 Ensure that secure support is provided for lighting fixtures by suspended ceilings, or by separate hangers, or by both.
- .2 Coordinate the ceiling system and lighting fixture installations to provide adequate support.
- .3 Submit affidavits with acceptable design information confirming that the installation of the suspended ceiling system and/or separate fixture hangers will provide adequate support for the lighting fixtures without exceeding specified deflection tolerances for the ceiling system.
- .4 Conform to current requirements of the Electrical Safety Authority (ESA).

14.7 Existing Services

- .1 Where work involves the interruption of, or connection to existing services, carry out such work as directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
- .2 All interruption or shut down of Building Systems must be fully coordinated with the Consultant and Supervisor of Facility and Mechanical Services.
- .3 Before commencing work, establish location and extent of service lines in area of work and notify Consultant of findings.
- .4 Submit schedule to, and obtain approval from Consultant for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

- .7 Remove abandoned service lines to distance of 1200 mm from foundations. Cap or otherwise seal lines at cut-off points as directed by Consultant.
- .8 Record locations of maintained, re-routed and abandoned service lines.
- 14.8 Alterations, or Additions to Existing Building
 - .1 Execute work with least possible interference or disturbance to occupants, public and normal use of premises. Arrange with Owner to facilitate execution of work.
 - .2 Interruptions to building services shall require a minimum of 72 hours written notice to the Owner. Obtain Owner's approval before interrupting any building service.
- 14.9 Protection Of Work In Progress
 - .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Consultant, at no increase in Contract Price.
 - .2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of Consultant.
 - .3 Protect finished surfaces with overlays of protective materials such as Kraft paper, cardboard, or plywood, as required for individual applications to provide adequate protection.
- 15 **CLEANING & WASTE MANAGEMENT**
 - 15.1 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.
 - 15.2 Store volatile wastes in covered metal containers, and remove from premises at end of each working day.
 - 15.3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
 - 15.4 No Mixing of Materials in open areas used by Building Occupants.
 - 15.5 Area for Mixing of Materials to be determined by the Consultant and Supervisor of Facility and Mechanical Services.
 - 15.6 Failure to maintain site cleanliness to the satisfaction of the Supervisor of Facility and Mechanical Services and the Consultants will result in cleaning performed by the owner and charged to the Contractor. (for both general cleaning and final cleaning).
 - 15.7 All cleaning materials used(for both general cleaning and final cleaning) to be reviewed and approved for use by the Consultant and Supervisor of Facility and Mechanical Services.

15.8 Cleaning During Construction

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.
- .2 Remove waste material and debris from the work areas and deposit in waste container at the end of each working day.
- .3 Vacuum clean interior areas prior to start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.

15.9 Waste Management

- .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
- .2 Fires, and burning of rubbish or waste on site is prohibited.
- .3 Burying of rubbish or waste materials, except as specified herein, is prohibited.
- .4 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
- .5 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris.

15.10 Final Cleaning Operations

- .1 Immediately following Date of Substantial Performance, and prior to Owner occupancy of the building or portion of the building affected by the Work, conduct full and complete final cleaning operations.
- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations.
- .3 Remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

- .6 Cleaning operations shall include the removal of all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections.
- .7 Remove all paint spots or overspray from all affected surfaces.
- .8 Vacuum, clean and dust behind grilles, louvres and screens.
- .9 Broom clean and spray wash all exterior paved surfaces.
- .10 Remove dirt and other disfiguration from exterior surfaces.
- .11 Clean all areaways, drywells, and drainage systems.
- .12 Clean all equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

16 **PROJECT CLOSE-OUT PROCEDURES**

16.1 Inspection and Declaration

- .1 Arrange for, conduct and document final inspections, close-out and commissioning at the completion of the Work in accordance with procedures described in the General Conditions of CCDC2-2008, and OAA/OGCA Document 100.

16.2 Substantial Performance

- .1 Contractor's Inspection
 - .1 Refer to OAA/OGCA Document 100 - STAGE 2.
 - .2 When the Contractor has carried out the steps in Stage 2 of OAA/OGCA Document 100, and has determined that the requirements of the Contract have been substantially performed as defined by local Lien legislation, the Contractor shall make application for Substantial Performance of the Work.
 - .3 In addition to the requirements of OAA/OGCA Document 100, the following items shall accompany the Contractor's application for Substantial Performance. These items must be submitted and reviewed and complete in all respects, and all verification certificates and reports having been submitted and approved by the Consultants prior to issuing Substantial Completion:
 - .1 Completed Maintenance Manuals for all disciplines,
 - .2 As-Built Drawings for all disciplines,
 - .3 Occupancy Permit (where required by Municipality),
 - .4 Air Balance Report (legible technicians worksheets are acceptable),
 - .5 Gas fired appliances inspection,
 - .6 Plumbing Inspection,
 - .7 Domestic Water Quality Test Report,
 - .8 Sprinkler dry test verification letter stamped and signed by sprinkler design Engineer,
 - .9 Mechanical start-up reports (Boilers, HVAC Units, Chillers, Water Softeners, etc.),

- .10 Fire Alarm verification (include legible technicians worksheets),
 - .11 Emergency Lighting verification,
 - .12 ESA Certificate,
 - .13 Systems operations have been demonstrated to Owner's personnel.
 - .4 The Contractor and all Subcontractors shall conduct an inspection of the work, identify deficiencies and defects, and make corrections as required to conform with the Contract Documents. Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Request a Consultant's Inspection.
- .2 Consultant's Inspection
 - .1 The Consultants shall perform an inspection of the Work to assess the validity of the Contractors application, and shall identify in separate lists, unfinished work and deficiencies. Contractor shall correct work accordingly.
- .3 Substantial Performance of the Work
 - .1 Refer to OAA/OGCA Document 100 - STAGE 4.
 - .2 Should the Consultant concur with the Contractor's application for Substantial Performance, the Consultant shall notify the Contractor of approval of the application for Substantial Performance and issue a Certificate of Substantial Performance.
 - .3 The Contractor shall publish a copy of the Certificate of Substantial Performance in a construction trade newspaper, and shall provide the Consultant with proof of the date of publication.
- .4 Lien Period And Release Of Basic Holdback
 - .1 Refer to OAA/OGCA Document 100 – STAGE 5.
 - .2 Commencement of Lien and Warranty Periods
 - .1 The day following the date of publication of Certificate of Substantial Performance shall be the date of commencement of the Warranty Period, and of the 45 day Lien Period prior to release of basic holdback, unless required otherwise by lien statute of the Place of the Work.
 - .2 When the Contractor has carried out the required steps in Stages 3 and 4 of OAA/OGCA Document 100, the Contractor shall make application for Release of Basic Holdback.
 - .3 The Consultant shall prepare the Certificate for Payment for release of basic holdback, and promptly upon receipt of the necessary documentation, issue the Certificate for Payment to the Owner.

- .5 Final Inspection and Payment
 - .1 Refer to OAA/OGCA Document 100 - STAGE 6.
 - .2 Submit a signed statement stating following have been performed:
 - .1 Work has been reviewed for compliance with Contract Documents,
 - .2 All deficiencies have been corrected and unfinished work have been completed,
 - .3 Work is complete and ready for Final Inspection.
 - .3 When items noted above are completed, a final inspection of the Work will be performed by the Owner, the Consultants, and the Contractor.
 - .4 If the Work is deemed to be incomplete, complete outstanding items and request a reinspection.
 - .5 If the Work is deemed to be complete, the Consultant will issue a Final Certificate for Payment.
- .6 Deficiency Review
 - .1 Following the issuance of the Certificate of Substantial Performance and prior to the Contractor's application for Final Payment and release of any monies retained as "Finishing Holdback", the Contractor shall continue to complete unfinished work and correct deficiencies. At the request of the Contractor, the Consultants shall conduct up to two general deficiency reviews during this period.
 - .2 The first review will be undertaken only if the Contractor has inspected the Work, and states in writing that the unfinished work noted in their application for Substantial Performance has been completed, and at least 50% of all deficiencies have been corrected.
 - .3 The second review will be undertaken only if the Contractor has inspected the Work, and states in writing that at least 90% of the deficiencies have been corrected.
 - .4 If the Consultants determine during either review that the above noted criteria for progress have not been met, they may terminate the deficiency review.
- .7 Reinspection
 - .1 Should reinspection by Consultant be required due to failure of work to comply with Contract Documents, the Owner will deduct amount of Consultant's compensation for reinspection services from monies owed to the Contractor.

17 CLOSE-OUT SUBMITTALS

17.1 Quality

- .1 Spare parts, maintenance materials and special tools provided shall be new, not damaged or defective, and of the same quality and manufacture as products provided in the Work.
- .2 If requested, furnish evidence as to type, source and quality of Products provided.
- .3 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

17.2 Delivery, Storage, and Handling

- .1 Deliver all materials required as maintenance materials, spare parts or special tools, to the site, include shipping costs, and store as directed.
- .2 Store spare parts, maintenance materials and special tools in a manner to prevent damage, or deterioration.
- .3 Store in original and undamaged containers with manufacturer's seals or labels intact.
- .4 Store materials subject to damage from severe climatic changes in a climate-controlled, weatherproof enclosure.
- .5 Store paints and freezable materials in a moderately heated and ventilated room.

17.3 Maintenance Materials, Spare Parts & Tools

- .1 Provide spare parts in quantities specified in individual specification sections. Provide identical items to those installed in the Work.
- .2 Provide maintenance materials in quantities specified in individual specification sections. Provide identical items of same manufacturer, dye lot or production run as items in the Work.
- .3 Provide special tools in quantities specified in individual specification sections, and tag items identifying their function and equipment or products to which they are associated.
- .4 Receive and catalogue all items. Check inventory and include approved listings in Operations and Maintenance Manual.
- .5 Obtain receipts for delivered products and submit prior to Substantial Performance.

17.4 Operations and Maintenance Manual

- .1 Prepare Operations and Maintenance Manual during the course of construction and have completed prior to Date of Substantial Performance.
- .2 Maintain digital copy of the Operation and Maintenance Manual volume(s) for periodic review and comment, as requested by the Consultant during the course of construction.
- .3 Submit digital copies of the final completed volume(s) and one digital copy as either a PDF or Microsoft Word document with the application for Substantial Performance in accordance with OAA/OGCA Document 100.
- .4 Provide table of contents and index tab sheets for each volume. Itemize and tabulate contents.
- .5 Group drawings as to content, and index for quick reference.

- .6 Each copy of the Operation and Maintenance Manual shall contain, as a minimum, the following information:
 - .1 Project contact list including after hours/emergency contact numbers
 - .2 All contract documents including tender calls, addendums, contract and change orders
 - .3 Contact information, including after-hours/emergency contact numbers, for maintenance and repairs
 - .4 Warranty and guarantee certificates
 - .5 Equipment start-up and troubleshooting instructions
 - .6 Equipment schematics & diagrams
 - .7 Catalogue of all maintenance materials and quantities
 - .8 Maintenance data
 - .9 Approved and stamped all shop drawings
 - .10 Before and after photographs organized such that the before and after photographs of any one are positioned adjacent to each other for easy reference.
- 17.5 As-Built Drawings
 - .1 Record information on a clean set of black line opaque drawings, provided by Owner.
 - .2 Maintain as-built drawings on site and update as construction progresses. Allow periodic review by Consultant as requested.
 - .3 Record information concurrently with construction progress. Do not conceal work until required information is recorded.
 - .4 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- 17.6 Record Drawings
 - .1 Upon attaining Substantial Performance completion of the Work, obtain base CAD drawings, from the Consultant. The electronic files will be in AutoCad Version 2004. Update the AutoCad drawings to include as-built conditions.

- .2 Submit electronic files to the Consultant for review. Any subsequent changes found by the Consultant shall remain the responsibility of the Contractor at no charge to the Owner.'

END OF SECTION

APPENDIX SA – SUGGESTED ALTERNATIVES

Bidder: _____

The following Suggested Alternatives are **NOT INCLUDED** in the Bid price.

Individual Suggested Alternatives may be discarded or incorporated into the Final Contract Price at the discretion of the Owner.

Provide the appropriate data for comparison showing conformance to specified standards, dimensions, fabrication, colour, quality assurance, warranty, execution etc. as necessary for the Consultant to confirm the Suggested Alternative meets or exceeds the specifications. At the time of this submittal, provide the Consultant with the relevant Architectural details which prove conformance with the design intent and co-ordination with and installation by affected trades.

Suggested Alternative Prices **DO NOT INCLUDE** H.S.T.

Suggested Alternatives identified on this form are for Divisions 1 to Division 26 inclusive.

We submit a proposal to substitute for:

specified in Section _____ of the Specifications, the following alternative:

The Suggested Alternative is submitted for the following reason:

We ensure that a comparison has been made of all specified characteristics, that the Suggested Alternative does not alter the intent of the Drawings and Specifications and we hereunder tabulate significant variations which lessen the performance characteristics and quality of materials, increase the weights and / or dimensions, and substitute different materials for those specified.

The effect on the stipulated price is (choose one):

ADDITION (\$ _____) DEDUCTION (\$ _____)

(Submit a separate sheet for each item)

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for demolition and removals Work in accordance with the Contract Documents.
- .2 Work included: Requirements for demolishing, and removing wholly or in part the various items designated on the drawings or required to be removed or partially removed for the receipt of the Work of this Contract, including not necessarily limited to:
 - .1 Alteration and renovations to existing building.
 - .2 Removal of all furniture and equipment in floor replacement areas. Items being stored are to be coordinated with Building Maintenance Department.
 - .3 Remove wall mounted accessories indicated on Drawings.
 - .4 Remove all existing counters, countertops and under counter millwork. Patch and make good existing gypsum board substrate to receive new paint. Replace if become damaged.
 - .5 Remove all existing toilet partitions and hooks and open existing wall to provide new wood blocking. Provide new partitions in areas indicated on Drawings.
 - .6 Remove all mechanical and electrical items as shown on Drawings.
 - .7 Removal of doors and frames as shown on Drawings.
 - .8 Remove all damaged gypsum wall board to clean edges and ready to be patched and made good.
 - .9 Patch and match good on floors where indicated.
 - .10 Cutting and removing of walls, floors, ceilings, doors and frames, in the existing buildings as indicated on Drawings.
 - .11 Patching, making good openings and chases in walls, floors, ceilings, including the supply and installation of lintels, channels and finishes.
 - .12 Removal of rubbish, debris, demolished fixtures, fitments and items not scheduled to remain the Owner's property, resulting from the demolition and preparatory work.
 - .13 Removal of all mechanical items including plumbing fixtures, services etc. where required for the work or indicated on drawings and or where not required to be relocated.
 - .14 Removal of existing electrical items including fixtures, etc. where required for the work or indicated on the drawings and not required to be relocated.
 - .15 Dust control during the operations of the work of this Section.
 - .16 Removal shall mean removal from site and safe disposal in a legal manner.

1.2 **REFERENCES**

- .1 CSA S350-M, Code of Practice for Safety in Demolition of Structures.

1.3 SUBMITTALS

- .1 Where required by Authorities having jurisdiction, submit a Fire Plan to local fire department for review and approval.
- .2 Submit shop drawings, diagrams and details in accordance with Section 01 00 00.
- .3 30 calendar days prior to start of demolition and removals work, submit for review, drawings, diagrams or details showing sequence of disassembly work and shoring of supporting structures in accordance with authorities having jurisdiction.
- .4 Submit for approval, a plan showing impacts, interruptions and delays to Owners operations.
- .5 Have submissions signed and sealed by Professional Engineer licensed in Province of Ontario.
- .6 Submit to Consultant, details of where rubble, debris and other materials are to be disposed or reused. Include each disposal/reuse site location, operator's name and business address, type of license under which site operates, and criteria used by site to assess suitability of rubble, debris and other materials for disposal.
- .7 Give notice to Utility Authorities controlling services and appurtenances which will be affected by demolition work.

1.4 QUALITY ASSURANCE

- .1 Prepare waste audits, waste reduction workplans, source separation programs and recycling programs as required by jurisdictional authorities and update programs and implement such programs as required.
- .2 Perform the work of this section in accordance with the 'Environmental Protection Act' including Ontario Regulation 102 and the 'Environmental Assessment Act' including Ontario Regulation 103.
- .3 Conform to Fire Code, Regulation under the Fire Marshals Act.
- .4 The demolition contractor must engage a registered professional engineer who holds a certificate of authorization and an appropriate level of liability insurance to prepare demolition procedures.
- .5 As part of the contract requirements, the engineer for the demolition contractor should be required to sign the general review commitment required by city building departments.

1.5 **SITE CONDITIONS**

- .1 Interruptions to Owners operations will not be permitted.
- .2 Perform operations, machine and equipment movements, deliveries and removals at time or times that will permit uninterrupted operations in and around structures, including parking, deliveries, and Site access and egress.
- .3 Take over structures to be demolished based on condition on date that Tenders close.

2 Products

2.1 **MATERIALS**

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

3 Execution

3.1 **GENERAL**

- .1 Clean up rubble and debris, resulting from work promptly and dispose at end of day or place in waste disposal bins. Empty bins on regular basis.
- .2 Stockpiling of rubble, debris, and surplus Products on Site will not be permitted.
- .3 Take precautions to guard against movement, settlement or collapse of adjacent services, sidewalks and driveways. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.

3.2 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.3 **PRESERVATION OF REFERENCES**

- .1 Record location and designation of survey markers and monuments located within demolition area, prior to removal. Store and restore markers and monuments upon completion of Work or relocate as directed by Consultant.

3.4 PROTECTION

- .1 Prevent movement or damage of adjacent structures, services, walks, paving, landscaping and parts of existing structure to remain. Supply and install bracing, and shoring as required. Make good damage caused by demolition to acceptance of Consultant.
- .2 Protect adjacent structures and property against damage which might occur from falling debris or other causes. Repair or replace damage caused from work of this Section to acceptance of Consultant.
- .3 Do not interfere with use of adjacent structures and Work areas. Maintain free, safe passage to and from adjacent structures and Work areas.
- .4 Take precautions to support affected structures. If safety of structure being demolished, adjacent structures or services are endangered, cease demolition operations and take necessary action to support endangered item. Immediately inform Consultant. Do not resume demolition until reasons for endangering have been determined and corrected and action taken to prevent further endangering.
- .5 If movement or settlement occurs, install additional bracing and shoring as necessary and make good damage to acceptance of Consultant.
- .6 Hang tarpaulins where debris and other materials are lowered. Build in around openings with wood and plywood at locations used for removal of debris and materials.
- .7 Prevent debris from blocking surface drainage system, mechanical, and electrical systems which are required to remain in operation.
- .8 Pay particular attention to prevention of fire and elimination of fire hazards which would endanger Work or adjacent structures and premises.
- .9 Supply and install adequate protection for materials to be re-used, set on ground and prevent moisture pick-up. Cover stockpiles of materials with tarpaulins.
- .10 Close off access to areas where demolition is proceeding by barricades and post warning signs.
- .11 Supply, install and maintain legal and necessary barricades, guards, railings, lights, warning signs, security personnel and other safety measures, and fully protect persons and property.
- .12 Dust partitions:
 - .1 Prior to demolition work proceeding in existing structures, temporarily enclose Work areas, access and supply and install dustproof partitions. Design partitions to prevent dust and dirt infiltration into adjoining areas, and prevent ingress of water.

- .2 Prevent dust, dirt and water from demolition operations entering operational areas.
- .3 Adjust and relocate partitions as required for various operations of work.
- .4 Upon completion of work, remove and dispose of partitions from Site.
- .13 Dust protection:
 - .1 Clean water to be applied to hard and soft surfaces and on open excavation faces on Site daily to eliminate dust.
 - .2 Roadways and sidewalks to be cleaned daily or as required.
 - .3 Loaded vehicles leaving Site to be cleaned of loose soil and debris with power washing or alternative method.
 - .4 Trucks loaded with indigenous soil or demolition debris to be covered by tarps or attached screens.
- .14 Blasting is not permitted.

3.5 **PREPARATION**

- .1 Disconnect and/or re-route electrical data, communication and telephone service lines entering structures to be demolished. Post warning signs on electrical lines and equipment which is required to remain energized.
- .2 Disconnect and cap designated mechanical services:
 - .1 Natural gas supply lines: As indicated on drawings and as required for alteration work, to be removed by qualified workers in accordance with gas company instructions.
 - .2 Sewer and water lines: Remove and dispose of as indicated on Contract Drawings and as required for alteration work.
- .3 Disassemble and remove mechanical equipment, ductwork and piping complete with supports and associated components.
- .4 Do not disrupt active or energized utilities designated to remain undisturbed.
- .5 Perform rodent and vermin control to comply with health regulations.

3.6 **DEMOLITION**

- .1 Perform demolition with extreme care. Confine effects of demolition to those parts which are to be demolished.
- .2 Perform work and prevent inconvenience to persons outside those parts which are to be demolished.
- .3 Carry out demolition in accordance with the requirements of CSA S350-M.
- .4 Demolish parts of structure to permit remedial work as indicated.

- .5 Demolition shall proceed safely in systematic manner from roof to grade and as necessary to accommodate remedial work indicated. Work on each floor level shall be complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.
- .6 Do not overload floor or wall with accumulations of material or debris or by other loads.
- .7 Perform work to minimize dusting. Keep work area wetted down with fog sprays to prevent dust and dirt rising. Supply and install temporary water lines and connections that may be required. Upon completion, remove installed temporary water lines. Use covered chutes, water down.
- .8 Do not sell or burn materials on Site.
- .9 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.
- .10 At end of day's work, leave Work in safe condition with no part in danger of toppling or falling.
- .11 Drainage and sewer system protection:
 - .1 Ensure that no dust, debris or slurry enters drainage and sewer system on Site.
 - .2 Remove and dispose of debris and slurry promptly from Site.
 - .3 Comply with City of Toronto Sewer Use By-Law.
- .12 Concrete:
 - .1 Demolish concrete by methods which avoid impact loads on items which are not to be demolished.
 - .2 Where only part or parts of a concrete floor, wall, or other items are to be demolished, use saw cuts to isolate areas which are to be demolished except where existing reinforcing steel is to be left in place. Prior to such isolating, install suitable support to prevent premature movement of area(s) being isolated and undesirable transfer of loads as cutting progresses. If necessary remove area(s) to be demolished by successively isolating small sections.
 - .3 Where reinforcing steel is to be left in place, use saw cuts from surface of concrete around perimeter(s) of area(s) to be demolished, chip concrete without damaging reinforcing steel. Retouch damaged epoxy coating of existing reinforcing steel.
- .13 Masonry:
 - .1 Demolish block walls in small sections of not more than 2 m². Do not permit masonry to fall in mass from one level to another.
 - .2 Where only part(s) of a wall is to be demolished, install adequate support for adjacent part(s).
 - .3 After removal of masonry walls, grind smooth floors ready for new floor finish.

- .14 Steel: Where only part or parts of structure is to be demolished, dismantle and maintain structure stable. Do not place excessive loads on components. Install adequate temporary guys and supports to ensure stability and to prevent excessive loading. Support each component being disconnected from structure, and lower, do not drop, component after it is disconnected.
- .15 Openings in existing walls, partitions and floors:
 - .1 Cut openings through existing walls, partitions, and floors. Any floor penetrations to be reviewed and approved by Structural Consultant. Establish exact location of steel reinforcing in existing concrete slabs or walls before cutting.
 - .2 Be responsible for damage to existing steel reinforcing and be liable for structural failure. Make good surfaces disturbed with materials to match existing.
- 16. Where doors are scheduled to be removed, include removal of door frames and door hardware.
- 17. Remove interior partitions, fittings, fixtures and accessories as indicated on drawings. Partitions and walls shall be removed full height to structure above.
- 18. Remove interior finishes, such as ceiling and floor finishes, where new finishes are indicated on Contract Drawings.
 - 1. Removal of existing ceilings shall include complete removal including bulkheads and suspension system.
 - 2. Removal of adhesive applied finishes shall include complete removal to substrate including adhesive. Take adequate care to prevent damage to substrate.
 - 3. Remove existing floor finishes, include mortar bed, underlayment or other cleavage membranes, underpad, base, floor moulding and transition strips.
- 19. Demolish all other items indicated or required.

3.7 **RECYCLING**

- .1 Whenever possible, all materials shall be recycled. Pay all costs for this work.
- .2 Deliver to nearest appropriate recycling depot all materials accepted for recycling by Authorities having jurisdiction over the Place of Work, including but not limited to cardboard, paper, plastic, aluminum, steel, and glass.
- .3 Deliver to nearest appropriate depot all scrap and excess gypsum wallboard for recycling of this material.

3.8 DISPOSAL OF MATERIALS

- .1 Remove from Site, rubble, debris, and other materials that can not be recycled resulting from demolition and removals work in accordance with Authorities having Jurisdiction, except where specified or indicated on Contract Drawings to be reused.
- .2 Conform to requirements of municipality's Works Department regarding disposal of waste materials.
- .3 Materials prohibited from municipality waste management facilities shall be removed from Site and dispose of at recycling companies specializing in recyclable materials.

3.9 RESTORATION

- .1 Where demolition removed a structure or installation, restore area in accordance with Authorities having Jurisdiction.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, equipment and services necessary for the miscellaneous and metal fabrication work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM A123, Specification for Zinc (Hot Dip Galvanized) Coatings on Iron & Steel Products.
- .2 ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- .4 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .5 CGSB 85-GP-16M, Painting Galvanized Steel.
- .6 CISC/CPMA 1.73.a, A Quick-Drying One-Coat Paint for Use on Structural Steel.
- .7 CAN/CSA-G40.20/G40.21-M, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steels.
- .8 CAN/CSA S16.1-M, Limit States Design of Steel Structures.
- .9 CSA S136.1-M, Commentary on CAN/CSA S136-M, Cold Formed Steel Structural Members.
- .10 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .11 CSA W48, Filler Metal and Allied Materials for Metal Arc Welding.
- .12 CSA W59-M, Welded Steel Construction (Metal Arc Welding).
- .13 CAN/CSA W117.2-M, Safety in Welding, Cutting and Allied Processes.
- .14 NAAMM, The National Association of Architectural Metal Manufacturers.
- .15 Steel Structures Painting Council (SSPC), Steel Structures Painting Manual, Vol. 2.

1.3 **DESIGN REQUIREMENTS**

- .1 Design details and connections, where not shown on Drawings, in accordance with CAN/CSA-S16.1 and CSA S136.1.

1.4 SUBMITTALS

- .1 Shop drawings:
 - .1 Submit shop drawings for fabrication and erection of miscellaneous and metal items in accordance with Section 01 00 00 indicating:
 - .1 Materials, core thicknesses, class of finish (AMP 555), connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.5 QUALITY ASSURANCE

- .1 Retain a Professional Engineer, licensed in the Province of Ontario, with experience in work of comparable complexity and scope, to perform the following services as part of the work of this Section:
 - .1 Design metal fabrication items that are required to resist live, dead, lateral, wind, or seismic loads.
 - .2 Review, stamp, date and sign shop drawings.
- .2 Workmanship: Fabricate work of this Section to meet the required class of workmanship indicated below in accordance with NAAMM's AMP 555, Section 8.
 - .1 Class 1: for use on direct exposed to view fabricated items:
 - .1 Exposed surfaces are finished smooth without pits, mill marks, nicks, burrs, sharp edges, and scratches filled or ground off. Defects should not show when painted, polished, or finished.
 - .2 Welds should be concealed where possible. Exposed welds are ground to small radius with uniform sized cove unless otherwise noted.
 - .3 Distortions should not be visible to the eye.
 - .4 Exposed joints are fitted to a hairline finish.
- .3 Execute welding by firms certified in accordance with CSA W47.1 Division 1 or 2.1. Ensure welding operators are licensed per CSA W47.1 for types of welding required by Work.

2 Products

2.1 MATERIALS

- .1 General:
 - .1 All materials under work of this Section, including but not limited to, primers and paints are to have low VOC content limits.
 - .2 Unless detailed or specified herein, standard products will be acceptable if construction details and installation meet intent of Drawings and Specifications.
 - .3 Include all materials, products, accessories, and supplementary parts necessary to complete assembly and installation of work of this Section.

- .4 Incorporate only metals that are free from defects which impair strength or durability, or which are visible. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight, and with sharp defined profiles.
- .2 Structural shapes, plates, and similar items: CAN/CSA-G40.20/G40.21-M, Grade 350W. Hollow structural sections: CAN/CSA-G40.20/G40.21-M, Grade 350W, Class H.
- .3 Welding materials: CSA W48 and CSA W59-M.
- .4 Fasteners: Conforming to ASTM A307, Grade A, in areas not exposed to view, use unfinished bolts with hexagon heads and nuts. In areas exposed to view, use bolts, nuts, washers, rivets, lock washers, anchor bolts, machine screws and machine bolts Z275 zinc coated in accordance with ASTM A653/A653M. Supply bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm beyond nut, without the use of washers.
- .5 Primer paint: CPMA 1.73a.
- .6 Galvanized primer paint: Inorganic zinc rich primer. For use on galvanized fabrications where touch up is to remain unpainted in finished work; Carbozinc 11WB by Carboline Company, Catha-Coat 305 by Devoe Coatings or Zinc Clad XI by Sherwin Williams.
- .7 Drilled inserts: "HSL-3" by Hilti Inc. or "Dynabolt Sleeve Anchors" by ITW Construction Products, heavy-duty anchors, sizes as shown.
- .8 Adhesive anchor system: 'HIT HY 200 Injectable Mortar with Hilti HAS Stainless Steel Anchor Rod System' by Hilti Ltd. or approved alternative by ITW Construction Products, complete with all components required for a complete installation.

2.2 **FABRICATION**

- .1 Verify dimensions of existing Work before commencing fabrications and report any discrepancies to the Consultant.
- .2 Fit and assemble work in shop where possible. Execute work in accordance with details and reviewed shop drawings.
- .3 Use self-tapping shake-proof screws on items requiring assembly by screws or as indicated. Use screws for interior metal work.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Execute shop welding to requirements specified .

- .6 Carefully make and fit details. Take special care with exposed finished work to produce a neat and correct appearance to the Consultant's acceptance.
- .7 Assemble members without twists or open joints.
- .8 Correctly size holes for connecting work of other trades where such can be determined prior to fabrication. Where possible, show holes on shop drawings. Place holes not to cause appreciable reduction in strength of member.
- .9 Draw mechanical joints to hairline tightness and seal countersunk screw and access holes for locking screws with metal filler where these occur on exposed surfaces.

2.3 **FABRICATED ITEMS**

- .1 Refer to Drawings for details of metal fabrication work and related items not specifically listed in this Section.
- .2 Where work is required to be built into work of other Sections supply such members to respective Sections.
- .3 Provide miscellaneous and metal fabrications indicated on the drawings, listed below, and not indicated to be supplied under other Sections. Provide miscellaneous and metal fabrications including but not limited to the following:
 - .4 Millwork and vanity counter supports:
 - .1 Provide supports for millwork and vanity counters. Construct supports of steel angles and steel plate as detailed. Where indicated, conceal supports within cavity of drywall partition.
 - .2 Provide all drill holes required for concealed anchorage of counters and for anchoring to building structure.
 - .5 Support framing for accordion folding grilles: Structural channel and angle framing continuously welded and securely anchored to structure above. Design framing and anchorage to support assembly dead loads and live loads, and lateral loads attributable to misuse and vandalism. Finish: Prime painted.
 - .6 Support framing for patient lift systems: Structural channel and angle framing continuously welded and securely anchored to structure above. Design framing and anchorage to support assembly dead loads and live loads, and lateral loads attributable to misuse and vandalism. Finish: Prime painted.
 - .7 Miscellaneous steel brackets, supports and angles:
 - .1 Supply and install or supply for installation by trades responsible, all loose steel brackets, supports and angles where indicated, except where such brackets, supports and angles are specified under work of other Sections. Drill for countersunk screws, expansion anchors and anchor bolts.
 - .2 Unless otherwise specified, prime paint for typical interior installation and galvanized finish for interior humid/wet areas.

2.4 ANCHORS AND FASTENING

- .1 Use weld studs of size not larger than 10 mm for attaching miscellaneous materials and equipment to building steel. If weight of item requires larger fasteners use clips or brackets and secure by welding or through bolting.
- .2 Use self drilling expansion type concrete anchors for attaching to masonry and concrete.
- .3 Do not secure items to steel deck.
- .4 Use steel beam clamps of two bolt design to transmit load to beam web. Do not use C and I clamps.

2.5 WELDING

- .1 Perform welding by electric arc process.
- .2 Execute welding to avoid damage or distortion to Work. Execute welding in accordance with following standards:
 - .1 CSA W48 - for Electrodes. If rods are used, only coated rods are allowed.
 - .2 CSA W59-M and CSA W59S1-M for design of connections and workmanship.
 - .3 CAN/CSA W117.2-M - for safety.
- .3 Thoroughly clean welded joints and expose steel for a sufficient distance to perform welding operations. Finish welds smooth. Supply continuous and ground welds which will be exposed to view and finish paint.
- .4 Test welds for conformance and remove work not meeting specified standards and replace to Consultant's acceptance.

2.6 SHOP PAINTING

- .1 Clean steel to SSPC SP6 and remove loose mill scale, weld flux and splatter.
- .2 Shop prime steel with one coat of primer paint to dry film thickness of 0.07 mm. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.
- .3 Shop prime galvanized steel in accordance with CGSB 85-GP-16M.
- .4 Clean but do not paint surfaces being welded in field.
- .5 Do not paint surfaces embedded in concrete, but clean as if they were to be primed.

- .6 Do not prime steel to be fireproofed or to receive intumescent paint coating.
- .7 Do not prime machine finished surfaces, but apply an effective anti-rust compound.
- .8 Take precautions to avoid damage to adjacent surfaces.

2.7 HOT DIP GALVANIZING

- .1 After fabrication, hot dip galvanize specific miscellaneous steel items as indicated. After galvanizing, plug relief vents air tight with appropriate aluminum plugs as suitable and required for intended metal fabricated item. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with zinc rich primer in accordance with manufacturer's printed directions.
- .2 Hot-dip galvanize members in accordance with requirements of the following ASTM, with minimum coating weights or thicknesses as follows:
 - .1 Rolled, pressed and forged steel shapes, plates, bars and strips: ASTM A123; average weight of zinc coating per square/metre of actual surface, for 4.8 mm and less thickness members 600 g/m² for 6 mm and heavier members 640 g/m².
 - .2 Iron and steel hardware: ASTM A153; minimum weight of zinc coating, in ounces per square foot of surface, in accordance with ASTM A153, Table 1 for the various classes of materials used in the Work.

3 Execution

3.1 EXAMINATION

- .1 Examine previously installed work, upon which this Section depends, verify dimensions and condition of existing Work, and coordinate repairs, alterations, and rectification if necessary. Commencement of work of this Section is deemed to signify acceptance of existing, prior conditions.
- .2 Obtain Consultant's written approval prior to field cutting or altering of structural members.

3.2 ERECTION

- .1 Install metal fabrications in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings. Build and erect work plumb, true, square, straight, level and accurate to sizes detailed, free from distortion or defects detrimental to appearance or performance.
- .3 Perform drilling of concrete and steel as required to fasten work of this Section.

3.3 **TOUCH UPS**

- .1 Paint bolt heads, washers, nuts, field welds and previously unpainted items. Touch up shop primer damaged during transit and installation, with primer to match shop primer.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for rough carpentry work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .2 ASTM A325, Specification for Bolts Quenched/Tempered Steel Nominal Thread Diameter M16 - M36 For Structural Steel Joints.
- .3 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .4 ASTM F1667, Driven Fasteners: Nails, Spikes and Staples.
- .5 CAN/CSA O80 Series M, Wood Preservation.
- .6 CSA O121-M, Douglas Fir Plywood.
- .7 CAN/CSA O141, Softwood Lumber.
- .8 NLGA, Standard Grading Rules for Canadian Lumber, National Lumber Grades Authority.

1.3 **QUALITY ASSURANCE**

- .1 Lumber identification: Grade stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: Grade mark in accordance with applicable CSA standards.
- .3 Lumber quality: Carefully select individual pieces so that knots and obvious defects will not interfere with placing bolts, proper nailing or making proper connections.
- .4 Moisture Content of wood at time of construction shall be 19% maximum.
- .5 Each piece of fire retardant treated lumber shall be shop marked with the ULC monogram respectively, in accordance with CAN/CSA O80-M.
- .6 Dimensions of lumber shall conform to dressed sizes specified in CAN/CSA-0141 unless actual dimensions are otherwise indicated or specified.
- .7 Dimensional references to lumber on Drawings and in Specifications are to nominal sizes unless actual dimensions are indicated. Such actual dimensions shall be dry size.

- .8 Lumber defects: Discard wood with defects which will render a piece unable to serve its intended function. Lumber will be rejected by Consultant for excessive warp, twist, bow, crook, mildew, fungus, or mould, as well as for improper cutting and fitting, whether or not it has been installed.

1.4 ENVIRONMENTAL REQUIREMENTS

- 1. When it is required that wood maintain dimensional stability and tolerances to ensure accurate installation of later work, store and install it only in dry areas, and where no further installation of moist materials is contemplated.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Store materials in a dry area. Cover materials with tarpaulins or polyethylene sheets to prevent moisture absorption and impairment of structural and aesthetic properties. Vent to allow air movement. Tie covering to keep in place.

2 Products

2.1 MATERIALS

- .1 General:
 - .1 All materials under work of this Section, including but not limited to, adhesives are to have low VOC content limits.
 - .2 Adhesives - Urea-formaldehyde-free glues.
 - .3 All composite wood and/or agrifibre products (including core materials) and adhesives used to fabricate laminated assemblies used in building must not contain added urea-formaldehyde.
- .2 Lumber: Softwood, G4S, moisture content 19% or less at time of installation, in accordance with the following:
 - .1 Lumber shall be of same species and grade, equally seasoned and shall be processed and stamped at same mill.
 - .2 CSA O141 and NLGA Standard Grading Rules for Canadian Lumber.
 - .3 Board quality: Construction or better.
 - .4 Dimension quality:
 - .1 Structural joists, planks, and framing: No. 1 Select Structural.
 - .2 Light framing: Construction.
- .3 Plywood: CSA O121-M, G1S, unsanded, T & G, standard construction, laminated with waterproof adhesive, exterior grade, Thickness as indicated on drawings.
- .4 Fire retardant treatment of lumber and plywood (interior and protected locations): 'FlamePRO FRTW' by Koppers, 'Dricon FRT' by Arxada, or approved alternative, conforming to ASTM E84, to provide a flame spread rating of 25 or less.

- .5 Rough hardware: Conforming to ASTM F1667; Nails, bolts, screws, anchors, expansion shields, and other fastenings required to frame and fix rough carpentry as follows:
 - .1 Nails, spikes and staples: Spiral type.
 - .2 Bolts: ASTM A325; 12.7 mm diameter minimum with nuts and washers unless noted otherwise.
 - .3 Screws: Countersunk head, full thread type.
 - .4 Proprietary fasteners: Toggle bolts, expansion shields, lag bolts, screws, inorganic fibre plugs, recommended for purpose by manufacturer.
 - .5 Galvanize rough hardware used in fire treated wood and hardware exposed to the atmosphere.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **GENERAL**

- .1 Lay out work carefully and to accommodate work of others. Cut and fit accurately: erect in position indicated by Drawings.
- .2 Install rough carpentry to allow for expansion and contraction of the materials.
- .3 Cut work into lengths as long as practicable and with square ends. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid backing.
- .4 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead 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.
- .5 Provide anchors, bolts, and inserts required for attachment of the work of this Section, to those performing the work of other Sections and who are responsible for their installation.
- .6 Do not attach work by wood plugs or blocking in concrete or masonry. Use lead shields, expansion shields, or similar methods only as approved by Consultant.

3.3 MISCELLANEOUS WOODWORK

- .1 Fit and install wood furring, strapping, grounds and blocking. Adequately size, correctly place and conceal members for finishes, fitments and for work under other Sections. Do not assume that Drawings show required work exactly or completely. Anchor wood members securely in place.
- .2 Install rough bucks, nailing strips and linings to rough openings as required for backing for frames and other work.
- .3 Except where steel supports are specifically shown, provide wood blocking and supports in metal stud partitions for fastening of item such as casework and other wall mounted accessories. Have respective trades approve the location of such wood blocking.
- .4 Bolt wood blocking or nailing strips to steel framing.
- .5 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .6 Use fire retardant lumber for blocking/framing in ceiling\spaces, partitions and bulkheads.

3.4 FASTENERS

- .1 Frame, anchor, fasten, tie and brace members for required strength and rigidity.
- .2 Use hot dipped galvanized fasteners for interior humid areas.
- .3 Countersink bolts and bolt heads as required for clearance of other work.
- .4 Size fasteners to penetrate base member by half of fastener length minimum. Minimize splitting of wood members by staggering nails in direction of grain.
- .5 For plywood use spiral, annular or resin coated nails and staples.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products equipment and services necessary for the finish carpentry work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ANSI/NEMA LD 3, High-Pressure Decorative Laminates.
- .2 APA - The Engineered Wood Association.
- .3 ASTM F1667, Driven Fasteners: Nails, Spikes and Staples.
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
- .5 North American Architectural Woodwork Standards (NAAWS).
- .6 CAN/CSA O141, Softwood Lumber.
- .7 CSA O151-M, Canadian Softwood Plywood.
- .8 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress.
- .9 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

1.3 **SUBMITTALS**

- .1 Shop drawings: Submit shop drawings of finish carpentry work in accordance with Section 01 00 00 indicating:
 - .1 Materials, thicknesses, sizes, finishes, wood species, grades, profiles, connection attachments, shop jointing, field jointing, reinforcing, anchorage, fastener types and sizes, location of exposed fastenings, mechanical and electrical service routes, service outlets, cutout locations, and sizes.
 - .2 Include erection drawings, plans, elevations, sections, and details as applicable.
- .2 Samples: Submit samples of the following in accordance with the requirements of Section 01 00 00:
 - .1 Two representative pieces of each type of wood finished as specified.
 - .2 Two of each colour, pattern, gloss, and texture of plastic laminate, in manufacturer's standard tag size.
 - .3 Two samples of laminated plastic joints, edging, cutouts and postformed profiles.
 - .4 Two of each quartz surface, in 100 x 75 x 19 mm samples.
 - .5 Two samples of melamine surfaced board, edging and postformed profiles.

.6 One of each item of finish carpentry hardware.

.3 Extended warranty: Submit extended warranty signed and registered by the manufacturer providing the warranty in the name of the Owner for the timeframe and coverage specified in this Section.

1.4 **QUALITY ASSURANCE**

.1 Execute work of this Section by member of AWMAC, with 5 years experience in finish carpentry work of comparable complexity and scope. Submit proof of experience upon Consultant's request.

.2 Fabricate finish carpentry work in accordance with NAAWS, Premium Quality materials and installation unless otherwise indicated. Perform work in accordance with the definition of Good Workmanship as defined in the NAAWS.

.3 Remove and replace finish carpentry work which does not conform to the NAAWS or as amended by these Specifications.

.4 Mock-up:

.1 Shop fabricate one mock-up of a base cabinet, wall cabinet, and counter top for each type of surfacing specified, complete with hardware and shop applied finishes, installed in location acceptable to Consultant.

.2 Arrange for Consultant's review and acceptance, allow 48 hours after acceptance before proceeding with work.

.3 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work.

1.5 **DELIVERY, STORAGE, AND HANDLING**

.1 Deliver, store, and handle finish carpentry in accordance with the NAAWS. Control the temperature and humidity in accordance with the NAAWS recommendations, before, during, and after finish carpentry delivery, and also during storage and installation.

.2 Cover finished plastic laminated work with heavy kraft paper or put in cartons during shipment. Protect installed surfaces by approved means. Do not remove until immediately before final inspection.

1.6 **EXTENDED WARRANTY**

.1 Submit an extended warranty for finish carpentry work of this Section in accordance with General Conditions, except that warranty period is extended to 2 years from date of Substantial Performance.

.1 Warrant against defects in material and workmanship including but not limited to opening of joints, cracking, shrinkage, warpage, and delamination of finish carpentry.

.2 Coverage: Complete replacement including affected adjacent Work.

2 Products

2.1 **MATERIALS**

.1 General:

- .1 All materials under work of this Section, including but not limited to, adhesives and mastics, are to have low VOC content limits.
- .2 Adhesives - Urea-formaldehyde-free glues.

.2 Concealed framing lumber and plywood:

- .1 Eastern Spruce, Balsam Fir, or Jack Pine, to CAN/CSA O141, NLGA, and NAAWS Custom Grade, S4S, average moisture content 7% +/- 2% at installation.
- .2 Softwood plywood: CSA O151-M; 19 mm unless indicated otherwise, (G2S).

.3 Plastic laminate (PLAM): Provide plastic laminates conforming to ANSI/NEMA LD 3 as follows:

- .1 Flatwork face sheet: 1.2 mm thick, heavy wear resistance.
- .2 Vertical interior face sheets: 0.8 mm thick.
- .3 Postformed face sheet: 0.8 mm thick.
- .4 Backing sheet: thickness to match face sheet, high pressure laminate, manufactured by same manufacturer as face sheet.
- .5 Plastic laminate: As manufactured by Arborite, Formica, Forbo, Nevamar, Pionite and Wilsonart.
- .6 Colour: Refer to Finish/Material/Product Schedule as shown on Contract Drawings for selected colour.
- .7 Edging: 3 mm thick PVC or ABS edging to match plastic laminate colour.

.4 Quartz surfacing (CS):

- .1 Crushed quartz combined with resins and pigments formed into minimum 20 mm thick dense non-porous slabs with polished finish and eased edges.
- .2 Colour: Refer to Finish/Material/Product Schedule as shown on Contract Drawings for selected colour.
- .3 Quartz countertops, 'Corian Quartz' by DuPont Inc. or approved alternative by CaesarStone Quartz Surfaces.
- .4 Installation and seam adhesives to be as recommended by quartz surfacing manufacturer, colour matched to quartz surfacing.

.5 Veneer core plywood (substrate): APA plywood, Grade A-D, in sizes, thickness and shapes as indicated.

.6 Marine grade plywood: CSA O151-M, T & G, composed entirely of Douglas Fir or Western Larch, laminated with structural waterproof adhesive, exterior grade. Thickness as indicated on drawings.

- 7. Melamine surfaced board (MEL):
 - .1 Provide melamine surfaced board for inside facing of millwork, unless otherwise indicated.
 - .2 ANSI A208.2, no urea-formaldehyde, melamine faced veneer core plywood conforming to APA requirements as specified and where indicated. Manufactured by Egger Group, Panolam Surface Systems or Uniboard Canada Inc.
 - .3 Melamine colour: Inside facing of millwork in white colour, unless otherwise indicated.
 - .4 Edge banding: Minimum 3 mm thick, PVC to match melamine colour.
- .8 Laminating adhesive: CSA O112 Series, water resistant type, low VOC content, selected by laminate manufacturer for intended end use.
- .9 Draw bolts and splines: Type as recommended by fabricator.
- .10 Nails and staples: Conforming to ASTM F1667; Size and type to suit application, galvanized for interior humid areas and for treated lumber; plain finish elsewhere.
- .11 Bolts, nuts, washers, blind fasteners, lags and screws: Size and type to suit application. Stapling is not acceptable.
- .12 Adhesive and bituminous mastic: Selected by the millwork fabricator with low VOC content.
- .13 Miscellaneous metals: In accordance with Section 05 50 00.

2.2 **HARDWARE**

- .1 The following hardware is the minimum quality standard for the work of this Section. Alternatives may be considered provided they are approved by Consultant prior to ordering of products.
- .2 Drawer slides: Full extension with soft-closing feature, '8400 Series' with '8450FM Soft-Close Drawer Slide' by Knappe & Vogt or approved alternative by Accuride.
- .3 Pilasters: Clear anodized aluminum recessed shelf standards with 12 mm divisions, Model 233 by Knappe & Vogt.
- .4 Clips: Bright zinc plated, adjustable height shelf supports, Model 256 by Knappe & Vogt
- .5 Cabinet hinges
 - .1 Heavy duty, concealed, minimum 170 degree opening angle, self closing.
 - .2 Supply manufacturer's recommended number of hinges to suit door size and thickness.
 - .3 Manufactured by Blum and complete with 'Blumotion' soft-closing feature.

- .6 Drawer and cabinet pulls: 10 mm dia. x 106 mm wide, stainless steel with matt finish, 115.61.601 by Hafele.
- .7 Magnetic catches: Model 918 by Knappe & Vogt.
- .8 Locks: Cam locks/deadbolt locks complete with lock core by Hafele, type to suit application and installation.
- .9 Cable grommets: round, one-piece chrome polished '429.94.258' by Hafele.
- .10 Nylon beads: Clear nylon bead door and drawer stops; provided at each corner.
- .11 Gate hardware:
 - .1 Provide heavy duty, corrosion resistant stainless steel hardware for gate.
 - .2 Provide gate hardware as required for smooth and efficient operation, including but not limited to, hinges and gate latch/lock.
 - .3 Gate hinge: Heavy duty, continuous, stainless steel piano hinge.

2.3 PLASTIC LAMINATE WORK

- .1 Perform plastic laminate work in accordance with NAAWS and ANSI/NEMA LD 3.
- .2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .3 Laminate plastic laminates to veneer core plywood, unless otherwise specified or indicated, in accordance with manufacturer's instructions. Laminate postformed laminates to particle board core in accordance with manufacturer's instructions.
- .4 Fabricate core surfaces and profiles with continuous support and bond over entire surface to receive plastic laminate.
- .5 Apply plastic laminate backing sheets to balance shrinkage stresses induced by plastic laminate face sheets.
- .6 Joints:
 - .1 Install joints in accordance with reviewed shop drawings.
 - .2 Jointing shall be placed at logical locations in intended millwork item and shall meet the overall aesthetic intent of the Consultant.
 - .3 Minimize joints in plastic laminate work.
 - .4 Do not install joints in plastic laminate work in less than 2400 mm o.c.
 - .5 Locate joints minimum 610 mm from cut-outs.
 - .6 Offset core and plastic laminate facing joints.
- .7 Form shaped profiles and bends as indicated, using postformed grade laminate to laminate manufacturer's instructions.

- .8 Edging to be done using 3 mm thick PVC to match plastic laminate colour to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .9 Apply laminated plastic liner sheet to interior of cabinetry and where indicated.
- .10 Fabricate units by quartz surfacing manufacturer's certified or approved fabricator/installer. Fabricate built-up profiles as indicated.

2.4 **FABRICATION**

- .1 Be responsible for methods of construction and for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other sections.
- .2 Coordinate locations of concealed supports and blocking with other parts of work. Provide cutouts for outlet boxes and other fixtures.
- .3 Fabricate work in a manner which will permit expansion and contraction of the materials without visible open joints. Conceal joints and connections in wherever possible.
- .4 Set nails and countersink screws, apply wood filler to indentations, sand smooth and leave ready to receive finish.
- .5 Mitre exposed corners, no end grain shall be visible in completed installation.
- .6 Finished millwork shall be free from bruises, blemishes, and other defects and shall be selected for uniformity of colour and texture.
- .7 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .8 Recess shelf standards, unless noted otherwise. Stagger recessed shelf standards on opposite sides of divider.
- .9 Do not exceed maximum 760 mm unsupported span for 19 mm thick shelving. House fixed shelving into gables and divisions.
- .10 Shop assemble finish carpentry to accommodate delivery and handling and to ensure passage through building openings.
- .11 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .12 Gate: Provide solid core wood gate, complete with blocking and ABS edging as shown on Contract Drawings.

3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 INSTALLATION

- .1 Install finish carpentry work in accordance with NAAWS and tolerances for architectural woodwork and reviewed shop drawings.
- .2 Set and secure finish carpentry in place, rigid, plumb, square, and level.
- .3 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate columns, fixtures, outlets, or other projecting, intersecting or penetrating objects leaving a 0.8 mm gap maximum.
- .4 Coordinate cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures, in finish carpentry. Round internal corners of cut-outs and seal exposed cores.
- .5 Form joints to conceal shrinkage.
- .6 Install draw bolts and splines in counter top joints at maximum spacing 450 mm o.c., and 75 mm from edge. Make joints flush, hairline butt joints.
- .7 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .8 Apply bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .9 Melamine panels: Installed melamine panels shall not show any exposed fasteners on finished/exposed surfaces.
- .10 Composite stone countertops:
 - .1 Install quartz surfacing in accordance with manufacturer's written instructions.
 - .2 Construct quartz countertops of sizes and details as noted.
 - .3 Accurately and neatly cut, drill and fit quartz material as required for fixtures, fittings, and other appurtenances abutting or extending through quartz and repair all quartz after other Sections have finished.
 - .4 In cutting and fitting, the edges shall be carefully cut and ground to a perfect fit and all cutting shall be done in such a manner as not to impair the strength or appearance of the material.
 - .5 Align work plumb and level.
 - .6 Seal perimeter of fabrication to adjacent construction in accordance with Section 07 92 00.

- .11 Gate: Adjust gate hardware for smooth and efficient operation.
- .12 Fastening:
 - .1 Coordinate wall securement, anchorage, and blocking for finish carpentry items.
 - .2 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .3 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .4 Provide heavy duty fixture attachments for wall mounted cabinets.
 - .5 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
- .13 Remove and replace damaged, marked, or stained finish carpentry.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for firestopping and smoke seals work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM C303, Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
- .2 ASTM C920, Standard Specification for Elastomeric Joint Sealants.
- .3 ASTM C1104, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
- .4 ASTM E814, Test Method for Fire Tests of Through-Penetration Fire Stops.
- .5 ASTM E2174, Standard Practice for On-Site Inspection of Installed Fire Stops.
- .6 CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies.
- .7 CAN/ULC S114, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
- .8 CAN/ULC S115, Standard Method of Fire Tests of Firestop Systems.
- .9 CAN/ULC S129, Standard Method Of Test For Smoulder Resistance Of Insulation (Basket Method).
- .10 CAN/ULC S702, Thermal Insulation, Mineral Fibre for Buildings.

1.3 **DEFINITIONS**

- .1 Fire Separation: A construction assembly, plane or device, either vertical or horizontal, which is required to prevent the passage of fire and smoke for a prescribed period of time. Proof of compliance to required time rating shall be by ULC, Warnock Hersey (or similar approved) certification or shall be as listed in the Ontario Building Code Supplementary Standard SB-2.
- .2 Smoke Separation: A construction assembly, plane or device, either vertical or horizontal, which is not required to prevent the passage of fire for a prescribed period of time but is required to prevent the passage of smoke. A "Smoke Separation" is also known as a "Fire Separation with No Rating" or a "Zero Hour Rated Separation".

- .3 Non-Rated Separation: A construction assembly, plane or device, either vertical or horizontal, which is not required to prevent the passage of fire for a prescribed period of time and is not required to prevent the passage of smoke.

1.4 **SYSTEM DESCRIPTION**

- .1 Firestopping and smoke seals: ULC or Intertek Testing Services listed Products and systems in accordance with CAN/ULC S115 suitable to actual application and installation conditions.
- .2 Firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.
- .3 Firestop and smoke seal system shall achieve a fire resistance rating and smoke seal rating equal to that of assemblies into which they are installed.
- .4 Provide smoke sealants over firestopping materials or combination smoke seal/firestop seal material to form air tight barriers to retard the passage of gas and smoke.
- .5 Firestopping and smoke seals located at movement joints shall be designed with movement capability.
- .6 Firestopping and smoke seals within mechanical and electrical assemblies shall be provided as part of the work of Divisions 21, 22, 23, 26, 27, and 28 respectively.

1.5 **SUBMITTALS**

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate cUL or ULC reference standard, characteristics, limitations.
 - .2 Product transportation, storage, handling and installation requirements.
 - .3 Submit firestop and smoke seal manufacturer's Product data for materials and prefabricated devices, including manufacturer's printed installation instructions.
- .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Fire rated and smoke sealed systems for each typical application.
 - .2 Construction details, accurately reflecting actual job conditions.
 - .3 ULC or Intertek Testing assembly listing.

- .4 Each floor and wall assembly requiring firestop system with each corresponding ULC firestop system.
- .3 Certification:
 - .1 Submit certified documentation from manufacturer for each worker performing work of this Section.
 - .2 Submit installer's and Product manufacturer's certification verifying compliance with the Contract Documents and conformance with ASTM E814 and CAN/ULC S115.
- 1.6 **QUALITY ASSURANCE**
 - .1 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of firestopping and smoke seal work of a similar size and nature and that is approved by manufacturer. Submit to Consultant, applicator's current certificate of approval by the material manufacturer as proof of compliance.
 - .2 Manufacturer's direct representative and/or fire protection specialist shall be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures conforming to manufacturer's written recommendations published in their literature and drawing details.
 - .3 Pre-construction meetings: Arrange with manufacturer's representative, Contractor, Consultant and Field Engineer to determine responsibility for handling such issues as FT rated partitions, firestop custom details, compatibility, mixed penetrations, and to review installation procedures 48 hours in advance of installation.
- 1.7 **DELIVERY STORAGE AND HANDLING**
 - .1 Deliver materials to Place of Work in manufacturer's unopened containers, containing classification label with labels intact and legible at time of use.
 - .2 Do not use damaged or adulterated materials exceeding their expiry date.
- 1.8 **SITE CONDITIONS**
 - .1 Conform to manufacturer's requirements and maintain a minimum temperature of 5⁰ C for a minimum period of 24 h before application, during, and until application is fully cured.
 - .2 Maintain sealant at a minimum 18° C for best workability.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Acceptable manufacturers of rated systems include:
 - .1 3M
 - .2 Hilti Canada Corporation.
 - .3 Specified Technologies Inc. (STI Firestop)
 - .4 Tremco Ltd.

2.2 **GENERAL SYSTEM REQUIREMENTS**

- .1 All materials under work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.
- .2 Do not use Products containing asbestos.
- .3 Firestopping components shall not contain volatile solvents or require special application to protect plastic pipe from firestopping compound.
- .4 Provide smoke seal sealant in following colours:
 - .1 Grey or white in finished areas.
 - .2 Red in unfinished areas.
- .5 Smoke sealant for overhead and vertical joints for floor to be self-levelling and non-sagging sealant.
- .6 Smoke sealant at vertical through penetrations in areas with floor drains shall be waterproof type.

2.3 **MATERIALS**

- .1 Following materials have been provided for convenience. Contractor shall provide complete system with all components and accessories as required for fire resistant and smoke seal installation.
- .2 Firestop sealant: single component, low modulus, silicone rubber, moisture curing sealant to ASTM C920, ULC labelled to CAN/ULC S115.
- .3 Pre-Installed firestop devices for use with non-combustible and combustible pipes, conduit and/or cable bundles penetrating concrete floors and walls.
 - .1 Cast-in place firestop device complete with aerator adaptor when used in conjunction with aerator system. Model CP 680-P by Hilti or approved alternative.
 - .2 Cast-in place firestop device for use with noncombustible penetrants. Model CP 680-M by Hilti or approved alternative.
 - .3 Speed sleeve for use with cable penetrations. Model CP 653 by Hilti or approved alternative.
 - .4 Firestop block. Model CFS-BL by Hilti or approved alternative.

- .4 Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating walls:
 - .1 Speed sleeve with integrated smoke seal fabric membrane. Model CP 653 by Hilti or approved alternative.
 - .2 Firestop Sleeve. Model CFS-SL SK by Hilti or approved alternative.
 - .3 Retrofit sleeve for use with existing cable bundles. Model CFS-SL RK by Hilti or approved alternative.
 - .4 Gangplate for use with multiple cable management devices. Model CFS-SL GP by Hilti or approved alternative.
 - .5 Gangplate Cap for use at blank openings in gangplate for future penetrations. Model CFS-SL GP CAP by Hilti or approved alternative.
- .5 Firestop insulation: to CAN/ULC S702, Type 2; mineral fibre manufactured from rock or slag, suitable for manual application.
 - .1 Density: Minimum 64 kg/m³ when tested to ASTM C303.
 - .2 Combustibility: Noncombustible to CAN/ULC S114.
 - .3 Melt temperature: >1175 degrees C.
 - .4 Surface burning characteristics: to CAN/ULC S102, maximum flame spread of 0, smoke developed of 0.
 - .5 Moisture Absorption: 0.04 percent when tested to ASTM C1104.
 - .6 Smoulder Resistance: 0.01 percent when tested to CAN/ULC S129.
- .6 Damming, back-up, supports, and anchorage: In accordance with manufacturer's fire rated systems and to acceptance of authorities having jurisdiction.
- .7 Primer: As recommended by firestopping sealant manufacturer.

3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify that substrates and surfaces to receive firestopping and smoke seals are clean, dry, and frost free.

3.2 PREPARATION

- .1 Prepare, modify, and adjust void sizes, proportions, and conditions to conform to fire rated and smoke sealed assembly requirements such as assembly opening size and dimensional restrictions.
- .2 Clean surfaces to remove material detrimental to bond including dust, paint, rust, oil, grease, moisture, frost and other foreign matter to manufacturers recommendations.

- .3 Mask adjacent surfaces to avoid spillage and over-coating of adjacent surfaces. Remove stains from adjacent surfaces.

3.3 **INSTALLATION**

- .1 Install firestopping and smoke seal systems in accordance with reviewed Shop Drawings, manufacturer's instructions and fire rated assembly to establish continuity and integrity of fire separations.
- .2 Install firestop insulation in compacted thicknesses required by ULC design. Compress insulation approximately 50 percent.
- .3 Install primers as recommended by firestop and smoke seal Product manufacturers.
- .4 Install temporary forming, damming, back-up as required, remove after materials have achieved initial cure and will resist displacement.
- .5 Install firestop and smoke seal filler in horizontal joints providing 25% compression fit.
- .6 Use resilient, elastomeric firestopping and smoke seal systems in following locations:
 - .1 Openings and sleeves for future use.
 - .2 Penetration systems subject to vibration or thermal movement.
 - .3 Penetration systems in acoustical containment enclosures.
- .7 Trowel and tool exposed firestop and smoke seal. Product surfaces to uniform, smooth finish.
- .8 Seal joints to ensure an air and water resistant seal capable of withstanding compressions and extensions due to thermal wind or seismic joint movement.
- .9 Taped joints will not be acceptable.
- .10 Repair damaged firestopped and smoke sealed surfaces to acceptance of Consultant.
- .11 Identify each firestop and smoke seal penetration assembly with permanent label listing following:
 - .1 Assembly and rating in hours.
 - .2 Date of installation.
 - .3 Installing company's name and telephone number.
- .12 Do not cover materials until full cure has taken place.

3.4 **INSPECTION AND TESTING**

- .1 Inspection of through-penetration firestopping shall be performed in accordance with ASTM E2174 to ensure that firestopping and smoke seals have been installed in accordance with Contract documents and to tested and listed firestop system.

3.5 CLEAN-UP

- .1 Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.
- .2 Remove excess materials and debris immediately after application.

3.6 SCHEDULE OF FIRESTOP AND SMOKE SEAL LOCATIONS

- .1 Following firestop and smoke seal location schedule is included for convenience and may not be complete. Examine Contract Drawings and other specification sections and determine entire extent of work of this Section. Generally provide systems with required fire and smoke ratings at following locations:
 - .1 Gaps at intersections of fire-resistance rated walls and partitions.
 - .2 Control and sway joints in fire-resistance rated walls and partitions.
 - .3 Gaps at top of fire-resistance rated partitions and walls.
 - .4 Penetrations through fire-resistance rated walls and partitions including but not limited to mechanical and electrical services and openings and sleeves for future use.
 - .5 Penetrations through fire-resistance rated floor slabs and ceilings.
 - .6 Perimeter of retaining angles on rigid ducts greater than 0.012 m², firestopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
 - .7 Where indicated on drawings.
 - .8 At non-rated assemblies that require a smoke seal.
 - .9 Where required by Ontario Building Code.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for sealant work in accordance with the Contract Documents.
- .2 Work of this Section does not include sealants in firestopping and smoke sealed assemblies.
- .3 Work of this Section does not include sealant work identified in individual specification sections.

1.2 **REFERENCES**

- .1 ASTM C834, Specification for Latex Sealants.
- .2 ASTM C920, Specification for Elastomeric Joint Sealants.
- .3 ASTM C1330, Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

1.3 **SUBMITTALS**

- .1 Product data: Submit copies of Product data in accordance with Section 01 00 00 describing type, composition and recommendations or directions for surface preparation, material preparation and material installation.
- .2 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00:
 - .1 Two samples of sealant/caulking, for colour selection.
 - .2 Two samples of back-up material and primer for physical characteristics.
- .3 Extended warranty: Submit extended warranty signed and registered by the manufacturer providing the warranty in the name of the Owner for the timeframe and coverage specified in this Section.

1.4 **QUALITY ASSURANCE**

- .1 Qualifications: Work of this Section shall be executed by trained applicators approved by sealant manufacturer and having a minimum of 5 years proven experience.

1.5 **SITE CONDITIONS**

- .1 Do not install materials when ambient air temperature is less than 5 °C, when recesses are wet or damp, or to manufacturer's recommendations.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Arrange delivery of materials in original, unopened packages with labels intact, including batch number, and ensure that on-site storage is kept to a minimum. Do not store materials on site where there exists any danger of damage from moisture, direct sunlight, freezing and other contaminants.

1.7 EXTENDED WARRANTY

- .1 Submit an extended warranty for Sealant work in accordance with General Conditions, except that warranty period is extended to 2 years from date of Substantial Performance.
 - .1 Warrant against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and staining adjacent surfaces.
 - .2 Coverage: Complete replacement including affected adjacent work.

2 Products

2.1 MATERIALS

- .1 General:
 - .1 All materials under work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.
 - .2 Use materials as received from manufacturers, without additives or adulterations. Use one manufacturer's Product for each kind of Product specified.
- .2 Sealant **Type A**: ASTM C920, Type S, Grade NS; One-part mildew-resistant silicone, in standard colours selected. Provide clear sealant where indicated.
 - .1 'Dowsil 786 Mildew Resistant Silicone Sealant' by Dow Consumer Solutions.
 - .2 'Sikasil GP Mildew Resistant' by Sika.
 - .3 'Tremsil 200 Silicone Sealant' by Tremco Ltd.
- .3 Sealant **Type B**: ASTM C920, Type M, Grade P, Class 25; Multi-component polyurethane-base, elastomeric sealant with self levelling properties, in standard colours selected.
 - .1 'Sikaflex 2c SL' by Sika, or approved alternative.
- .4 Sealant **Type C**: ASTM C834; Pure acrylic siliconized sealant; in standard white colour (paintable).
 - .1 '950A Siliconized Acrylic Latex Caulk' by Sherwin Williams.
 - .2 'Tremflex 834 Silconized Sealant' by Tremco Ltd.

2.2 ACCESSORIES

- .1 Primers: Type recommended by material manufacturers for various substrates, primers to prevent staining of adjacent surfaces encountered on project.

- .2 Joint backing: ASTM C1330; Round, solid section, closed cell, skinned surface, soft polyethylene foam gasket stock, compatible with primer and sealant materials, 30 to 50% oversized, Shore A hardness of 20, tensile strength 140 to 200 kPa. Bond breaker type surface.
- .3 Bond breaker: Type recommended by material manufacturers.
- .4 Void filler around the window frames to be one part expanding polyurethane foam.
- .5 Cleaning agents: As recommended by material manufacturer, non-staining, harmless to substrates and adjacent finished surfaces.

2.3 **MIXING**

- .1 Follow manufacturers instructions on mixing, shelf and pot life.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **PREPARATION**

- .1 Protect adjacent exposed surfaces to prevent smearing, staining or other damage, by masking or other means, prior to performing work. Make good any damage caused by sealant application. Remove protection upon completion and clean adjacent, exposed surfaces of any compound deposited upon such surfaces.
- .2 Remove all existing sealant, loose rust and mill scale by hand cutting, power grinding or wire brushing. Completely remove sealant build up in all joints. Remove any loose particles by blowing joint out with compressed air.
- .3 Clean substrate surfaces so that they are free from caulking, dust, grease, soiling, or extraneous matter, which are detrimental to the adhesion of the sealant.
- .4 Chemically clean all non-porous surfaces, such as aluminum and glass, by solvent wipe and drying with a clean cloth.
- .5 Patch, repair, and smooth minor substrate defects and deficiencies. Clean porous surfaces such as masonry and concrete by mechanical abrading.
- .6 Where existing fasteners are loose, tighten or replace as required.

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- .7 Substrate moisture tests:
 - .1 Test for moisture content over areas where sealant is to be applied.
 - .2 If any test registers above 10% allow entire substrate surfaces, within the plane, to dry further before sealant system application. Install temporary drying fans if necessary.
 - .3 After drying of the substrate, re-test employing same criteria.
 - .8 Mildew removal: Scrub with solution of TSP and rinse with water, and allow to dry completely.
 - .9 Prepare joints to receive sealants to manufacturer's instructions. Ensure that joints are clean and dry and ferrous surfaces are free from rust and oil.
 - .10 Clean recesses to receive sealant, to be free of dirt, dust, loose material, oil, grease, form release agents and other substances detrimental to sealant's performance.
 - .1 Remove lacquer or other protective coatings from metal surfaces, without damaging metal finish, using oil-free solvents. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sand blasting.
 - .2 Ensure recess is dry.
 - .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings. Remove incompatible coatings as required.
 - .11 Ensure that all materials in contact with sealant are compatible. Test substrate for adhesion.
 - .12 Depth of recess: Maintain depth to $\frac{1}{2}$ joint width up to a maximum of 13 mm and not less than 6 mm at centre of joint. For greater depth, use joint backing under. Where recess is less than specified depth, cut back surface of recess to specified recess depth.
 - .13 Install polyethylene backing rod in joints 6 mm or more in width. Roll backing rod into joint. Do not stretch or bend backing rod. Install bond breaker to back of recess.
 - .14 Prime sides of recess, in accordance with sealant manufacturer's instructions.
 - .15 Condition products for use in accordance with manufacturer's recommendations.

3.3 **INSTALLATION**

- .1 Apply sealant immediately after adjoining work is in condition to receive such work. Apply sealant in continuous bead using gun with correctly sized nozzle. Use sufficient pressure to evenly fill joint.
- .2 Ensure sealant has full uniform contact with, and adhesion to, side surfaces of recess. Superficial painting with skin bead is not acceptable. Tool sealant to smooth surface, free from ridges, wrinkles, sags, air pockets, embedded impurities, dirt, stains or other defects.
 - .1 At recesses in angular surfaces, finish sealant with flat profile, flush with face of material at each side.
 - .2 At recesses in flush surfaces, finish compound with concave face, flush with face of material at each side.
- .3 Make sealant bead uniform in colour.
- .4 Cure sealants in accordance with sealant manufacturer's instructions. Do not cover up sealants until proper curing has taken place.
- .5 Immediately remove excess compound or droppings which would set up or become difficult to remove from adjacent finished surfaces, using recommended cleaners, as work progresses. Do not use scrapers, chemicals or other tools which could damage finished surfaces. Remove defective sealant.
- .6 Clean recesses and re-apply sealant.
- .7 Remove masking tape immediately after joints have been sealed and tooled.

3.4 **CLEANING**

- .1 Clean surfaces adjacent to joints, remove sealant smears or other soiling resulting from application of sealants. At metal surfaces, remove residue. Do not mar or damage finishes on materials adjacent to joints. Repair or replace marred or damaged materials.

3.5 **SCHEDULE OF LOCATIONS**

- .1 Following sealant location schedule is included for convenience and may not be complete. Examine Contract Drawings and other specification sections and determine entire extent of work of this Section. Generally seal following locations:
 - .1 Concrete, masonry, wood and stone to metal.
 - .2 Wood to masonry, concrete and stone.
 - .3 Metal to metal.
 - .4 All dissimilar materials.
 - .5 Where 'sealant' or 'caulking' is indicated on drawings.

- .2 Sealant **Type A:**
 - .1 Around mechanical fixtures/fittings.
- .3 Sealant **Type B:**
 - .1 Control joints in epoxy flooring as indicated.
- .4 Sealant **Type C:**
 - .1 Perimeter of millwork counters.
 - .2 Perimeter of interior windows.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for metal door and frame work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .2 ASTM A924/A924M, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .3 CAN/CGSB-1.198, Cementitious Primer, (for Galvanized Surfaces).
- .4 CAN/ULC-S702, Thermal Insulation, Mineral Fibre for Buildings.
- .5 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .6 CSA W59-M, Welded Steel Construction (Metal Arc Welding).
- .7 CSDMA, Canadian Steel Door Manufacturers Association.

1.3 **SUBMITTALS**

- .1 Product data: Submit manufacturer's Product data in accordance with Section 01 00 00 indicating door and frame construction.
- .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 for each type of door and frame indicating:
 - .1 Thickness and type of steel.
 - .2 Thickness and type of core.
 - .3 Thickness and type of steel stiffeners and location of them within the door.
 - .4 Thickness and type of metal facing on edges of door and method of fastening.
 - .5 Location of mortises, reinforcement, anchorages, joining, welding, sleeving, exposed fasteners, openings and arrangement for hardware.
 - .2 Include schedule identifying each unit with door marks and numbers relating to numbering on Contract Drawings and in door schedule.

1.4 **QUALITY ASSURANCE**

- .1 Perform work in accordance with requirements of the Canadian Steel Door Manufacturer's Association (CSDMA).

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Daybar Industries Limited
- .2 Fleming Doors Products.
- .3 Steelcraft.
- .4 Vision Hollow Metal Limited.

2.2 **MATERIALS**

- .1 General: All materials under work of this Section, including but not limited to, primers are to have low VOC content limits.
- .2 Steel: ASTM A924/A924M, Class 1; Commercial grade steel, hot dip galvanized to ASTM A653/A653M, ZF120 galvanized coating.
- .3 Minimum base steel thickness:
 - .1 Frames 1.6 mm
 - .2 Typical doors 1.6 mm
 - .3 Interior stiffeners 0.9 mm
 - .4 Lock/strike reinforcements 1.6 mm
 - .5 Hinge reinforcements 2.7 mm
 - .6 All other reinforcement 1.6 mm
 - .7 Top and bottom channels 1.2 mm
 - .8 Guard boxes 0.9 mm
 - .9 Jamb spreaders 0.9 mm
- .4 Primer: CAN/CGSB 1.198.
- .5 Core material: Mineral fibre insulation with a minimum face density of 24 kg/m³.
- .6 Screws: Stainless steel screws with countersunk flat head.
- .7 Door silencers: Type 6-180, black neoprene.
- .8 Frame anchors:
 - .1 Frames in steel stud partitions: 0.9 mm minimum steel anchors of suitable design securely welded inside each jamb.
 - .2 Frames in existing walls: 0.9 mm minimum frame anchors to suit design.
- .9 Floor anchors: 1.6 mm minimum adjustable floor clip angles with 2 holes for anchorage to floor.
- .10 Grilles: Corrosion resistant steel with baked enamel finish. Model 61DG Series by Nailor Industries Inc or approved alternative by Hart and Cooley.

- .11 Pocket door hardware: In accordance with Section 08 71 00.

2.3 FABRICATION

.1 General

- .1 Fabricate doors and frames in accordance with reviewed shop drawings.
- .2 Welding: CSA W59-M to produce a finished unit with no visible seams or joints, square, true and free of distortion.
- .3 Welding: Continuous unless specified otherwise. Execute welding by a firm fully acceptable to the Canadian Welding Bureau to requirements of CSA W47.1.
- .4 Form profiles accurately to details shown on Contract Drawings.
- .5 Ream and remove burrs from drilled and punched holes.
- .6 Grind welded corners and joints to a flat plane and fill with metallic filler and sand to a uniform smooth finish. Apply one coat of primer.
- .7 Unless otherwise indicated, overall door thickness to be 45 mm.

.2 Frames:

- .1 Fabricate frames of welded construction. Cut mitres and joints accurately and weld continuously on inside of frame profile.
- .2 Construct large frame sections with provision for on Site assembly to suit Site conditions.
- .3 Blank, reinforce, drill and tap frames for mortised, templated hardware. Protect mortised cut-outs with guard boxes.
- .4 Reinforce frames where required for surface mounted hardware.
- .5 Reinforce frames over 1200 mm wide with roll formed steel channels or hollow structural sections specified in Section 05 50 00 and as indicated on drawings.
- .6 Prepare each door opening for single stud rubber door silencers, 3 for single door openings located in strike jamb, and 2 for double door openings located in head.
- .7 Install 2 channel or angle spreaders per frame, to ensure correct frame alignment. Install stiffener plates or spreaders between frame trim where required, to prevent bending of trim and to maintain alignment when setting in place.
- .8 Provide the following requirements for electrified frame applications:
 - .1 Low voltage wire conduit for required electrified hardware devices.
 - .2 Junction boxes for all frame mounted electrified hardware devices, complete with required connectors to in frame low voltage wire conduit.

.3 Anchorage:

- .1 Anchor units to floor and wall construction. Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb, minimum number of anchors for each jamb:
 - .1 Frames up to 2285 mm 3 anchors.
 - .2 Frames from 2285 mm to 2440 mm 4 anchors.

- .2 Fabricate frames for installation in steel stud partitions with steel anchors of suitable design, minimum number of anchors for each jamb:
 - .1 Frames up to 2285 mm height 4 anchors.
 - .2 Frames 2285 mm to 2440 mm 5 anchors.
- .3 Frames in previously placed concrete, masonry, precast or structural steel: Anchors located at 150 mm maximum from top and bottom of each jamb, and intermediate anchors at maximum 660 mm o.c.
- .4 General Door Requirements:
 - .1 Hollow steel construction, flush swing type, of sizes to conform to details, schedules and reviewed shop drawings with provisions for cut-outs for grilles and reinforced to receive hardware fastenings.
 - .2 Blank, reinforce, drill and tap doors for mortised, templated hardware. Where required, reinforce doors for surface mounted hardware and door closers.
 - .3 Reinforce oversized doors with steel channels and plates specified in Section 05 50 00 and as indicated on drawings.
 - .4 Where openings are required, form integral cut-outs with framing.
 - .5 Bevel both stiles of single doors 1 in 16.
 - .6 Reinforce doors with galvanized metal stiffeners at 150 mm o.c.
 - .7 Provide the following requirements for electrified door applications:
 - .1 In door low voltage wire raceways.
 - .2 Steel astragals for hollow metal doors.
 - .3 Reinforcement for all door mounted electrified hardware devices as required and as indicated on Contract Drawings.
- .5 Interior doors:
 - .1 Supply and install inverted, recessed, fully welded channels at top and bottom of doors.
 - .2 Fabricate doors with joints between front and back panels meeting on stile edges. Make joints continuously welded for entire height of door. After welding has been completed, grind joints smooth to match metal. Ensure that no filler is used in joints.
 - .3 Fill hollow space within door and vertical stiffeners from top to bottom with mineral fibre batt insulation.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 HOLLOW METAL DOOR AND FRAME INSTALLATION

- .1 Install hollow metal doors and frames in accordance with reviewed shop drawings, manufacturer's written instructions and to meet CSDMA requirements.
- .2 Install hollow metal doors and frames plumb, square, level, secure, and at correct elevation.
- .3 Install doors clear of floor finishes, and with the correct rebate opening for the door installation. Install door silencers.
- .4 Secure anchorages and connections to adjacent construction. Brace frames rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at third points of frame rebate height to maintain frame width. Supply and install vertical supports as indicated on drawings for openings over 1200 mm in width. Remove wood spreaders after frames have been built-in.
- .5 Allow for structural deflection and prevent structural loads from being transmitted to hollow metal frames.
- .6 Touch-up areas where galvanized coating has been removed or damaged with primer.

3.3 ADJUSTING AND CLEANING

- .1 Adjust doors for smooth and balanced door movement.
- .2 Clean doors and frames.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, tool, equipment and services necessary for interior framed aluminum window work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 AAMA 611, Voluntary Standards for Anodized Architectural Aluminum.
- .2 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.
- .3 ANSI, H35.1M Alloy and Temper Designation Systems for Aluminum (Metric).
- .4 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- .5 ASTM B221M, Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
- .6 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .7 CAN/CGSB-1.108-M, Bituminous Solvent Type Paint.
- .8 CSA W59-M, Welded Steel Construction (Metal Arc Welding).

1.3 **DESIGN REQUIREMENTS**

- .1 Design interior window assemblies to withstand live, dead, lateral, seismic, handling, transportation, and erection loads.
- .2 Design interior window assemblies to provide maximum deflection of L/360 or that is consistent with smooth, non-binding operation, whichever is more stringent.

1.4 **SUBMITTALS**

- .1 Shop drawings:
 - .1 Submit shop drawings in accordance with the Section 01 00 00 indicating:
 - .1 Plans, sections, details, type of extrusions, profiles, anchorage, glazing details, and finishes.
 - .2 Section and hardware reinforcement.
- .2 Reports:
 - .1 Submit substantiating engineering data, and independent test results of tested interior windows to substantiate compliance with specified design requirements.
 - .2 Submit qualification data to demonstrate proof of compliance.

1.5 **QUALITY ASSURANCE**

- .1 Manufacturer's qualifications: Perform work of this Section by a company that has a minimum of ten years proven experience in the manufacture of aluminum window units of a similar size and nature and that is approved by manufacturer.
- .2 Installer's qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of aluminum window units of a similar size and nature and that is approved by manufacturer. Submit to Consultant, installer's current certificate of approval by the material manufacturer as proof of compliance.

1.6 **DELIVERY, STORAGE, AND HANDLING**

- .1 Handle aluminum work in accordance with AAMA CW-10.
- .2 Protect aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Do not remove before final cleaning of building.

2 **Products**

2.1 **ACCEPTABLE MANUFACTURER(S) AND SYSTEM(S)**

- .1 Interior aluminum window/screen: Non-thermally broken, interior aluminum window, '1800 Series' by Alumicor Limited or approved alternative by CRL/U.S. Aluminum or Kawneer.

2.2 **MATERIALS**

- .1 General: All materials under work of this Section, including but not limited to, sealants and coatings are to have low VOC content limits.
- .2 Aluminum extrusions and channels: ASTM B211 and ANSI H35.1 AA6063 alloy, T6 temper.
- .3 Reinforcements and anchors: ASTM A167, Type 304 to AISI No. 2B finish. Size as shown.
- .4 Glass and glazing materials: As specified in Section 08 80 00.
- .5 Frame sealant: Type as recommended by the aluminum work manufacturer.
- .6 Screws, bolts and other fasteners: ASTM F738M; Stainless Steel Type 304.
- .7 Isolation coating: CAN/CGSB-1.108-M; Bitumastic coating, acid and alkali resistant material.

2.3 **FABRICATION**

- .1 Fabricate interior aluminum window in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.
- .3 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints. Apply
- .4 Conceal anchors, reinforcement and attachments from view. Fabricate reinforcement in accordance with design requirements.
- .5 Do not expose manufacturer's identification labels on aluminum assemblies.

2.4 **FINISH**

- .1 Extrusion finish: Colour anodized to AAMA 611 per Aluminum Association Designation System for Aluminum Finishes AA-M12C22A44. Colour: Black colour to match existing vestibule. Finish to be verified by the Consultant.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Install interior aluminum window in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Install work of this Section securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist.
- .3 Coordinate installation of glass and glazing in accordance with Section 08 80 00.
- .4 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.
- .5 Remove damaged or unacceptable Products and assemblies from Site and replace to Consultant's acceptance.

- .6 Install glass presence markers, in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.

3.3 **CLEANING**

- .1 Maintain aluminum windows, inside and outside, in clean condition throughout construction period.
- .2 Remove labels, protective material, and glass presence markers from prefinished surfaces.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, equipment and services necessary for automatic sliding door work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 AAMA 611, Voluntary Standards for Anodized Architectural Aluminum.
- .2 ANSI H35.1M Alloy and Temper Designation Systems for Aluminum (Metric).
- .3 CAN/CGSB-1.108-M, Bituminous Solvent Type Paint.
- .4 CAN/CGSB-12.1-M, Tempered or Laminated Safety Glass.

1.3 **DESIGN REQUIREMENTS**

- .1 Design, fabricate, and supply anchorage inserts for installation as part of other parts of the Work. Design anchorage assemblies to accommodate construction and installation tolerances.
- .2 Design sliding door system to accommodate 19 mm vertical deflection in supporting structure.
- .3 Emergency exit break-away: Design sliding door break-away hardware on active leafs only, in direction of egress, under 90 N factory set, horizontal force field adjustable.

1.4 **SUBMITTALS**

- .1 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Plans, sections, and details.
 - .2 Products and glazing types.
 - .3 Finishes.
 - .4 Anchorage inserts, system installation tolerances
 - .5 Section and hardware reinforcement, anchorage, assembly fixings
 - .6 Detailing, locations, and allowances for movement, expansion, contraction.
 - .7 Relationship of doors, frames, track, hardware and operating components to adjacent construction.
- .2 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00:
 - .1 Two 300 mm long sliding door extrusion.
 - .2 Two 300 mm square corner samples of each type door and frame.
 - .3 Two 300 mm x 300 mm samples of frosted opaque glass.

1.5 **QUALITY ASSURANCE**

- .1 Perform work of this Section by a company which supplies and installs work of this Section. Execute installation by manufacturer's trained and certified installation specialists.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 This specification is written on the basis of a Versamax ICU touchless door by Besam or approved alternative by Horton Automatics or Stanley Ltd. Specified manufacturer's products establish the minimum acceptable standards for the work of this Section. Sliding door assemblies of other manufacturer's shall exceed specified manufacturer's standards.

2.2 **MATERIALS**

- .1 All materials under work of this Section, including but not limited to, sealants and coatings are to have low VOC content limits.
- .2 Aluminum extrusions: ANSI H35.1 AA6063, T5 temper alloy.
 - .1 Finish: Clear anodized to AAMA 611 per Aluminum Association Designation System for Aluminum Finishes. AA-M12C23A41.
- .3 Glass: CAN/CGSB-12.1-M, Type 2, Class B, Category II, clear, minimum 6 mm thick frosted opaque glass.
- .4 Temporary glass presence markers: Easily removable, non-residue depositing.
- .5 Glazing tape: Preformed and pre-shimmed tape, paper release, colour as selected by Consultant.
- .6 Setting blocks: Neoprene, 80-90 Shore A Durometer hardness, 100 mm long x 6 mm high x rebate width.
- .7 Hardware: Provide manufacturer's standard hardware as required for operation indicated.
 - .1 Breakaway arms and bottom pivot assemblies shall be allow panels to breakout to 90 degrees. Maximum force to breakout slider panel to be 50 lbf (222 N). Gas regulated damper to control movement of breakout panels.
 - .2 Positive Latch: Mortise type self-latching hookbolt, BHMA A156.5, Grade 1, with lever handles on each slide.
 - .3 Flush bolts: Manual operated flush bolt to secure sidelite panel(s).

- .8 Guide track/threshold: 12 mm high aluminum guide track floor mounted in front of the sidelight portion of the door assembly.
 - .1 Recessed mounted track.
 - .2 Guide track shall allow breakout from any position except when door is latched.
- .9 Anchors, clips, blocking, and angles: AISI Type 304 stainless steel, 2B mill finish.
- .10 Screws, bolts and other fasteners: AISI Stainless Steel Type 304.
- .11 Isolation coating: CAN/CGSB-1.108-M; Bitumastic coating, acid and alkali resistant material.
- .12 Foam insulation: One component polyurethane foam for installation within closures and fillers; Enerfoam by DuPont de Nemours Inc.
- .13 Frame sealant: Type as recommended by the sliding door manufacturer.
- .14 Lubricant: Type as recommended by manufacturer.
- .15 Smoke seal: Standard kit as recommended by manufacturer.

2.3 **OPERATORS**

- .1 Sliding door operator:
 - .1 Operator and controller: Electro-mechanical controlled unit utilizing a high-efficiency, energy efficient, DC motor. System shall be capable of operating at full performance through brown out and high voltage line conditions (85V – 265V) by sensing changes and adjusting automatically. Operator shall allow an adjustable hold open time of 0 to 60 seconds.
 - .2 Microprocessor control Box: Factory-adjusted configuration, with pre-set opening and closing speeds. Selector switch to be interior jamb mounted and shall allow “on”, “off”, and “hold open” functions to be engaged when switch is turned to the appropriate setting. Switch shall be a multi- position keyed cylinder.
- .2 Sensor Plate: Touchless, activation sensor plates, black polycarbonate with white letters. Microwave technology has an adjustable range of 2 inches to 24 inches.
- .3 Safety Presence Sensors:
 - .1 Header Mounted Safety Sensor: Shall be the Besam OA Presence Safety Sensor utilizing active infrared reflection technology to detect presence from a single housing mounted on each side of the header.
 - .2 Breakout Beam: Transmitter/receiver assembly with an infrared photoelectric beam, to stop sliding door movement when door is in breakout position and breaks photoelectric beam.

- .4 Remote Activation: Remote activation system allowing remote activation by patient, nurse, smoke/fire detection system, and/or security system.

2.4 **FABRICATION**

- .1 Verify dimensions of existing work before commencing fabrication and report discrepancies to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.
- .3 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints.
- .4 Fabricate to conceal anchors and attachments from view. Fabricate concealed reinforcement in accordance with design requirements.
- .5 Do not expose manufacturer's identification labels on sliding door assemblies.
- .6 Fit and mitre corners and joints accurately fitted and securely jointed together.
- .7 Fabricate doors and frames complete with internal reinforcements, cutouts, recesses.
- .8 Supply and install transom framing complete with glazing.
- .9 After fabrication, apply protective strippable coating to prefinished aluminum surfaces. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Do not remove before final cleaning of building.

3 Execution

3.1 **EXAMINATION**

- .1 Verify conditions and dimensions of previously installed work upon which work of this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Install sliding door system in accordance with reviewed shop drawings and manufacturer's instructions.
- .2 Install work of this Section securely, in correct location, level, square, plumb, at correct elevations, free of warp or twist.

- .3 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.
- .4 Install flashings, closures, and trim pieces.
- .5 Fill voids between aluminum framing and adjacent construction with foam insulation.
- .6 Supply and install sliding door systems complete with glazing and accessories.
- .7 Door operators: Connect door operators to in accordance with Division 26.
- .8 Install glass presence markers, in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.
- .9 Install manufacturer's standard smoke seal kit.
- .10 Adjust operable parts for correct function.
- .11 Remove damaged or unacceptable Products and assemblies from Site and replace to acceptance of Consultant.

3.3 **ERECTION TOLERANCES**

- .1 Maximum variation from plumb: 1.5 mm/3 m non-cumulative.
- .2 Maximum misalignment of two adjoining members abutting in plane: 0.4 mm.

3.4 **FIELD QUALITY CONTROL**

- .1 Lubricate moving parts before test operations, include greasing/lubrication of sprockets, bearings, cables, and guides.
- .2 Test operate sliding doors and demonstrate operation to acceptance of Consultant.

3.5 **CLEANING**

- .1 Remove strippable, protective coatings, temporary labels, and glass presence markers, clean frames and glazing free of residue.
- .2 Clean and polish glass and metal surfaces, both sides.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for accordion folding grille work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 AAMA 611, Voluntary Standards for Anodized Architectural Aluminum.
- .2 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.
- .3 ANSI, H35.1M Alloy and Temper Designation Systems for Aluminum (Metric).
- .4 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .5 ASTM B221M, Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
- .6 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .7 CAN/CGSB-1.108-M, Bituminous Solvent Type Paint.

1.3 **SUBMITTALS**

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard(s), Product characteristics, and limitations.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings: Submit shop drawings in accordance with Section 01 00 00 indicating elevations, sections, details, required clearances, materials, operating components, dimensions, gauges, and finishes.
- .3 Closeout submittals: Submit operation, maintenance, cleaning instructions for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.
- .4 Extended warranty: Submit extended warranty signed and registered by the manufacturer providing the warranty in the name of the Owner for the timeframe and coverage specified in this Section.

1.4 QUALITY ASSURANCE

- .1 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of grilles of a similar size and nature and that is approved by manufacturer. Submit to Consultant, installer's current certificate of approval by the material manufacturer as proof of compliance.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Handle grilles in accordance with AAMA CW-10.
- .2 Protect aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Do not remove before final cleaning of building.

1.6 EXTENDED WARRANTY

- .1 Submit an extended warranty for work of this Section in accordance with General Conditions, except that warranty period is extended to three years from date of Substantial Performance, and agree to make good promptly any defects which occur within the warranty period.

2 Products

2.1 ACCEPTABLE PRODUCTS AND MANUFACTURERS

- .1 'S-126' by MobilFlex Inc.
- .2 Or approved alternative by Amstel or Dynamic Closures.

2.2 MATERIALS

- .1 Aluminum extrusions: ASTM B211 and ANSI H35.1 AA6063 alloy, T5 temper.
- .2 Aluminum sheet: ASTM B209 and ANSI H35.1 AA1100 aluminum alloy, H14 temper, minimum 3.0 mm thick.
- .3 Fasteners: ASTM F738M; Stainless Steel Type 304.
- .4 Isolation coating: CAN/CGSB-1.108-M; Type 2, Bitumastic coating, acid and alkali resistant material.

2.3 **FABRICATION**

- .1 Verify dimensions of existing work before commencing fabrications and report discrepancies to Consultant. Fabricate work in accordance with Contract Documents.
- .2 Fabricate work free from defects impairing function, appearance, strength and durability.
- .3 Ensure exposed surfaces of aluminum are free of die marks, scratches, blisters, leave off marks, or other blemishes, whether left unfinished or finished.
- .4 Curtain: 8 mm diameter rods on 89 mm centres linked by flat horizontal bars 3 mm x 16 mm x 197 mm. Vertical rods spaced every 305 mm with 11 mm sleeves over alternating rods.
- .5 Steel hanger assembly: Supplied and installed by Section 05 50 00.
- .6 Tracks: 35 mm wide by 41 mm high extruded aluminum type with continuous extruded profile seamed together by alignment bars and track pins. Track to accept 28 mm nylon trolleys and carry weight of complete curtain.
- .7 Top plate: to be complete with adjustable height hardware to allow up to 25 mm upward or downward height correction without removal of curtain from installed position.
- .8 Connect panels with one-piece vertical tubular hinges.
- .9 Connect vertical members at curtain edges to 31 mm by 50 mm extruded vertical members with fixed end members fastened to wall. Provide trailing end of curtain with a floating end-member where stacking pockets are used.
- .10 Provide openings over 3000 mm in width with intermediate members, and fit all intermediate members with concealed drop bolts and cylinders locks.
- .11 Provide leading end members with master keyed cylinder locks operable from both sides. Intermediate members shall have concealed locking devices on either side. Floor sockets for drop bolts to be spring loaded dustproof type.

2.4 **FINISHES**

- .1 Clear anodized to AAMA 611 per Aluminum Association Designation System for Aluminum Finishes AA-M12C22A41.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of steel hanger system, installed by Section 05 50 00, and other Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Install grilles complete with tracks, operating equipment and all required hardware in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Install work of this Section securely, flush, in correct location, level, square, plumb, at proper elevations, free of warp or twist.
- .3 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials.

3.3 **CLEANING**

- .1 Upon completion of work of this section, remove strippable coatings, clean, materials, adjust operations and lubricate as required to obtain optimum performance.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for finish hardware work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 BHMA, Builders Hardware Manufacturing Association.
- .2 NFPA 80, Standard for Fire Doors and Other Opening Protectives.

1.3 **SUBMITTALS**

- .1 Product data: Submit manufacturer's Product data in accordance with Section 01 00 00 indicating compliance with reference standards, transportation, storage, handling and installation requirements.
- .2 Shop Drawings:
 - .1 Submit Shop Drawings and 3 complete hardware lists in accordance with Section 01 00 00 indicating:
 - .1 Door locations, sizes, hardware manufacturer's catalogue numbers, finish symbols and quantities required.
 - .2 Locations and mounting heights of each type of hardware.
 - .2 Supply templates and required information to door and frame manufacturer to enable accurate sizes, locations of cut-outs and reinforcement for hardware.
 - .3 Submit templates to required trade to arrange for provisions for accurate setting and fitting of hardware.
- .3 Samples:
 - .1 Submit 2 samples in accordance with Section 01 00 00 of each item that is different from hardware specified and include manufacturer's parts lists and installation instructions.
 - .2 Submit hardware component samples illustrating style, colour and finish. Tag samples identifying applicable Specification article number, brand name and number, finish, building location, date and catalogue number.
 - .3 Do not order hardware until samples have been accepted. Submit new samples to replace rejected samples. Supply hardware and finishes identical to each accepted sample.
- .4 Closeout submittals:
 - .1 Submit the following in accordance with Section 01 00 00 for each Product for incorporation into Operation and Maintenance Manual:
 - .1 Maintenance data.
 - .2 Operating instructions and safety precautions.
 - .3 Parts list with name and address of supplier.
 - .4 Lubrication schedule and type of lubricant recommended.
 - .5 Keys, tools and special devices.

- .6 Inspection procedures related to preventive maintenance.

1.4 **QUALITY ASSURANCE**

- .1 General:
 - .1 Manufacturers: Companies specializing in manufacturing door hardware and registered with BHMA.
 - .2 Hardware supplier: Company specializing in supplying commercial door hardware and acceptable to manufacturer.
- .2 Certifications:
 - .1 Employ an Architectural Hardware Consultant to inspect completed installation and certify that hardware has been installed in accordance with manufacturer's printed instructions, Authorities having Jurisdiction and as specified.
 - .2 Submit manufacturer's certificate that finish hardware and fire rated hardware meets specified requirements.

1.5 **DELIVERY, STORAGE, AND HANDLING**

- .1 Be responsible for packaging of hardware, on a set by set basis. As material is received from various manufacturers identify it to correspond to Hardware List symbols.
- .2 Label packages legibly, indicating manufacturer's number, types, sizes, opening number and Hardware List reference number. Wrap hardware and include in package, screws, bolts and fastening necessary for correct installation. If hardware package is not complete, pay additional charges incurred by installer.
- .3 Deliver hardware to Site packaged, labelled and cross-referenced to hardware list for each item and its scheduled installation location.
- .4 Accept Products of this Section on Site and ensure that each item is undamaged.
- .5 Catalogue and store hardware in secure area.

2 **Products**

2.1 **GENERAL**

- .1 Carefully check and verify Hardware List against Contract Drawings to ensure that hardware listed can be used as specified. Inform Consultant of concerns regarding quality, quantity, operation or function of hardware selected:
 - .1 Verify hand of doors, examine details on Contract Drawings and at Site to ensure hardware supplied can be correctly installed and is correct for work as constructed.
 - .2 Select hardware in accordance with applicable codes and regulations and to approval of local Fire Marshal.

- .3 Replace and pay for defective hardware including hardware which was incorrectly selected, and remedial and installation costs.
- .2 Ensure that hardware selected will function correctly, meets Contract requirements and Ontario Building Code and authorities having jurisdiction.
- .3 Ensure that each hardware item is of same type, design and by same manufacturer.
- .4 Manufacturer's names or trade marks are not permitted on exposed surfaces of hardware.
- .5 Include in packing slip a list of parts, name of supplier and door number in which lock is to be installed.
- .6 Hardware for fire rated and labelled door and frame assemblies: ULC listed or as accepted by authorities having jurisdiction.
- .7 Fire rated assemblies:
 - .1 Hardware: Selected and installed in accordance with applicable codes and regulations, NFPA-80 and to approval of Ontario Fire Marshal.
 - .2 Fire rated doors: ULC labelled hardware. Submit written certification of conformance to ULC requirements for each type of hardware prior to delivery.
 - .3 Locksets and latchsets on fire rated doors: 19 mm throw minimum.

2.2 ACCESSORIES

- .1 Items to be attached to masonry or concrete with expandable shields, lag screws, bolts or other fastening devices as required. Exposed screws: Stainless steel, Phillips or Robertson heads.

2.3 FINISHES

- .1 Metal finishes: Free from defects, clean, unstained and of a uniform colour for each type of finish required. Exposed surfaces and anchors: Specified finish symbol of item.

3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Install hardware in accordance with reviewed Shop Drawings, manufacturer's installation instructions, and applicable Codes and regulations.
- .2 Install hardware in accordance with hardware templates.
- .3 Adjust fixed and operable hardware for correct clearances and function.
- .4 Mount hardware measured from finished floor to centre of hardware, unless indicated otherwise or required by Code:
 - .1 Top hinge: 250 mm from head of door to top.
 - .2 Bottom hinge: 265 mm from finished floor to bottom of hinge.
 - .3 Intermediate hinge: Equal distance between top and bottom hinge.
 - .4 Locksets, latchsets: 1000 mm.
 - .5 Panic device crossbar: 1000 mm.
 - .6 Push plates: 1100 mm to bottom of plates.
 - .7 Guard bars: 1100 mm.
 - .8 Door pulls: 1100 mm to bottom of pulls.
 - .9 Blank strike: 1450 mm.
 - .10 Blank fronts: 1450 mm.
- .5 Include for supply and installation of wiring for electric strikes from electrical junction box to electric strike hardware.
- .6 Locate door stops to contact doors 75 mm from latch edge.
- .7 Install hardware and trim square and plumb to doors.
- .8 Replace wrappings for hardware provided by manufacturer after installation.
- .9 Safeguard keys to keep them out of unauthorized hands, tag them with door number, and deliver them to person designated by Consultant at building completion.

3.3 **FIELD QUALITY CONTROL**

- .1 Have hardware inspected after installation by hardware supplier's representative, obtain certification in writing that hardware has been supplied and installed in accordance with Specifications and hardware manufacturer's instructions and is functioning correctly.
- .2 Inspect fire rated openings to ensure they are installed in compliance with NFPA 80 requirements and Authorities having Jurisdiction.
- .3 Test access control system and electrified hardware devices for proper operation. Verify electric door release hardware operates properly upon activation of fire alarm system.

3.4 **ADJUSTING**

- .1 Verify under work of this Section, that installed hardware functions properly.
- .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 manufacturer's instructions.
- .3 Adjust doors with self closing devices or automatic closing devices for proper operation after the HVAC system is balanced and adjusted. Verify spring power of non sized door closers is properly adjusted.

3.5 **CLEANING**

- .1 Remove wrappings at completion of the Project and clean hardware in accordance with manufacturer's instructions.

3.6 **HARDWARE GROUPS/SCHEDULE**

- .1 Hardware groups/schedule: Refer to hardware groups/schedule appended to this Section.

END OF SECTION

HARDWARE SCHEDULE

SET: 1.0

DOORS: [D-1/031A](#), [D-1/031C](#)
 DESCRIPTION: NEW KEYPAD

1	KEYPAD	BY SECURITY CONTRACTOR	OT
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NOTES: EXISTING OPENING. ADD A NEW KEYPAD AT NURSE STATION.

SET: 2.0

DOORS: [D-3/031](#), [D-3/040](#), [D-3/041](#), [D-3/095](#), [D-3/096](#), [D3/101](#)
 DESCRIPTION: KEYPAD LOCK

3	CONTINUOUS HINGE	CFM__SLF-HD1 x Door Height	PE
1	STANDALONE KEYPAD	CO-100 MS 70 KP SPA	SC
	PROGRAMMABLE LOCK		
1	SURFACE CLOSER	7500	NO
1	KICKPLATE	GSH80A 200MM X 50MM LDW	GA
1	WALL STOP	GSH250	GA
1	DOOR SWEEP	29326CNB X DOOR WIDTH	PE
3	DOOR SILENCER	608CA	RO
1	ELECTRIFIED HARDWARE	BY CONTRACTOR	OT
	ELEVATION		

SET: 3.0

DOORS: [D-3/039](#), [D-3/094](#)
 DESCRIPTION: WASHROOM

3	HINGE, FULL MORTISE	TA2714 4-1/2" X 4"	US26D	MK
1	PUSH PLATE	70E W150MM X H400MM	US32D	RO
1	DOOR PULL	T118 H460MM 6HD	US32D	RO
1	SURFACE CLOSER	2800ST	689	NO
1	KICKPLATE	GSH80A 200MM X 50MM LDW	C32D	GA
1	WALL STOP	GSH250	C26D	GA
1	DOOR SWEEP	29326CNB X DOOR WIDTH		PE
3	DOOR SILENCER	608CA		RO

SET: 4.0

DOORS: [D-3/030](#), [D-3/033](#), [D-3/034](#), [D-3/036](#), [D-3/042](#), [D-3/043](#), [D-3/097](#), [D-3/098](#), [D-3/100](#), [D-3/103](#), [D-3/104](#), [D-3/106](#)

DESCRIPTION: POCKET SLIDING DOOR

1	SLIDING POCKET DOOR	SC-PF28200A9684	PE
	HARDWARE W/ SOFT CLOSE		
1	SLIDING DOOR PRIVACY SET	C-94BL-HLDP	KN
	ADA		

NOTES: ROUGH FRAME OPENING DIMENSIONS: 2 X DOOR WIDTH +1" AND DOOR HEIGHT + 5"

THE TOTAL POCKET DOOR OPENING MUST BE 44 IN [1117.6 MM] MINIMUM. THE DOOR MUST PROTRUDE A MIN. OF 8 IN [203.2 MM] TO ATTACH THE ADA POCKET DOOR HARDWARE.

SET: 5.0

DOORS: [D-3/032](#), [D-3/035](#), [D-3/044](#), [D-3/099](#), [D-3/102](#), [D-3/105](#)

DESCRIPTION: AUTOMATIC SLIDING DOOR

1	SURFACE APPLIED SLIDE DOOR SYSTEM	VERSAMAX TOUCHLESS ICU - VMSA1T X DOOR WIDTH	BM
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NOTES: SURFACE APPLIED FULL BREAKOUT NARROW STILE SINGLE SLIDE DOOR SYSTEM WITH JAMB
WAVE PLATE AND PRESENCE SENSORS. FROSTED/OPAQUE GLASS.

MANUFACTURER LIST

<u>CODE</u>	<u>NAME</u>
FL	FLEMING BARON
BM	BESAM
GA	GALLERY SPECIALTY HARDWARE
KN	K.N. CROWDER
MK	MCKINNEY
NO	NORTON
OT	OTHER
PE	PEMKO
RO	ROCKWOOD
SC	SCHLAGE

OPENING LIST

<u>Opening</u>	<u>Hdw Set</u>	<u>Fire Rating</u>
D-1/031C	1.0	
D-1/031A	1.0	
D-3/039	3.0	
D-3/094	3.0	
D-3/095	2.0	
D-3/100	4.0	
D-3/106	4.0	
D-3/104	4.0	
D-3/103	4.0	
D-3/097	4.0	
D-3/098	4.0	
D-3/096	2.0	
D3/101	2.0	
D-3/105	5.0	
D-3/099	5.0	
D-3/040	2.0	
D-3/030	4.0	
D-3/036	4.0	
D-3/034	4.0	
D-3/033	4.0	
D-3/042	4.0	
D-3/043	4.0	
D-3/041	2.0	
D-3/035	5.0	
D-3/044	5.0	
D-3/102	5.0	
D-3/031	2.0	
D-3/032	5.0	

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, equipment, tools, and services necessary for glazing work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM D2240, Test Method for Rubber Property - Durometer Hardness.
- .2 CAN/CGSB-12.1-M, Tempered or Laminated Safety Glass.
- .3 Glass Association of North America (GANA) Glazing Manual.

1.3 **DESIGN REQUIREMENTS**

- .1 Design glazing work to accommodate live, dead, lateral, seismic, handling, transportation, and erection loads.

1.4 **SUBMITTALS**

- .1 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating as a minimum:
 - .1 Fabrication and erection of glazing elements indicating materials, thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- .2 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00.
 - .2 Submit one sample of each type of glass.
 - .3 One 300 x 300 mm standard tempered glass sample.
- .4 Certificates: Submit manufacturer's certification that glass and glazing materials are compatible.

1.5 **QUALITY ASSURANCE**

- .1 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of glazing units of a similar size and nature.

1.6 **SITE CONDITIONS**

- .1 Do not install the work of this Section outside of environmental ranges as recommended by manufacturer without Consultant's and Product manufacturer's written acceptance.

- .2 Supply and install temporary protection and facilities to maintain Product manufacturer's, and above specification, environmental requirements before, during, and after installation.

2 Products

2.1 ACCEPTABLE MANUFACTURERS

- .1 Glass manufacturers, typical:
 - .1 AGC Flat Glass.
 - .2 Cardinal Glass Industries.
 - .3 Guardian Industries.
 - .4 Viracon Inc.
 - .5 Vitro Architectural Glass (formerly PPG Industries Ltd.)

2.2 MATERIALS

- .1 General:
 - .1 All materials under work of this Section, including but not limited to, primers, coatings, sealers, sealants, adhesives and cleaners are to have low VOC content limits.
 - .2 Back-paint, adhesives and sealers: Products to be recommended by supplier to suit purpose and in-service conditions, adhesive materials compatibility and performance requirements.
- .2 Clear tempered glass (**TGL**): Minimum 10 mm thick, clear tempered glass conforming to CAN/CGSB-12.1-M, Type 2, Class B, Category II, with polished, chamfered edges and free of tong and roller marks.
- .3 Glazing accessories:
 - .1 Glazing and rebate primers, adhesives, sealants, sealers, and cleaners: Compatible with each other.
 - .2 Primers and adhesives to be recommended by glass manufacturer to maintain long-term adhesion and to prevent ghosting through to the visible finish surface.
 - .3 Accessory types as recommended by glass manufacturer to meet performance requirements as specified and as required for complete and secure installation.
- .4 Glazing tape: 'Polyshim II' glazing tape EPDM shim.
- .5 Setting Block: Silicone setting blocks with Shore A durometer hardness of 85, plus or minus 5 to ASTM D2240, sized to suit glazing method, glass unit weight and area.
- .6 Edge blocks: Silicone, 75-80 Shore A durometer hardness to ASTM D2240, self adhesive on face, sized with 3 mm clearance from glass edge and spanning glass thickness(es).

.7 Glass presence markers: Easily removable, non-residue depositing.

.8 Screws, bolts, fasteners and channels: Type 304 stainless steel.

2.3 **GLAZING SCHEDULE**

.1 **Glazing Type 1:** Minimum 10 mm thick clear tempered glass (TGL), for use at glass windows/screens.

.2 **Glazing Type 2:** Refer to Section 08 13 73 for frosted opaque glazing used at automatic sliding door.

2.4 **FABRICATION**

.1 Verify glazing dimensions on Site.

.2 Clearly label each glass lite with maker's name and glass type. Ensure labels are easily removable, non-residue depositing type. Do not remove labels until after Work is accepted by Consultant.

.3 Fabricate glazing not less than 3 mm smaller than rebate size in either dimension; allow for edge spacers, shims, and setting blocks as necessary.

.4 Work shall have smooth finished surfaces free from distortion and defects detrimental to appearance and performance.

.5 Carefully make and fit details. Take special care with exposed finished work to produce a neat and correct appearance to the Consultant's acceptance.

3 Execution

3.1 **EXAMINATION**

.1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

.2 Verify that openings for glazing are correctly sized and within tolerance.

.3 Verify that surfaces of glazing recesses are clean, free of obstructions, and ready to receive glazing.

3.2 **PREPARATION**

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing recesses with substrate compatible primer or sealer.

- .3 Prime surfaces scheduled to receive sealant.

3.3 **INSTALLATION**

- .1 Install glass and glazing materials in accordance with reviewed shop drawings, manufacturer's written instructions and to GANA recommendations.
- .2 Install glazing to the work of Section 08 11 63.
- .3 Provide neat, straight sight lines. Trim excess glazing tape.
- .4 Remove protective coatings, glazing stops, clean rebate and glass contact surfaces with solvent, wipe dry.
- .5 Apply primer/sealer to contact surfaces, prior to glazing.
- .6 Apply glazing tape as per manufacturer's instructions including recommended corner sealant.
- .7 Use setting blocks at 1/4 points and spacers to centre glass unit in frame.
- .8 Install glazing in accordance with reviewed shop drawings and manufacturer's written instructions. Install glazing with full contact and adhesion at perimeter. Maintain edge clearance recommended by glass manufacturer.
- .9 Do not cut or abrade tempered, heat treated, or coated glass.
- .10 Install glass presence markers in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.
- .11 Remove, dispose of, and replace broken, cut, abraded glass, and defective glass including but not limited to production dimples, roller wave or marks, tong marks, chips, cracks, etc.
- .12 Interior glass: Glaze interior glass using glazing gasket glazing tape.

3.4 **CLEANING**

- .1 Immediately remove sealant and compound droppings from finished surfaces.
- .2 Remove labels, protective material, and glass presence markers from prefinished surfaces.
- .3 Clean glass surfaces with cleaning agents and methods in accordance with manufacturer's written instructions.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, equipment and services necessary for gypsum board work.

1.2 **REFERENCES**

- .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .2 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C645, Specification for Nonstructural Steel Framing Members.
- .4 ASTM C665, Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .5 ASTM C754, Specification for Steel Framing Members to Receive Screw-Attached Gypsum Board.
- .6 ASTM C834, Standard Specification for Latex Sealants.
- .7 ASTM C840, Specification for Application and Finishing of Gypsum Board.
- .8 ASTM C1002, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .9 ASTM C1396, Specification for Gypsum Board.
- .10 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 **DESIGN REQUIREMENTS**

- .1 Design gypsum board wall and ceiling systems with a maximum deflection of $l/360$.
- .2 Design ceiling suspension system in accordance with manufacturer's printed directions and ASTM C754.
- .3 Design ceiling system for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.
- .4 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.

- .5 Design suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures.
- .6 Design subframing as necessary to accommodate, and to circumvent, conflicts and interferences where ducts or other equipment prevent the regular spacing of hangers.
- .7 Design wall framing system and reinforce as necessary to accommodate and support items attached to and supported by wall framing system.
- .8 Design wall framing system for wall assemblies with a height greater than 3000 mm.

1.4 **REGULATORY REQUIREMENTS**

- .1 Provide fire separations and fire protection exactly as specified in test design specification that validates the specified rating. Verify that work specified in other Sections, as a part of the entire assembly, meets applicable validating test design specification.

1.5 **SUBMITTALS**

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard, characteristics, and limitations.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop Drawings:
 - .1 Submit Shop Drawings in accordance with Section 01 00 00 indicating:
 - .1 Wall assemblies, suspension systems, adjacent construction, elevations, sections and details, dimensions, thickness, finishes and relationship to adjacent construction.
 - .2 Framing and blocking for items being supported of wall systems.
 - .3 Fire rated designs.
- .3 Certifications: Submit written certification stating that suspended ceiling system is designed for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.

1.6 QUALITY ASSURANCE

- .1 Qualifications: Execute the work of this Section by skilled, qualified, and experienced workers trained in the installation of the work of this Section.
- .2 Retain a Professional Engineer, licensed in Province of Ontario, with experience in work of comparable complexity and scope, to perform following services as part of work of this Section:
 - .1 Design of wall systems with height greater than 3000 mm.
 - .2 Design of suspended gypsum board assemblies.
 - .3 Review, stamp, and sign Shop Drawings and design calculations.
 - .4 Conduct shop and on-site inspections, prepare and submit written inspection reports verifying that this part of Work is in accordance with Contract Documents and reviewed Shop Drawings.

1.7 SITE CONDITIONS

- .1 Do not begin work of this Section until:
 - .1 Mechanical and electrical work above the ceiling is complete.
 - .2 Substrate and ambient temperature is above 15°C.
 - .3 Relative humidity is below 80 %.
 - .4 Ventilation is adequate to remove excess moisture.
- .2 Install temporary protection and facilities to maintain Product manufacturer's, and above specification, environmental requirements 24 h before, during, and 24 h after installation.

2 Products

2.1 MATERIALS

- .1 General: All materials under work of this Section, including but not limited to, sealants, adhesives, and primers are to have low VOC content limits.
- .2 Steel framing: ASTM C754; ASTM A653/A653-M, Z275; cold rolled, galvanized steel sheet.
 - .1 Bailey Metal Products Limited
 - .2 Corus Metal Profiles
- .3 Steel studs and track runners: ASTM C645; Galvanized steel studs and runners, 32 mm wide x depth as indicated on Contract Drawings. Formed from galvanized steel sheet, thicknesses as follows:
 - .1 Studs less than 3000 mm: Minimum 0.53 mm (25 ga.).
 - .2 Studs greater than 3000 mm and non-standard assemblies: Minimum 0.91 mm (20 ga.), unless stud thickness of greater thickness is required to accommodate intended loading, spans, or conditions.
 - .3 Track runners and ancillary components to match stud thickness.

- .4 Main carrying channels: ASTM C645; Formed from galvanized steel sheet, 38 x 19 mm cold rolled, channels.
- .5 Resilient channel: ASTM C645; 0.5 mm thick galvanized metal, 57 mm wide x 12 mm deep for walls and ceiling to reduce sound transmission.
- .6 Furring channels: ASTM C645; Formed from galvanized steel sheet, 22 mm winged flange type, cold rolled.
- .7 Furring channels (hat type): ASTM C645; 0.5 mm base steel thickness, galvanized. 70 mm wide x 22 mm deep hat shaped channel.
- .8 Heavy duty furring channels: ASTM C645; 0.9 mm steel thickness, galvanized hat shaped channel with a wider and deeper size as required by manufacturers.
- .9 Hanger wires: 4.1 mm minimum diameter galvanized pencil rod.
- .10 Tie wire: 1.6 mm thick minimum diameter, soft annealed, galvanized steel wire.
- .11 Corner bead, casing bead, and special shapes: Formed from 0.6 mm thick minimum, galvanized steel sheet, designed to be concealed by joint compound.
- .12 Deflection track: ASTM C 645 top runner with 50.8-mm- deep flanges, in thickness indicated for studs and in width to accommodate depth of studs.
- .13 Deflection track (fire rated): Provide 25 mm deep leg deflection track where indicated on rated walls. 'Fire Trak Shadowline' by Fire Trak Corporation or approved alternative.
- .14 Ceiling clips: Hot dip galvanized partition attachment clips, in square and reveal edge; 'PAC 15 Series' to match grid system by CGC Inc. or approved alternative.
- .15 Gaskets (acoustic partitions): Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 3.2 mm thick, in width to suit steel stud size.
- .16 Control joint strip: Roll formed from galvanized steel sheet, with a tape protected recess, 6 mm wide x 11 mm deep.
- .17 Screw fasteners: ASTM C1002 Type S; Corrosion resistant.
- .18 Concrete anchors: tie wire sleeve anchors, 'Redi-Drive Anchors' by ITW Red Head or approved alternative.
- 19. Batt insulation (fire-rated/acoustic): ASTM C665, Paperless, semi-rigid, spun stone wool fibre mats, of thickness as indicated on Contract Drawings, 'MinWool SAFB' by Johns Manville, 'SAFB Thermafiber' by Owens Corning Inc. or 'Rockwool AFB' by Rockwool.

- .20 Sealants:
 - .1 Acoustic sealant (non-rated): Non-hardening acoustic sealant for use at non-rated assemblies, ASTM C834; Lightweight, acrylic, mould resistant sealant, paintable. 'Lightweight Smoke and Acoustic Sealant CS-S SA Light' by Hilti or approved alternative.
 - .2 Fire-rated sealant: Non-hardening sealant for use at fire-rated assemblies: CAN/ULC-S102; Acrylic based firestop sealant, colour: red or white as selected by Consultant. 'Flexible Firestop Sealant CP606' by Hilti or approved alternative.
 - .3 Fire-rated seal: Non-hardening seal for use at fire-rated assemblies: CAN/ULC-S102; Flexible seal for installation between top track and substrate. 'Firestop Top Track Seal CFS-TTS' by Hilti or approved alternative.
 - .4 Standard sealants: In accordance with Section 07 92 00.
- .21 Gypsum board: ASTM C1396; gypsum board 12.7 mm and 15.9 mm thicknesses where indicated, of maximum practical lengths to minimize end joints, unless indicated otherwise. Furnish Board by Certainteed Gypsum Canada, CGC Inc., or Georgia-Pacific Canada LP.
- .22 Fire rated gypsum board: ASTM C1396; gypsum board 15.9 mm thick of maximum practical lengths to minimize end joints, unless indicated otherwise. Furnish Type X Board by Certainteed Gypsum Canada, CGC Inc., or Georgia-Pacific Canada LP.
- .23 Moisture and mould resistant board: 15.9 mm thick of maximum practical lengths to minimize end joints, unless indicated otherwise; 'M2Tech Moisture and Mould Resistant' by Certainteed Gypsum Canada, 'Sheetrock Mold Tough' by CGC Inc. or 'DensArmor Plus High Performance Interior Panel' by Georgia-Pacific Canada LP.
- .24 Primer: Where indicated by board manufacturer, provide primer as required to achieve finishes as defined in ASTM C840.
- .25 Joint reinforcing tape:
 - .1 Standard gypsum board: ASTM C475; 50 mm wide x 0.25 mm thick, perforated paper, with chamfered edges.
 - .2 Moisture resistant boards: ASTM C475; fibreglass mat joint tape as recommended by board manufacturer to suit location.
- .26 Bonding adhesive: Type for purpose intended and as recommended and approved by manufacturer.
- .27 Joint and patching compound: ASTM C475; Asbestos-free, supplied by manufacturer of gypsum board used.
- .28 Fast setting patching compound: ASTM C475; Asbestos-free, Sheetrock or Durabond by CGC Inc., 'Moisture and Mold Resistant Setting Compound with M2Tech' by Certainteed Gypsum Canada or approved alternative.

- .29 Access doors: Supplied by other Sections for installation as part of the work of this Section.

3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 SUSPENSION FRAMING

- .1 Install ceiling systems in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install hanger wires plumb and securely anchored to the building structural framing, independent of walls, pipes, ducts, and metal deck; install additional framing and hangers to bridge interference items.
- .3 Install hanger wires at 1200 mm maximum centres along carrying channels, not less than 25 mm, and not more than 150 mm from channel ends.
- .4 Install additional hangers at lighting fixture and ductwork locations. Do not attach hanger wires to mechanical or electrical equipment. Do not support mechanical and electrical fixtures and fitting on ceiling without the ceiling manufacturer's written acceptance.
- .5 Install main carrying channels transverse to structural framing members. Lap main carrying channels 200 mm minimum at splices and wire each end with two loops and prevent clustering or lining-up of splices.
- .6 Install furring channels at 400 mm o.c., not less than 25 mm, and not more than 150 mm from perimeter walls, at openings, at interruptions in ceiling continuity, and at change in plane. Install furring channels to a tolerance of 3 mm maximum in 3600 mm.
- .7 Install additional main carrying and furring channels to frame and to reinforce openings such as recessed lighting fixtures, access hatches, ceiling grilles, outlet boxes, ventilating outlets and similar items.

3.3 STEEL STUDS AND FURRING

- .1 Install steel studs and furring in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install steel stud partitions to underside of structure unless indicated otherwise.

- .3 Install track runners at floors, ceilings, and underside of structure; align track runners accurately and secure to structure at 600 mm centres maximum.
- .4 Install double top track runner assembly to prevent the transmission of structural loads to steel studs.
- .5 Install steel studs vertically at 400 mm o.c., unless otherwise indicated, and not more than 50 mm from abutting walls, at openings, and at each side of corners. Install studs securely to track runners.
- .6 Schedule and coordinate steel framing installation with mechanical and electrical services installation.
- .7 Install full height, double studs at door and service openings, fastened together and stiffened back to the structure to prevent vibration when doors close.
- .8 Provide double studs boxed together at all openings, sill, head and jambs and at door jambs, fastened together and stiffened back to the structure to prevent vibration. At each opening exceeding 900 mm in width, double studs shall be 20 ga. extending to structure above, and adequately anchored at each end. Provide steel studs above and below openings spaced at 400 mm oc maximum. All metal stud partitions above doors and screens over 1220 mm wide shall be secured to structure over and reinforced with sway bracing to stabilize walls to prevent lateral movement.
- .9 Erect three studs at corner and intermediate intersections of partitions. Space 50 mm apart and brace together with wired 19 mm channels.
- .10 Stiffen partitions over 2440 mm high or 3000 mm long, or both, with horizontal bracing extended for full length of partitions. Provide one line of bracing in partitions. Space lines to provide equal unbraced panels. Provide bracing for portions of partitions over door openings in partitions over 3000 mm high, and bracing both above and below openings in partitions located no greater than 150 mm from top and bottom of opening, and extending two stud spaces beyond each edge of opening for both doors and windows. Wire tie or weld bracing to studs.
- .11 Frame control joints using back to back double studs at abutting structural elements, at dissimilar backup interface, at dissimilar walls and ceilings, at structural expansion and control joints, at door and other openings, and at 9000 mm maximum spacing in continuous runs. Install control joint strips and secure in place.
- .12 Install additional support framing at openings and cutouts for built-in equipment, upper cabinet support, access panels and similar items.

- .13 Attach to framing adequate steel reinforcing members or an 1.2 mm (18 ga.) steel stud mounted horizontally and notched around furring members to support the load of, and to withstand the withdrawal and shear forces imposed by, items installed upon the work of this Section. Such items include, but are not restricted to, miscellaneous metals, coat hooks, washroom accessories, wall-hung cabinets and fitments, shelving, curtain tracks, miscellaneous specialties; Owner supplied equipment; and minor mechanical and electrical work. Heavy mechanical and electrical equipment shall be self-supporting in Divisions 21, 22, 23 and 26.
- .14 Provide for support and incorporation of flush-mounted and recessed mechanical and electrical equipment and fixtures only after consultation and verification of methods with those performing the work of Divisions 21, 22, 23 and 26.
- .15 Install cross bracing in accordance with the steel stud manufacturer's recommendations.

3.4 **FIRE RATED ASSEMBLIES**

- .1 Install Products in fire rated assemblies in strict accordance with reviewed Shop Drawings and applicable tested and approved designs required by Authorities Having Jurisdiction.
- .2 Install firestop fill material behind fire rated acoustical sealant and provide firestop identification tag.
- .3 Stiffen fire rated walls over 3.66 m high, where linear length of wall is greater than 2.44 m between perpendicular wall supports, with diagonal bracing above the ceiling extending perpendicular to wall at a 45° angle to structure above. Locate diagonal bracing at maximum 2.44 m o.c.
- .4 Where double layers of gypsum board are shown, and required for fire rating, screw first layer to studs and furring and laminate the second layer to the first using joint filler as an adhesive. Stagger joints between first and second layers.

3.5 **BATT INSULATION**

- .1 Install batt insulation in partitions, between studs, and as indicated on Contract Drawings and in accordance with the manufacturer's instructions.
- .2 Fill stud cavities to full height of partitions and carefully cut and fit required batt insulation type around services and protrusions.

3.6 ACOUSTICAL SEALANT

- .1 Install acoustical sealant to acoustically insulated partitions in accordance with the manufacturer's instructions and Contract Drawings.
- .2 Install acoustical sealant under floor runner track, at partition perimeter both sides and at openings, cut-outs, and penetrations, concealed from view in the final installation.
- .3 Smooth acoustical sealant with trowel prior to skin forming.

3.7 GYPSUM BOARD

- .1 Comply with ASTM C840. Install gypsum board in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install gypsum board vertically or horizontally, whichever results in fewer end joints. Locate end joints over supporting members.
- .3 Install gypsum board in lightly butted contact at edges and ends and with 1.6 mm maximum open space between boards; do not force gypsum board into place. Do not install imperfect, damaged or damp boards.
- .4 Install gypsum board butting paired tapered edge joints, and mill-cut or field-cut end joints; do not place tapered edges against cut edges or ends.
- .5 Install vertical joints minimum 300 mm from the jamb lines of openings and stagger vertical joints over different studs on opposite sides of partitions.
- .6 Do not locate joints within 200 mm of corners or openings, except where control joints occur at jamb lines or where openings occur adjacent to corners. Where necessary, place a single vertical joint over the centre of wide openings.
- .7 Cut, drill and patch gypsum board as may be necessary to accommodate the work of other trades.
- 8. Fire Separations:
 - .1 Construct gypsum board assemblies, where located, in accordance with tested assemblies to obtain required or indicated fire rated assemblies. As a minimum fire separations shall consist of metal framing covered on both sides by fire-rated gypsum board.
 - .2 Install assemblies tightly to enclosing constructions to maintain integrity of the separations. Install casing beads at all perimeter edges.

3.8 CORNER, CASING BEADS AND TRIM

- .1 Corner reinforcing bead: Install along all external angles, erect plumb, level and with a minimum of joints. Secure with screws at 225 mm o.c. apply filler over flanges flush with nose of the bead and extending at least 75 mm onto surface of board each side of corner. When filler dries, apply a thin coat of topping cement and blend onto adjoining surfaces.
- .2 Casing bead: Install where wallboard butts against a surface having no trim concealing the juncture and where shown on drawings. Erect casing beads plumb or level, with minimum joints, and secure with screws at 300 mm o.c. apply filler over flange flush with bead and extending at least 75 mm onto surface of board. When dry, apply a thin coat of topping cement and blend onto adjoining surfaces.
- .3 Recess channels and trim: Install recess channels and special metal trim where shown. Secure to substrate. Provide casing beads full height on wallboard edges at recess channels and metal trim.

3.9 JOINT TAPING AND FINISHING

- .1 Install reinforcing tape and a minimum of 3 coats of joint compound over gypsum board joints, metal trim and accessories, and screw fasteners in accordance with the gypsum board manufacturer's instructions.
- .2 Fill gaps between ,and any imperfections in, gypsum boards with joint compound, allow to dry, and sand smooth ready for painting.
- .3 Install finished gypsum board work smooth, seamless, plumb, true, flush, and with square, plumb, and neat corners.
- .4 Finish gypsum board in accordance with ASTM C840 to the following grades:
 - .1 Level 0: No taping, finishing, or accessories required. Use above suspended ceilings and within other concealed spaces, unless the assembly is fire rated, sound rated, sound or smoke controlled, or unless the space serves as an air plenum.
 - .2 Level 1: At joints and interior angles embed tape in joint compound. Leave surface free of excess joint compound. Tool marks and ridges are acceptable. Use above suspended ceilings and within other concealed spaces if the gypsum board assembly is fire rated, sound rated, sound or smoke controlled, or the space serves as an air plenum.
 - .3 Level 2: At joints and interior angles embed tape in joint compound with one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Use for water resistant gypsum board indicated for use as a substrate for ceramic tile.
 - .4 Level 3: At joints and interior angles embed tape in joint compound with two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges. Use where heavy grade wall coverings are the final decoration.

- .5 Level 4: At joints and interior angles embed tape in joint compound with three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges. Use for all locations except those indicated for other finish levels.
- .6 Level 5: At joints and interior angles embed tape in joint compound with three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply a thin skim coat of joint compound, or a material manufactured especially for this purpose, to the entire surface. Leave surface smooth and free of tool marks and ridges. Use where semi-gloss or gloss finish coatings are the final decoration.

3.10 ACCESS DOORS

- .1 Install access doors, supplied as part of other parts of the work, in accordance with manufacturer's written instructions.

3.11 SITE TOLERANCES

- .1 Install metal support systems to ensure that, within a tolerance of +3 mm and -1.5 mm for plaster thickness, finish surfaces will be flat within 3 mm under a 3 m straightedge, and with no variation greater than 1.5 mm in any running 300 mm, and that surface planes shall be within 3 mm of dimensioned location.

3.12 WORK IN EXISTING AREAS

- .1 In existing areas, where existing gypsum board work has been demolished and/or damaged and repair work is required, provide new gypsum board finish.
- .2 Thoroughly prepare areas to be repaired. Provide neat, clean and straight cuts.
- .3 Finish all repair work as specified for new work.
- .4 In existing areas where existing openings are to be filled in with gypsum board, provide new gypsum board wall and ceiling construction. Ensure new board faces are flush with faces of abutting existing walls and ceilings.

3.13 REPAIR

- .1 Make good cut-outs for services and other work, fill in defective joints, holes and other depressions with joint compound.
- .2 Make good defective work, and ensure that surfaces are smooth, evenly textured and within specified tolerances to receive finish treatments.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, equipment and services necessary for acoustical ceiling work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM C635, Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- .3 ASTM C636, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- .4 ASTM C645, Specification for Non-Load Bearing (Axial) Steel Studs, Runners (Tracks), and Rigid Furring Channels for Screw Application of Gypsum Board.
- .5 ASTM E1264, Classification for Acoustical Ceiling Products.

1.3 **DESIGN REQUIREMENTS**

- .1 Design ceiling suspension systems in accordance with ASTM C636 and manufacturer's printed directions.
- .2 Design tile ceiling system for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority. Acoustic panel system is not designed to carry the weight of electrical equipment.
- .3 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.
- .4 Design tile suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures. Acoustic panel system is not designed to carry the weight of mechanical and electrical equipment.
- .5 Design subframing as necessary to accommodate, to avoid conflicts and interferences where ducts or equipment prevent regular spacing of hangers.

1.4 SUBMITTALS

- .1 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Suspension system layout including hangers and supports for acoustic tile system.
 - .2 Acoustic panel system including suspension system, hangers, supports and panel sizes and locations.
 - .3 Conditions at abutting, intersecting, and penetrating construction.
 - .4 Dimensioned locations of lighting fixtures, diffusers, sprinkler heads and other items that pierce the ceiling plane.
- .2 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00:
 - .1 One full-size sample of each type of tile panels to be used.
 - .2 One of each type of suspension system members.
- .3 Certificates: Submit written certification stating that suspended ceiling system is designed for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.

1.5 SITE CONDITIONS

- .1 Do not install the work of this Section until:
 - .1 Mechanical and electrical work above the ceiling is complete.
 - .2 Relative humidity is below 80 %.
 - .3 Ventilation is adequate to remove excess moisture.
 - .4 Areas are closed and protected against weather, and maintained at no less than 10°C.
- .2 Install temporary protection and facilities to maintain Product manufacturer's, and above specification, environmental requirements 24 h before, during, and after installation.

1.6 MAINTENANCE

- .1 Submit extra acoustic ceilings amounting to 2% of gross ceiling area, allowing proportionately for each pattern and type specified to nearest full carton. Submit Products which are part of same production run as installed Products. Store maintenance Products as directed by Consultant.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Transport, handle and store material in manner to prevent warp, twist, damage to panel edges and surfaces in accordance with Manufacturer's recommendations.
- .2 Any warped and/or damaged panels and trim shall be rejected and be replaced by new, straight, undamaged and acceptable material at no cost to Owner.

- .3 Bent, twisted or otherwise damaged Tee grid suspension components shall not be used under any circumstances. Replace such damaged items with new undamaged material at no additional cost to Owner.
- .4 Store material in warm, dry place away from water and the elements. Protect against undue loading stresses and shock.
- .5 All packaged material shall be delivered in original manufacturers wrappers and containers with labels and seals intact. All cartons shall bear U.L. label.

2 Products

2.1 MATERIALS

- .1 General:
 - .1 Provide all components and accessories as required for ceiling alteration work.
 - .2 All new components shall match existing types.
- .2 Galvanized steel sheet: ASTM A653/A653-M, Z275; cold rolled, galvanized steel sheet.
- .3 Main carrying channels: ASTM C645; Channels formed from galvanized steel sheet, 38 x 19 mm cold rolled.
- .4 Subframing: ASTM C645; Channels formed from galvanized steel sheet, dimensions and spans as required.
- .5 Hangers: 2.6 mm minimum diameter, galvanized steel wire.
- .6 Tie wire: 1.6 mm minimum diameter, soft annealed galvanized steel wire.
- .7 Concrete anchors: tie wire sleeve anchors, 'Redi-Drive Anchors' by ITW Red Head or approved alternative.
- .8 Wall mouldings and accessories, including but not limited to, corner caps, edge mouldings, panel hold over clip, metal closures, and trim. Finish and colour: same as main tees.
- .9 Suspension grid:
 - .1 Exposed main, cross tees, and relocatable cross tees: ASTM C635, 38 mm high steel, bulb tee design double steel web, rectangular single spans without exceeding a deflection of 1/360 of the span. Splices to be integral and reversible; cross tee interlocking into main tee.
 - .2 Suspension grid type, colour and finish to match existing.
- .10 Acoustic tile (ACT): Conforming to ASTM E1264, provide new acoustic ceiling tiles as required to match existing type.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **SUSPENSION SYSTEM**

- .1 Modify existing suspension system as required to accommodate the Work.
- .2 Coordinate locations and openings of mechanical and electrical services support, and penetration through the acoustical ceilings. Coordinate field conditions, clearances, measurements, and mechanical and electrical services testing and commissioning, above the acoustical ceilings.
- .3 Install hanger wires plumb and securely anchored to the building structural framing, independent of walls, pipes, ducts, and metal deck; install additional framing and hangers to bridge interference items.
- .4 Install acoustical ceiling systems in accordance with manufacturer's written instructions, reviewed shop drawings, and ASTM C636, listed in order of precedence.
- .5 Install hanger wires at 1200 mm maximum centres along carrying channels, not less than 25 mm, and not more than 150 mm from channel ends.
- .6 Install additional hangers at lighting fixture and air distribution ductwork locations. Do not attach hanger wires to mechanical or electrical equipment. Do not support mechanical and electrical fixtures and fitting on ceiling without the ceiling manufacturer's written acceptance.
- .7 Install acoustical ceiling suspension system to a tolerance of 1:1200 of span and 0.4 mm maximum between adjacent metal members. Tolerances are not cumulative. Refer to Electrical Contract Drawings for fixture layout.
- .8 Do not bend or twist hangers as a means of levelling. Form double loops tightly and lock to prevent vertical movement or rotation within the loop.
- .9 Install edge moulding at intersection of ceiling and vertical surfaces.
- .10 Centre acoustical ceiling suspension systems on room axis; install equal border pieces. Install hangers onto the ends of main tee runners at not more than 150 mm from ends of runners, adjacent and perpendicular to walls.
- .11 Support the suspension system independently of walls, columns, ducts, pipes and conduits.

- .12 Install main runners in maximum available lengths. Layout joints in suspension members to avoid the perimeters of recessed fixtures. Lock grid members to form a rigid assembly. Install additional tee, suspension system framing around recessed fixtures, diffusers, grilles and other items for a complete assembly.

3.3 **ACOUSTIC LAY-IN TILES**

- .1 Install acoustic tile in grid system openings supported by bottom flanges of members. Provide special shapes and sizes to provide a complete installation by cutting tile to fit into openings. Fit tile moderately tight between upright legs of members.
- .2 Carefully cut and trim acoustic tiles to accommodate items piercing the finished ceiling plane.
- .3 Remove and replace acoustic tiles with broken edges, or damaged, marked, discoloured, soiled, or stained faces.

3.4 **ADJUSTMENTS AND CLEANING**

- .1 Clean soiled or discoloured surfaces of exposed work on completion of work.
- .2 Replace components which are visibly damaged, marred or uncleanable.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for epoxy flooring work in accordance with the Contract Drawings.

1.2 **SUBMITTALS**

- .1 Product data: Submit manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Two copies of manufacturer's Product data on characteristics, performance criteria, and limitations.
 - .2 Preparation, installation requirements and techniques, Product storage, and handling criteria.
- .2 Samples: Submit duplicate samples of each type and colour of epoxy flooring mounted on 250 x 200 mm hardboard in accordance with Section 01 00 00.
- .3 Reports: Submit manufacturer's acceptance of substrate prior to installation in writing. Submit verification of moisture content of floor prior to installation.
- .4 Close-out submittals: Submit maintenance data for incorporation into Operations and Maintenance manuals in accordance with Section 01 00 00.

1.3 **QUALITY ASSURANCE**

- .1 Perform work of this Section by a company that has a minimum of five years proven experience in installations of a similar size and nature and that is approved by manufacturer. Submit to Consultant, applicator's current certificate of approval by the material manufacturer as proof of compliance.
- .2 Mock-up:
 - .1 Construct one 2 m² mock-up of each type and colour of epoxy flooring in location acceptable to Consultant.
 - .2 Arrange for Consultant's review and acceptance, allow 48 hours after acceptance before proceeding with work.
 - .3 Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work.
 - .4 Upon acceptance, mock-up shall serve as a minimum standard of quality for the balance of the work of this Section.
- .3 Pre-installation meetings: Arrange with manufacturer's representative and Consultant to inspect substrates, and to review installation procedures 48 hours in advance of installation.

1.4 SITE CONDITIONS

- .1 Do not install the work of this Section outside of the following environmental ranges without Product manufacturer's written acceptance:
 - .1 Ambient air and surface temperature: 15°C to 30°C.
 - .2 Relative Humidity: In accordance with manufacturers' requirements.
 - .3 When no dust is being raised.
 - .4 In well-ventilated and broom clean areas.
- .2 Do not apply epoxy flooring over materials that contain over 4% moisture.
- .3 Install temporary protection and facilities to maintain the Product manufacturer's, and the above specification, environmental requirements for 24 hours before, during, and 24 h after installation.
- .4 Post do not enter and appropriate warning signs at conspicuous locations.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Package, seal and label each epoxy flooring material to show manufacturer's and product name, and colour.
- .2 Store materials at site in an area specifically set aside for purpose that is locked, ventilated, and maintained at a minimum temperature of 16°C.
- .3 Ensure that health and fire regulations are complied with in storage area, and during handling and application.

2 Products

2.1 MATERIALS

- .1 General:
 - .1 All materials under work of this Section, including but not limited to, primers and epoxy flooring are to have low VOC content limits.
 - .2 Each material used in the application of each flooring system shall be as recommended or manufactured by the supplier of the flooring system.
- 2. Epoxy flooring and base (EP):
 - .1 Trowelled system, silica sand filled 100% epoxy binder, minimum 6 mm thick, with one coat of 100% solids chemical free resistant epoxy top coat.
 - .2 Finish/texture: To later selection by Consultant and to match Consultant approved sample.
 - .3 Colour: Refer to Finish/Material/Product Schedule as shown on Contract Drawings for selected colour.
 - .4 Acceptable Product: 'Sikafloor Morritex Trowel System' by Sika Canada Inc. or approved alternative by Mapei Inc.

3. Waterproof membrane: 100% solids, two component, flexible polyurethane membrane, 'Sikalastic Duochem 390' by Sika Canada Inc. or approved alternative.
- .4 Primer: As recommended by manufacturer.
- .5 Sloped mortar: Water based epoxy binder, formulated to be filled with graded aggregates and portland cement to create bevel/shower lip. 'Sikafloor Duochem 6010' by Sika Canada Inc. or approved alternative.
- .6 Base cove strip: L-shaped, heavy duty, coloured plastic cove strips, colour to be selected by the Consultant.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify that concrete floor has cured 28 days minimum and that substrate is acceptable to epoxy manufacturer.
- .3 Test substrate surfaces to ensure that moisture level and acid-alkali balance does not exceed limits recommended manufacturer.

3.2 **PREPARATION**

- .1 Prepare substrate using steel aggregate blast method and vacuum substrate free of debris and dust.
- .2 Fill minor cracks and voids and prime surfaces in accordance with manufacturer's recommendations.
- .3 Protect adjacent surfaces from damage resulting from this work. Mask and/or cover adjacent surfaces, fixtures, and equipment as necessary.
- .4 Fill open control joints, and other cracks and voids with material compatible with epoxy materials.
- .5 Clean prime and seal surfaces as recommended by epoxy manufacturer.

3.3 APPLICATION

- .1 Apply epoxy flooring in accordance with manufacturer's printed instructions. Epoxy manufacturer shall supervise application.
- .2 Apply waterproofing membrane to 30 mils thickness and in accordance with manufacturer's written instructions.
- .3 Sloping mortar: Apply sloping mortar in accordance with manufacturer's written instructions to create a ridge between shower and main washroom area. Formed ridge to meet the approval of the Consultant.
- .4 Stop epoxy in a straight line on each side of control joints; fill space over expansion joint with a self-levelling, non-sag polyurethane sealant.
- .5 Apply epoxy with care to ensure that no laps, voids, or other marks or irregularities are visible, and with an appearance of uniform colour, sheen and texture, all within limitations of materials and areas concerned.
- .6 Match colours and textures of approved samples.
- .7 Make clean true junctions with no visible overlap between adjoining applications of epoxy.
- .8 Chase edge of adjacent floor systems so that epoxy finishes flush with adjacent floor systems.
- .9 Provide 100 mm coved base at room perimeter and at built-in fitment locations and complete with cove strip. Form cove with 25 mm radius.

3.4 SITE TOLERANCES

- .1 Finish surfaces shall be level, or straight where sloped to drains, within a tolerance of 1.5 mm in 3 m, and shall not vary more than 0.8 mm in any running 300 mm.

3.5 REPAIR

- .1 Touch-up and refinish minor defective work. Refinish entire coated surface areas where finish is damaged or otherwise unacceptable.

3.6 CLEANING

- .1 Remove promptly as work progresses spilled or spattered materials from surfaces of work performed under other Sections. Clean floors on completion of work. Do not mar surfaces while removing.
- .2 Leave storage and mixing areas in same condition as equivalent spaces in project.

3.7 **PROTECTION**

- .1 Erect barriers to prevent the entry and presence of personnel not performing work of this Section during application of epoxy flooring, and for 48 hours following completion of application.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for hygienic wall cladding work in accordance with the Contract Documents.

1.2 **SUBMITTALS**

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, characteristics, and limitations.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Elevations, sections, details, materials, dimensions, thicknesses, trim and accessory pieces, and interfacing with adjacent construction.
 - .3 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00.
 - .1 Two 300 x 300 mm samples of wall cladding.
 - .2 Two 300 mm samples of each trim and accessory proposed for use.
 - .4 Certificates: Submit certification from material manufacturer that installation is in accordance with manufacturer's instructions.
 - .5 Closeout submittals: Submit maintenance and cleaning instructions for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.

1.3 **QUALITY ASSURANCE**

- .1 Installers qualifications: Perform work of this Section by a company that has a minimum of three years proven experience in the installation of wall cladding on projects of a similar size and nature and that is approved by manufacturer. Submit to Consultant, installer's current certificate of approval by the cladding manufacturer as proof of compliance.
- .2 Mock-up:
 - .1 Construct one 2 m² mock-up of wall cladding system in location acceptable to Consultant.
 - .2 Arrange for Consultant's and manufacturer's review and acceptance prior to start of installation.
 - .3 Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work.
 - .4 Upon acceptance, mock-up shall serve as a minimum standard of quality for the balance of the work of this Section.

1.4 **SITE CONDITIONS**

- .1 Do not install work of this Section outside of following environmental ranges without Consultant's and Product manufacturer's written acceptance:
 - .1 Ambient air and surface temperature: 15⁰C to 30⁰C.
 - .2 Relative Humidity: 45%.
- .2 Supply and install temporary protection and facilities to maintain Product manufacturer's, and above specified environmental requirements for 24 hours before, during, and 24 hours after installation.

2 Products

2.1 **MATERIALS**

- .1 All materials under work of this Section, including but not limited to, sealants and adhesives are to have low VOC content limits.
- .2 Hygienic wall protection (WP)
 - .1 Extruded rigid PVC sheets, coloured throughout, smooth finish, Agriculture and Agri-Food Canada Approved, 2440 mm x 1220 mm x 2.5 mm thick. 'Altro Whiterock' by Altro or approved alternative.
 - .2 Wall cladding to come complete with thermoformed corners and all accessories required to provide a complete system.
 - .3 Colour: Refer to Finish/Material/Product Schedule as shown on Contract Drawings for selected colour.
- .3 Accessories:
 - .1 Provide accessories as required for complete installation, including but not limited to welding rod, adhesive, double-sided tape, and sealant.
 - .2 Types as recommended by cladding manufacturer to suit intended application.
 - .3 Tape: 25 mm wide, double-sided tape, as recommended by cladding manufacturer.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **PREPARATION**

- .1 Verify substrate surfaces are solid, free of moisture, dust, oil, grease, scaling or laitance, projections and any other foreign matter detrimental to performance. Obtain manufacturer's approval of substrate in writing, submit copy to Consultant.

3.3 **INSTALLATION**

- .1 Install hygienic wall cladding in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Dry-fit sheet prior to fixing.
- .3 Bevel leading edges of sheet prior to fitting joint and cap strips.
- .4 Apply adhesive to back of sheet uniformly using a 4.5 mm 'V' notched trowel. Allow adhesive to dry tacky to the touch.
- .5 Offer sheet to wall substrate. Roll sheet thoroughly with a wall roller to ensure full adhesion.
- .6 Provide double-sided tape at juncture of coved base in accordance with manufacturer's written instructions and as shown on Contract Drawings.
- .7 Cut sheet neatly to accommodate pipes, electrical boxes, etc., providing a 3 mm gap for expansion.
- .8 Fit sheets neatly at door and window trim providing a 3 mm gap for expansion.
- .9 Heat weld seams in accordance with manufacturer's written instructions.
- .10 Thermoform all inside and outside corners and specific shapes to fit building contours.
- .11 Provide water tight seal to all pipes, projections, door and window trims with sealant.

3.4 **CLEANING**

- .1 Upon completion of installation, remove the protective film and wash with a dilute soap/detergent solution and rinse with clean water.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for painting work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 Master Painters Institute (MPI), Painting Specification Manual.
- .2 SSPC Steel Structures Painting Council, Standards.

1.3 **SUBMITTALS**

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Submit listing of manufacturer's Product types, Product codes, and Product names, number of coats, and dry film thicknesses, corresponding to each Painting Schedule code; submit listing minimum of 8 weeks before materials are required.
- .2 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00:
 - .1 Three 300 x 300 mm draw downs of each colour minimum 4 weeks before paints are required.
 - .2 Identify each sample with Contract number and title, colour reference, sheen, date, and name of applicator.
- .3 Certificates:
 - .1 Submit certification from paint manufacturer, on company letterhead, indicating each product proposed for use is Manufacturer's premium grade, first line Product.
 - .2 Submit certified documentation to confirm each airless spray painter has minimum of 5 years experience on applications of similar complexity and scope.
 - .3 Submit certified documentation to confirm each worker has Provincial Tradesman Qualification certificate of proficiency.
- .4 Reports:
 - .1 Submit written field inspection and test report results after each inspection.
 - .2 Submit Field Quality Control test result reports for alkali content, substrate moisture, and dry film thickness.
 - .3 Submit electronic moisture meter manufacturer's specifications including tolerances. Submit record of latest meter calibration to meet manufacturer's recommendations.

1.4 QUALITY ASSURANCE

- .1 Finishing work: Perform work to MPI requirements for premium grade.
- .2 Supervision: Have work supervised by a full-time qualified foreperson who has 10 years minimum experience on Contracts of similar complexity and scope.
- .3 Mock-up:
 - .1 Construct three 2 m² mock-ups of different Paint Schedule code systems, selected by Consultant, in locations acceptable to Consultant to demonstrate installation workmanship, colour, and hiding power of Products.
 - .2 Obtain Consultant's acceptance in writing before proceeding with the work of this Section.
 - .3 Mock-ups may remain as part of the Work if acceptable to Consultant and will serve as a standard for similar code systems.
 - .4 Repaint over mock-ups which do not form part of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Install correct, safe temporary storage for paint, thinner, solvents, and other volatile, corrosive, hazardous, and explosive materials in accordance with requirements of authorities having jurisdiction.
- .2 Post hazard warning signage in areas of storage and mixing. Install and maintain sufficient CO₂ fire extinguishers of minimum 9 kg capacity, accessible in each storage mixing and storage areas.
- .3 Maintain storage enclosures at minimum 10°C ambient temperature and to manufacturer's instructions.

1.6 SITE CONDITIONS

- .1 Apply coatings under the following conditions:
 - .1 Interior coatings: 7°C minimum.
 - .2 Relative humidity: 85% maximum.
 - .3 Not in direct exposure to sun light.
- .2 Maintain temperature conditions indicated above for 24 hours before, during and 24 hours after painting.
- .3 Install clean plywood sheets to protect floors and walls in storage and mixing areas, from paint drips, spatters, and spills.
- .4 Apply sufficient masking, clean drop cloths, and protective coverings for full protection of work not being painted including, but not limited to, the following:
 - .1 Light fixtures, fire and smoke detectors.
 - .2 Data cabling and data infrastructure.
 - .3 Sprinkler heads.
 - .4 Prepainted diffusers and registers.

- .5 Prepainted equipment.
- .6 Fire rating labels and equipment specification plates.
- .7 Finished surfaces.

1.7 **MAINTENANCE**

- 1. Deliver to Owner's place of storage on completion of work, sealed containers of each finish painting material applied, and in each colour. Label each container as for original, including mixing formula. Provide the following:
 - .1 1 L of extra materials when less than 50 L are used for Project;
 - .2 3.78 L of extra stock when 50 to 200 L are used;
 - .3 7.57 L of extra stock when over 200 L are used.

2 Products

2.1 **MATERIALS**

- .1 Paint:
 - .1 All materials under work of this Section, including but not limited to, primers, stains, and paints are to have low VOC content limits.
 - .2 Products in accordance with the MPI Painting Specification Manual, Exterior and Interior Systems;
 - .1 For each MPI paint code, manufacture's premium grade, first line Products is to be use.
 - .2 Uniform dispersion of pigment in a homogeneous mixture.
 - .3 Ready-mixed and tinted whenever possible.
 - .3 Products within each MPI paint system code: From single manufacturer.
 - .4 Acceptable manufacturers:
 - .1 AkzoNobel.
 - .2 Benjamin Moore.
 - .3 PPG Industries Inc.
 - .4 Sherwin Williams.

2.2 **COLOUR SCHEDULE**

- .1 Consultant will select final choice of colours and gloss when compiling a Colour Schedule after award of Contract; allow for colour selection beyond paint manufacturer's standard colour range.
- .2 Paint types (PT): Refer to Finish/Material/Product Schedule for selected colour references.
- .3 Conform to gloss reflectance definitions listed in MPI Specification Manual.

2.3 PAINTING AND FINISHING SCHEDULE

- .1 Refer to Table 1, MPI Painting and Finishing Schedule coded systems, comply with MPI Painting Specification Manual.

Table 1: Painting and Finishing Schedule				
INTERIOR SUBSTRATES	Typical substrates (Including but not limited to)	MPI Manual Ref.	MPI Finish System Code	Topcoat
Metal Fabrications (Factory primed)	Supports in view	INT 5.1	INT 5.1R	High performance latex
Galvanized steel	Ducts, pipes	INT 5.3	INT 5.3J	Latex
Galvanized metal	HM doors & door frames	INT 5.3	INT 5.3M	High Performance Latex
Gypsum board	Drywall, walls, ceilings	INT 9.2	INT 9.2B	High performance latex
Gypsum board	Wet areas	INT 9.2	INT 9.2F	Epoxy-modified latex

3 Execution

3.1 EXAMINATION

- .1 Verify condition of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 PREPARATION

- .1 General:
 - .1 Clean substrate surfaces free from, dust, grease, soiling, or extraneous matter, which are detrimental to finish.
 - .2 Patch, repair, and smoothen minor substrate defects and deficiencies e.g. machine, tool and sand paper marks, shallow gouges, marks, and nibs.
 - .3 Clean, sweep, and vacuum floors and surfaces to be painted, debris and dust-free prior to painting.
 - .4 Refer to manufacturer's written instructions and MPI Painting Specification Manual for surface preparation requirements of substrates not listed here.
 - .5 Existing surfaces, general:
 - .1 Remove all loose paint and other deleterious matters from surface of existing surfaces which require re-painting.
 - .2 Thoroughly clean and prepare such surfaces to accept positive and permanent bond of new paint finish. If such preparation exposes bare surface, provide touch up primer.
- .2 Where finish hardware has been installed remove, store, re-install finish hardware, to accommodate painting. Do not clean hardware with solvent that will remove permanent lacquer finishes.
- .3 Alkali content tests and neutralization:
 - .1 Test for ph level using litmus paper on dampened substrate.
 - .2 Neutralize surfaces over 8.5 ph with 4% solution of Zinc Sulphate for solvent based systems and tetrapotassium pyrophosphate for latex based systems, to below 8.0 ph, and allow to dry.
 - .3 Brush-off any residual Zinc Sulphate crystals.
 - .4 Coordinate paint system primer / sealer to be alkali-resistant.
- .4 Substrate moisture tests:
 - .1 Test for moisture content over entire surface to be painted, minimum one test/ 2 m² in field areas and one test/600 mm along inside corners including at ceiling to wall juncture.
 - .2 If any test registers above 10% allow entire substrate surfaces, within the plane, to dry further before paint system application. Install temporary drying fans if necessary.
 - .3 Re-test employing same criteria.
- .5 Mildew removal: Scrub with solution of trisodium phosphate and sodium hypochlorite (Javex) bleach, rinse with water, and allow to dry completely.
- .6 Galvanized steel sheet:
 - .1 Z275 (Satin & Spangled Sheet): SSPC SP7 brush blast.
 - .2 ZF075 (Wiped Coat): Remove contamination, wash with Xylene solvent.
 - .3 Touch-up damaged galvanized areas with organic zinc rich primer.

- .7 Galvanized iron and steel: Prepare galvanized and ungalvanized metal surfaces as follows:
 - .1 Unpassivated, unweathered and weathered: Remove contamination, wash with Xylene or Toluol solvent, allow to dry thoroughly. Make paint system primer/sealer an etching type primer.
 - .2 Manufacturer pre-treated (including passivated): SSPC SP7.
 - .3 Touch-up damaged galvanized areas with organic zinc rich primer.
- .8 Miscellaneous metal fabrications:
 - .1 Coordinate the following with the responsible trades:
 - .1 Rust, mars, mill scale, and weld-burn touch-ups.
 - .2 Oil, grease, weld flux and other residue removal.
 - .2 Prime paint items, not otherwise indicated to be primed as part of another Section.
 - .3 Touch-up damaged galvanized areas with organic zinc rich primer.
- .9 Gypsum board (existing):
 - .1 Remove dust, dirt, oil, grease, glue and all foreign material. Clean with stiff fibre brush prior to applying primer coat.
 - .2 Coordinate repairs and touch-ups with the responsible trade.
 - .3 Lightly sand surface to smooth out ridges and provide neat smooth surface.
- .10 Gypsum board:
 - .1 Apply primer/sealer paint to reveal defects and deficiencies and to equalize absorption areas.
 - .2 Coordinate repairs and touch-ups with the responsible trade.
 - .3 Re-prime repairs.
- .11 Coordinate with other trades to prevent:
 - .1 Damage, and inadvertent activation of fire and smoke detectors.
 - .2 Odour and dust distribution by permanent HVAC systems including fouling of ducts and filters.
- .12 Field-mix Products in accordance with manufacturer's written instructions.

3.3 APPLICATION

- .1 Apply painting systems in accordance with manufacturer's written instructions and the MPI Painting Specification Manual. Apply each Product to manufacturer's recommended dry film thickness.
- .2 Painting systems listed are required minima, apply additional coats if necessary to obtain substrate hiding acceptable to the Consultant.
- .3 Tint intermediate coats lighter than final top coats for identification of each succeeding coat and to facilitate inspections. Include only manufacturer's recommended reducing and tinting accessories. Do not add adulterants.

- .4 Primer to be specialized primer coating system as required by manufacturer for selected colour. Standard primer being tinted shall be tinted to a maximum of 1.5% by volume.
- .5 Sand lightly between coats to achieve a tooth or anchor for subsequent coats.
- .6 Apply paint uniformly in thickness, colour, texture, and gloss, as determined by the Consultant under adequate illumination and viewed at a distance of 1500 mm. Apply finishes free of defects in materials and application which, in the opinion of the Consultant, affect appearance and performance. Defects include, but are not limited to:
 - .1 Improper cleaning and preparation of surfaces.
 - .2 Entrapped dust, dirt, rust.
 - .3 Alligatoring, blisters, peeling.
 - .4 Scratches, blemishes.
 - .5 Uneven coverage, misses, drips, runs, and poor cutting in.
- .7 Do not apply coatings on substrates which are not sufficiently dry. Unless indicated otherwise, allow each painting system coat to cure dry and hard before following coats are applied.
- .8 Repaint entire areas of damaged or incompletely covered surfaces, to the nearest inside or outside corner; patching will not be permitted.
- .9 Miscellaneous painting requirements:
 - .1 Paint projecting ledges, and tops, bottoms and sides of doors both above and below sight lines to match adjacent surfaces.
 - .2 Paint door frames, access doors and frames, door grilles, prime coated butts, and prime coated door closers to match surface in which they occur.
 - .3 Paint interior columns to match walls of room.
 - .4 Unless otherwise indicated, allow for:
 - .1 2 wall colours per room, one ceiling colour per room.
 - .2 Different door colours in each functionally different area.
 - .3 Different colours on both sides of same door.
- .10 Mechanical, electrical and other painting coordination:
 - .1 Paint following items unless specified or indicated on drawings not to be painted.
 - .2 Paint mechanical services in accordance with Mechanical Identification Division 21, 22 and 23.
 - .3 Coordinate painting of pipes, ducts, and coverings with the work of Division 21, 22 and 23 to precede pipe colour banding, flow arrows, and other pipe identification labeling installation.
 - .4 Paint exposed conduit, pipes, hangers, ductwork, grilles, gratings, louvres, access panels, fire hose cabinets, registers, enclosures, and other mechanical and electrical equipment including services concealed inside cupboard and cabinet work; apply colour and sheen to match adjacent surfaces, except as noted otherwise.
 - .5 Paint portions of surfaces such as duct interiors, piping, ductwork, hangers, insulation, walls, and similar items, visible through grilles, louvres, convactor covers etc., matte black in colour.

- .6 Remove the following to accommodate painting, carefully store, clean, then re-install on completion of each area and when dry:
 - .1 Switch and receptacle plates, fittings and fastenings, grilles, gratings, louvres, access panels, and enclosures .

3.4 FIELD QUALITY CONTROL

- .1 Dry film thickness tests:
 - .1 Test for film thickness over entire surface to be painted, minimum one test/2 m² in field areas and one test/600 mm along inside corners including at ceiling to wall juncture.
 - .2 If any test registers below specified thickness, re-apply paint to entire surface to nearest inside and outside corners.
 - .3 If test registers more than 50% above specified thickness, consult with paint manufacturer, determine if problem exists, offer solutions to Consultant, and repair as directed.
 - .4 Re-test employing same criteria after repair.

3.5 CLEANING

- .1 Remove spilled, splashed, and spattered paint promptly as work proceeds and on completion of work. Clean surfaces soiled by paint spillage and paint spatters. Repair or replace damaged work, as directed by Consultant.

3.6 PROTECTION

- .1 Post Wet Paint signs during drying and restrict or prevent traffic where necessary.
- .2 Post sign, after Consultant's inspection and acceptance of each room, reading: PAINTING COMPLETE - NO ADMITTANCE WITHOUT CONTRACTOR'S PERMISSION.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for signage work in accordance with the Contract Documents:

1.2 **REFERENCES**

- .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .2 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .3 ASTM F3125/F3125M, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- .4 CAN/CSA-G40.20/G40.21-M, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steels.
- .5 CAN/CSA G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .6 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .7 CSA W48, Filler Metal and Allied Materials for Metal Arc Welding.
- .8 CSA W59-M, Welded Steel Construction (Metal Arc Welding).
- .9 CAN/CSA W117.2-M, Safety in Welding, Cutting and Allied Processes.
- .10 Ministry of Transportation Ontario, Manual of Uniform Traffic Control Devices.

1.3 **DESIGN REQUIREMENTS**

- .1 Design signage work in accordance with Contract Drawings, utilizing material types, accessories and methods indicated.
- .2 Design signage work to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads and with a deflection not exceeding L/360.
- .3 Design signage in accordance with climatic design data for Toronto contained in the Ontario Building Code to accommodate thermal movements of components and structural movements to provide an installation free of oil canning, buckling, delaminating, failure of joint seals, excessive stress on fasteners or any other detrimental effects.

- .4 Design connections to substrates and structures to withstand live, dead, lateral, seismic, and other imposed loads for the locations they are installed.
- .5 Design miscellaneous, additional structural framing members as required to complete the Work, where not indicated on Contract Drawings.
- .6 Design of directional signage to be in accordance with the Ministry of Transportation and Communications Manual of Uniform Traffic Control Devices.

1.4 SUBMITTALS

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Compliance with appropriate reference standards and specifications.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Elevations, sections, details, materials, thicknesses, sizes, finishes, colours, removable and interchangeable components, anchorage to substrate, mounting methods, schedule of signs.
 - .2 Submit full size templates drawn-to-scale details for individually fabricated or incised lettering indicating word and letter spacing.
 - .3 Submit full or 1/2 scale artwork for pictographs.
 - .4 Submit templates to Contractor for use by installers and fabricators as required for proper location and installation of hardware.
- .3 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00.
 - .1 Submit one sample of each sign type as requested, demonstrating material, finish, colour, font type, size and pictographs.
 - .2 Two 150 x 150 mm samples of each reflective sheet material and colour minimum 2 weeks before sheet material is required.
 - .3 Identify each sample with Contract number and title, colour reference, date, and name of installer.
- .4 Closeout submittals: Submit maintenance data for each sign type for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.

1.5 QUALITY ASSURANCE

- .1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in signage work of comparable complexity and scope, to perform following services as part of work of this Section:
 - .1 Design of signage work.
 - .2 Design of connections for attaching signs to structures or posts.
 - .3 Review, stamp, and sign shop drawings and design calculations.

- .2 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in project of a similar size and nature.
- .3 Execute welding by firms certified in accordance with CSA W47.1 Division 1 or 2.1.
- .4 Ensure welding operators are licensed per CSA W47.1 for types of welding required by work.

1.6 **DELIVERY, STORAGE, AND HANDLING**

- .1 Protect prefinished surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
- .2 Be responsible for handling and delivery of products. Protect products from damage during handling, storage and installation.
- .3 Deliver store and handle items in accordance with manufacturer's instructions and as specified.
- .4 Be responsible for all costs of delivery, loading and off-loading, and for transportation back to its origin for correction, if required, due to damage or defect.
- .5 Manufacture, pack, ship, deliver, and handle Products so that no damage occurs to structural qualities and finish appearance, nor in any other way which is detrimental to their function and appearance.

1.7 **SITE CONDITIONS**

- .1 Do not install the work of this Section outside of environmental ranges as recommended by manufacturer without Consultant's and Product manufacturer's written acceptance.
- .2 Supply and install temporary protection and facilities to maintain Product manufacturer's, and above specification, environmental requirements before, during, and after installation.

2 Products2.1 **MATERIALS**

.1 General:

- .1 All materials under work of this Section, including but not limited to, adhesives, paints, coatings, solvents and grouts are to have low VOC content limits.
 - .2 Unless detailed or specified herein, standard products will be acceptable if construction details and installation meet intent of Drawings and Specifications.
 - .3 Include all materials, products, accessories, and supplementary parts necessary to complete assembly and installation of work of this Section.
 - .4 Incorporate only metals that are free from defects which impair strength or durability, or which are visible. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight, and with sharp defined profiles.
 - .5 Incorporate fastenings and anchorage required for building in of products.
 - .6 Accessories: Provide all accessories and components as required for complete and secure installation of signage including but not limited to posts, fasteners and grout.
- .2 Steel shapes, box beams, posts, plates, brackets, and similar items: CAN/CSA-G40.20/G40.21-M, Grade 300W. For hollow sections; Grade 350W Class H. Galvanize in accordance with CAN/CSA G164-M.
- .3 Galvanized sheet steel: ASTM A653/A653M Grade A, Z275 Commercial Quality zinc coating, 2.7 mm (12 ga.) thick unless noted otherwise, size and shape as indicated.
- .4 Galvanized tubing:
- .1 ASTM A653/A653M Grade A, Z275 Commercial Quality zinc coating,
 - .2 Provide extendable galvanized Telespar perforated square tubing, anchor tubes and sleeves as required for installation. Sizes as shown.
- .5 Reflective sheet material: Reflective sheet with pressure-activated adhesive for application to sign panels, 'Scotchlite Reflective Sheeting by 3M or approved alternative. Colours as selected by the Consultant.
- .6 High strength bolts: ASTM F3125/F3125M, stainless steel, heavy hexagon high strength bolts. Unless indicated otherwise, bolts to be minimum 12.7 mm diameter with nuts and washers. Provide lock washers where vibration may occur.
- .7 Screws, bolts, and other fasteners: Low profile stainless steel type 304 in accordance with ASTM F738M. Provide lock washers where vibration may occur.
- .8 Non-shrink grout: Pre-mixed, flowable, non-shrink grout without aggregate fillers; Masterflow 713 or Sika Grout 212 by Sika Canada Inc. or approved alternative.

2.2 **FABRICATION**

- .1 Fabricate work in accordance with reviewed shop drawings and manufacturer's written instructions utilizing material types, accessories and methods described.
- .2 Fabricate sections true to detail, free from defects impairing function, appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.
- .3 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints.
- .4 Allow for thermal movement without distortion of components.
- .5 Conceal anchors, reinforcement and attachments from view.
- .6 Clean and dress metal components free of burrs, tool and mould marks prior to finishing.

2.3 **WELDING**

- .1 Perform welding by electric arc process.
- .2 Execute welding to avoid damage or distortion to Work. Execute welding in accordance with following standards:
 - .1 CSA W48 - for Electrodes. If rods are used, only coated rods are allowed.
 - .2 CSA W59-M and CSA W59S1-M for design of connections and workmanship.
 - .3 CAN/CSA W117.2-M - for safety.
- .3 Thoroughly clean welded joints and expose metal for a sufficient distance to perform welding operations. Provide continuous welds ground smooth and polished to match finish.
- .4 Test welds for conformance and remove work not meeting specified standards and replace to Consult's acceptance.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 INSTALLATION

- .1 Install signage in accordance with the reviewed shop drawings and manufacturer's written instructions in locations indicated.
- .2 Install work securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist. All fastenings to be concealed or have colour matched heads.
- .3 Reflective sheet:
 - .1 Apply reflective sheet in accordance with manufacturer's written instructions and Contract Documents.
 - .2 Shop apply sheet material to signs where practical, fitted to substrate with no air bubbles, gaps, or fish mouths.
 - .3 Ensure reflective sheet is applied free of wrinkles, twists, and any other imperfections to the satisfaction of the Consultant.
- .4 Mechanical attachment:
 - .1 To steel use bolts with nut and lock washers, self-tapping screws, welding, as appropriate for stresses and metal thicknesses.
 - .2 Fabricate special fasteners as required for installation conditions.
 - .3 Mechanical fasteners and methods of attachment subject to Consultant's approval.
- .5 Completed sign work shall be free from distortion or defects detrimental to appearance or performance.

3.3 CLEANING

- .1 Final cleaning of all surfaces shall be carefully undertaken in accordance with sign manufacturer's instructions. Remove debris from interior of signs as required.
- .2 Touch up any damaged finishes.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for compartments and cubicles work in accordance with the Contract Documents.

1.2 **REFERENCES.**

- .1 ASTM A167, Specification for Stainless Steel and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A653, Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 CAN/CSA B651-M, Accessible Design for the Built Environment.

1.3 **SUBMITTALS**

- .1 Shop drawings: Submit shop drawings in accordance with Section 01 00 00 indicating fabrication and erection details, plans, elevations, hardware, and installation details.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 00 00.
 - .1 Submit 300 x 300 mm samples for each colour.
 - .2 Submit samples of each hardware item, including brackets, fastenings, and trim.
- .3 Closeout submittals: Provide maintenance data for maintenance of finished work for incorporation into Maintenance Manual in accordance with Section 01 00 00.

1.4 **PROTECTION**

- .1 Cover finished surfaces with heavy Kraft paper or put in cartons during shipment. Protect installed surfaces by approved means. Do not remove until immediately prior to final inspection.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Floor mounted overhead braced toilet partitions (TP):
 - .1 'Powder Coated, Elite Series' by Hadrian Manufacturing Inc.
 - .2 Or approved alternative by ASI Global Partitions or Shanahan's.

2.2 MATERIALS

- .1 All materials under work of this Section, including but not limited to, adhesives are to have low VOC content limits.
- .2 Painted metal:
 - .1 To ASTM A653, 0.8 mm thick galvanized steel skin with organic polymer powder coating finish.
 - .2 25 mm cell honeycomb core of long fibre paper with a maximum 25 mm cell size and compressive strength of 31 lbs per sq. inch.
 - .3 Colour: Refer to Finish/Material/Product Schedule as shown on Contract Drawings for selected colour.
- .3 Hardware:
 - .1 Hinges: Concealed, heavy duty, stainless steel casting, self-lubricating inward swing.
 - .2 Slide bolt and keeper: Stainless steel casting or extrusion, equipped for emergency access.
 - .3 Door stop: Stainless steel casting or extrusion with rubber insert.
 - .4 Connecting brackets: Channel shaped, anodized aluminum or stainless steel extrusion or casting, continuous.
 - .5 Coat hook: Combination hook and door bumper, aluminum or stainless steel casting.
- .4 Stainless steel sheet metal: ASTM A167, Type 304 with No. 4 satin finish.
- .5 Fasteners: Stainless steel tamperproof type screws and bolts.

2.3 FABRICATION

- .1 Toilet partitions shall be floor mounted, overhead braced.
- .2 Laminate skin material to core material in strict accordance with adhesive manufacturer's printed instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Finish edges with matching strip edging.
- .3 Unless otherwise indicated or required, doors shall be nominal 610 mm wide. Doors to meet barrier-free requirements shall be nominal 900 mm wide, with 860 mm clear opening when door is in open position.
- .4 Fabricate headrail of brake formed anti-grip 1.5 mm thick clear anodized aluminum.
- .5 Fabricate pilaster boot assembly for bottom, of 1.5 mm thick die formed stainless steel. Fabricate assembly in size to suit pilaster.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify there is adequate supports and/or blocking in gypsum board assemblies prior to installation of toilet partitions.

3.2 **INSTALLATION**

- .1 Install compartments and cubicles in accordance with manufacturer's details and reviewed shop drawings, for a secure, plumb, square, and rigid installation.
- .2 Provide connecting brackets and secure to building structure and to pilasters. Insert edge of panels and closure pilasters into brackets and secure with through type sleeve bolt and nut.
- .3 Install doors with 6 mm to 10 mm maximum space between door panel and pilasters.
- .4 Install panels with 6 mm maximum space between panels and walls.
- .5 Install hardware in accordance with manufacturers' instructions and CAN/CSA B651-M.
- .6 Make compartments adjustable with screw jack through steel saddles made integral with pilaster. Conceal fixings with stainless steel shoes.
- .7 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel boot assemblies.
- .8 Install door tops edges aligned parallel with top edges of side partitions; determine alignment when doors are in closed position.
- .9 Brace through top of pilasters with rectangular shaped anti-grip headrail and fasten with stainless steel sheet metal screws.
- .10 Set panels and doors level and in line, raised approximately 300 mm above finished floor.
- .11 Hang doors to remain stationary at open position.
- .12 Equip each door with hardware. Adjust and align hardware for easy, proper function.
- .13 Provide closure pilasters, as required, at end units of compartment bank.

- .14 Remove and replace damaged components not acceptable to Consultant.

3.3 ADJUSTING

- .1 Adjust operating hardware to work smoothly and without force. Adjust hinges of compartment doors so that all doors remain open to the same degree when unlatched, except doors at handicapped cubicles shall close automatically.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for cubicle curtain and track work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 CAN/ULC-S109, Flame Tests of Flame-resistant Fabrics and Films.

1.3 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, characteristics, and limitations.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Shop Drawings:
 - .1 Submit Shop Drawings in accordance with Section 01 00 00 indicating:
 - .1 Clearly indicate dimensions in relation to finished floor and tracks and details and description of fabric material, anchorage and accessories.
 - .3 Samples:
 - .1 Submit following samples in accordance with Section 01 00 00.
 - .1 Five 300 x 300 mm samples of curtain fabric.
 - .4 Closeout submittals: Submit maintenance and cleaning instructions for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.

1.4 **QUALITY ASSURANCE**

- .1 Manufacturer qualifications: Cubicle curtains shall be fabricated by skilled craftsmen employed by a firm having not less than five (5) years of experience in the manufacturing of quality cubicle curtains.

1.5 **MAINTENANCE MATERIALS**

- .1 Provide two sets of mesh and curtain per curtain track, neatly packaged, for maintenance use. Store where directed. Clearly identify packages.
- .2 Maintenance materials shall be same production run as installed materials.

2 Products

2.1 MATERIALS

.1 Cubicle curtains:

.1 Curtain fabric:

- .1 CAN/ULC S109, fire rated, woven, 100% polyester, curtain fabric, treated with an antimicrobial agent to inhibit and control bacteria/mildew growth with 'Visa' finish.
- .2 Colour: To be selected by the Consultant from manufacturer's full colour range and match Consultant approved sample.
- .3 Acceptable Product: Curtain fabric, 'Chalet Fabric' by Inpro Corporation or approved alternative.

.2 Drop-chain: Cubicle curtain complete with manufacturer's standard 'Style 3' adjustable stainless steel drop-chain to accommodate various conditions and for air circulation, hung from curtain carriers.

.3 Acceptable Product: Cubicle curtain fabric and drop-chain assembly, 'Clickeze' by Inpro Corporation or approved alternative.

.2 Cubicle curtain track:

- .1 Quiet sliding, extruded clear anodized aluminum curtain track complete with spool curtain carriers.
- .2 Track shall be complete with all components and accessories as required for complete and secure installation including but not limited to suspension units, end sleeves, splicers, one-piece solid spool carriers, other similar track components and ten cubicle glides per metre of track. Form curved sections as indicated on Drawings.
- .3 Curtain track, 'Optitrac Cubicle Track' by Inpro Corporation or approved alternative.

2.2 FABRICATION

.1 Fabricate curtains in accordance with reviewed shop drawings, manufacturer's written instructions and meeting requirements as specified herein.

- .1 Curtain width: Manufacturer curtains of one piece, sized to approximately 10% wider than the track length but no less than 305 mm extra fullness. Width tolerance +/- 75 mm. Width of curtain to be field verified.
- .2 Curtain height: Height of curtain to be field verified.
- .3 Curtain heading: Curtain to include rustproof nickel-plated grommets, 152 mm on centre for drop-chain and no further than 50 mm from ends of finished curtain. Top hem to be triple-turned hem over nylon tape for rugged wear.
- .4 Seams: Seamless curtains when possible, with sanitary 'no scum' side and bottom edges. Sewing thread to be triple-ply twisted nylon.
- .5 Provide bottom hem and ends of cubicle curtain fabric with 25 mm double folded finished hems.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.
- .2 Verify that surfaces and above ceiling supports are ready to receive work.
- .3 Verify all sizes, dimensions and quantities by field examination and measurements.

3.2 **INSTALLATION**

- .1 Install cubicle curtains and tracks in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install cubicle track, secure, rigid, and true to ceiling line.
- .3 Slide carriers onto the track.
- .4 Install end cap or stop device.
- .5 Secure track to ceiling system. Install with mechanical fasteners.
- .6 Ensure smooth, even operation of curtain assembly.
- .7 Ensure curtains hang plumb and uniform and will operate smoothly and positively without binding.

3.3 **CLEANING**

- .1 At completion of installation, remove any debris and clean surfaces in accordance with manufacturer's written instructions.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services for washroom accessories work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 ASTM A167, Specification for Stainless Steel and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A312, Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
- .3 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .4 CAN/CSA B651-M, Accessible Design for the Built Environment.

1.3 **SUBMITTALS**

- .1 Product data: Submit Product data to requirements of Section 01 00 00 indicating each washroom accessory describing size, finish, details of function, attachment methods, hardware and locks, description of rough-in frame, and building-in details of anchors for grab bars.
- .2 Closeout submittals:
 - .1 Submit for each Product operation and maintenance instructions for incorporating into the Operations and Maintenance Manuals in accordance with Section 01 00 00.
 - .1 Supply 2 keys for each lockable washroom accessory to Consultant.
 - .2 Master key washroom accessories which are keyed.
- .3 Extended warranty: Submit extended warranty signed and registered by the manufacturer providing the warranty in the name of the Owner for the timeframe and coverage specified in this Section.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in sealed cartons and containers with manufacturer's name and product description clearly marked.

1.5 **EXTENDED WARRANTY**

- .1 Submit an extended warranty for washroom accessories work in accordance with the General Conditions, except that the warranty period is extended to 10 years from the date of Substantial Performance.
 - .1 Against cracked or scratched mirrors, spoiling or deterioration of silvering or backing, loosening of fastenings or adhesive
 - .2 Coverage: complete replacement including effected adjacent work.

1.6 **MAINTENANCE**

- 1. Maintenance tools: Provide special tools necessary for accessing, assembly/disassembly or removal of toilet, bath and cleaning accessories in accordance with Section 01 00 00.

2 **Products**

2.1 **MATERIALS**

- .1 Stainless steel:
 - .1 Sheet metal: ASTM A167, Type 304.
 - .2 Tubing: ASTM A312, Type 304.
- .2 Sheet steel: ASTM A653M, Z275; Cold rolled, commercial quality, surface preparation and pretreatment as required for applied finish.
- .3 Fasteners, screws and bolts: ASTM A167, Type 304 stainless steel, tamper-proof.

2.2 **ACCESSORIES**

- .1 Refer to drawings for quantity and location of washroom accessories.
- .2 Owner supplied and Contractor installed accessories: Coordinate with Section 11 32 00 as required for Owner supplied and Contractor installed washroom accessories.
- .3 Tilted mirror (MR1): 6 mm thick, mirror quality float glass.
 - .1 #B-293 1830 by Bobrick or approved alternative by ASI Group Canada; mitred corners welded, and polished smooth. Sized at 460 x 760 mm.
 - .2 Tilted mirror with mirror frame having beveled design to hold mirror against frame, a tumbler lock to secure mirror to tapering wall frame, and galvanized steel back with integral horizontal hanging brackets.
 - .3 Frame finish: Type 304 stainless steel satin finish.
- .4 Sanitary napkin disposal (SND):
 - .1 #B-270 by Bobrick or approved alternative by ASI Group Canada; surface mounted, stainless steel wall box and waste receptacle, complete with full length stainless steel hinge. Receptacle capacity: 3.8 L.
 - .2 Finish: Type 304 stainless steel with satin finish.

- .5 Waste receptacle (WR):
 - .1 #B-35643 by Bobrick or approved alternative by ASI Group Canada; recessed receptacle, door secured to cabinet with a concealed full-length stainless steel piano-hinge, cable door-swing limiter, equipped with two tumbler locks keyed. Removable, leak-proof, rigid molded plastic waste container with minimum capacity: 45.4 L.
 - .2 Finish: Type 304 stainless steel with satin finish.
- .6 Straight grab bar (GB1 & GB4):
 - .1 Series B-6806-99 by Bobrick or #3800-P Series by ASI Group Canada; 38 mm diameter, 1.2 mm thick, concealed mounting with snap flange, complete with escutcheons. Lengths and configurations as indicated on drawings.
 - .2 Finish: Type 304 stainless steel with a satin finish and peened grip.
- .7 L-shaped grab bar (GB2):
 - .1 'Series 6898-99 - L30x30' by Bobrick Washroom Equipment or approved alternative by ASI Group Canada; 38 mm diameter, 1.2 mm thick, concealed mounting with snap flange, complete with escutcheons.
 - .2 Length and configuration: 762 x 762 mm, in L-shaped configuration as shown on Contract Drawings.
 - .3 Finish: Type 304 stainless steel with a satin finish and peened grip.
- .8 L-shaped grab bar (GB3):
 - .1 3800-P Series by ASI Group Canada or approved alternative by Bobrick; 38 mm diameter, 1.2 mm thick, concealed mounting with snap flange, complete with escutcheons. 'L' Shaped configuration in lengths as indicated on drawings.
 - .2 Finish: Type 304 stainless steel with a satin finish and peened grip.
- .9 Coat hook (CH):
 - .1 #B-670 by Bobrick or approved alternative by ASI Group Canada; surface mounted utility hook, hook with flange, support arm and concealed wall plate, projecting 50 mm from wall.
 - .2 Finish: Type 304 stainless steel, bright polished finish.
- .10 Folding shower seat (FSS):
 - .1 #B-5191 by Bobrick or #8203 Series by ASI Group Canada; surface wall mounted seat with 8 mm thick water-resistant, ivory coloured solid phenolic.
 - .2 Dimensions: 405 mm deep x 460 mm wide.
 - .3 Finish: Type 304 stainless steel frame.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Verify and coordinate templates, inserts, and rough-in frames and verify exact location of washroom accessories for installation.
- .2 Verify there is adequate supports and/or blocking in gypsum wall assemblies prior to installation of washroom accessories. Provide addition support/ blocking in gypsum wall assemblies if necessary.
- .3 Provide fastening and mounting kits for washroom accessories.
- .4 Locate washroom accessories where indicated on Drawings and where directed by Consultant.
- .5 Install washroom accessory fixtures, accessories, and items in accordance with manufacturer's instructions and CAN/CSA B651-M. Provide exposed tamper-proof screws of stainless steel to match units.
- .6 Install washroom accessories plumb, level, and securely and rigidly anchored to substrate surfaces and framing. Adjust accessories for proper operation and verify mechanisms function smoothly.
- .7 Install grab bars to withstand minimum load of 1.3 kN applied vertically or horizontally. Provide necessary reinforcements as required.

3.3 **CLEANING**

- .1 Clean and polish exposed surfaces and fill accessories with necessary supplies prior to acceptance by Consultant.

END OF SECTION

-
- 1 General
 - 1.1 **SECTION INCLUDES**
 - .1 Labour, Products, equipment and services necessary for miscellaneous specialties work in accordance with the Contract Documents.
 - 1.2 **SUBMITTALS**
 - .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data for each Product specified in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard(s), characteristics, and limitations.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Shop drawings: Submit shop drawings in accordance with Section 01 00 00 indicating elevations, sections, details, dimensions, materials, gauges, and finishes.
 - .3 Closeout submittals: Submit cleaning and maintenance instructions for miscellaneous specialties for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.
 - 1.3 **DELIVERY, STORAGE, AND HANDLING**
 - .1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.
 - 2 Products
 - 2.1 **MANUFACTURED UNITS**
 - .1 Stainless steel corner guard (CG): 51 mm x 51 mm x 90°, stainless steel corner guard. Surface mounted 'CO-8' by C/S Group or approved alternative by Inpro Corporation or McGill Architectural Products. Full height as indicated on Contract Drawings.
 - 3 Execution
 - 3.1 **EXAMINATION**
 - .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 PREPARATION

- .1 Verify substrate surfaces are solid, free from surface water, dust, oil, grease, projections and other foreign matter detrimental to performance.
- .2 Items to be built-in: Provide 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.
- .3 Verify there is adequate supports and/or blocking in gypsum wall assemblies prior to installation of miscellaneous specialty items as required.

3.3 INSTALLATION

- .1 Install miscellaneous specialties level and securely and rigidly anchored to substrate in accordance with authorities having jurisdiction, reviewed shop drawings, and manufacturer's written instructions.
- .2 Guards: Securely install guards level and plumb.
- .3 After installation, adjust miscellaneous specialties in accordance with manufacturer's written instructions.

3.4 CLEANING

- .1 Clean and polish exposed surfaces prior to acceptance by Consultant.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Design, Labour, Products, equipment and services necessary for parking control equipment work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .2 Manual of Uniform Traffic Control Devices for Canada, Roads and Transportation Association of Canada.

1.3 **DESIGN REQUIREMENTS**

- .1 Design parking control equipment in accordance with Manual of Uniform Traffic Control Devices for Canada for colour and design of traffic control signs, signals and markings intended to regulate, warn or guide road users.

1.4 **SUBMITTALS**

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard(s), characteristics, limitations, and trouble-shooting protocol.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Elevations, sections, details, materials, operating components, dimensions, gauges, finishes and relationship to operating components and adjacent construction.
 - .2 Indicate equipment layout, mounting bolt locations, electric power requirements, sensing loop and lead-in wire installation details, wiring diagrams.
 - .3 Submit markings and designs of messages on signs to Consultant for approval.
 - .4 Complete engineering design data confirming that Products meet design criteria.

- .3 Closeout submittals:
 - .1 Submit following for each Product incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00:
 - .1 Identification: Manufacturing name, type, year, serial number, number of units, capacity, and identification of related systems.
 - .2 Functional description detailing operation and control of components.
 - .3 Operating instructions and precautions.
 - .4 Safety precautions.
 - .5 Conduct comprehensive demonstration for accommodation maintenance staff on operation and care of parking control system.

1.5 **QUALITY ASSURANCE**

- .1 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of Parking Control Equipment units of a similar size and nature and that is approved by manufacturer. Submit to Consultant, installer's current certificate of approval by the material manufacturer as proof of compliance.
- .2 Retain a Professional Engineer, licensed in Province of Ontario, with experience in Parking Control work of comparable complexity and scope, to perform following services as part of work of this Section:
 - .1 Design of parking control equipment.
 - .2 Review, stamp, and sign fabrication and erection shop drawings, design calculations.
 - .3 Conduct shop and on-site inspections, prepare and submit written inspection reports verifying that this part of Work is in accordance with Contract Documents and reviewed shop drawings. Perform inspections periodically minimum.
- .3 Pre-installation meetings: Arrange with manufacturer's representative and Consultant to inspect substrates, and to review installation procedures 48 hours in advance of installation.

1.6 **DELIVERY, STORAGE, AND HANDLING**

- .1 Exercise care in handling parking control equipment. Use nylon slings for handling and a combination of wood or polystyrene blocking between units, in stockpile and in transit. Schedule and sequence the work so a minimum of handling occurs prior to installation.

1.7 **MAINTENANCE**

- .1 Submit extra gate arms for replacement purposes, Identify each gate arm including colour, type, and location. Submit Products from same production run as installed products. Deliver to Consultant, upon completion of the work if this section and store maintenance Products as directed by Consultant.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Precise Parklink Inc.
- .2 Or approved alternative.

2.2 **MANUFACTURED UNITS**

- .1 Motorized parking gate:
 - .1 Acceptable Product: 'Barrier.Gate' by Precise Parklink Inc. or approved alternative.
 - .2 Provide complete barrier gate system including equipment such as but not limited to intercoms, barrier gate, card reader pedestal, built-in video camera and pedestal, loops, and cabinet. Card reads to be provided under work of Division 28.
 - .3 Barrier arm: 3600 mm long standard version, non-illuminated, barrier arm fabricated from high impact UV resistant glass fibre reinforced plastic with coloured contour stripes, in colour 'Traffic Yellow RAL 1023/Translucent'.
 - .4 Parking barrier with mounting plate and lockable main body fabricated from aluminum, equipped with driver motor and washer for barrier arm installation.
 - .5 Motor: Integrated drive gear motor with frequency converter control and slipping clutch.
 - .6 System is equipped with electronic control assembly with real-time communication to parking column and includes a barrier breakage detector.
- .2 Vehicle detection and sensing unit: Manufacturer's standard unit for use in temperature range of -40 °C to 80 °C, for use with specified barrier arm system.
- .3 Accessories:
 - .1 Provide all components and accessories as required for complete and secure installation of barrier gate arm system.
 - .2 System to include infrastructure, such as but not limited to conduits, concrete pads and islands, cabinets, bollards, handwell, traffic box, and traffic lights.
 - .3 Provide all anchors and hardware as required.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 PREPARATION

- .1 Verify substrate surfaces are solid, free from surface water, frozen matter, dust, oil, grease, scaling or laitance, projections and any other foreign matter detrimental to performance.
- .2 Prohibit traffic on prepared areas, until work of this Section is completed.
- .3 Supply and install temporary protection to adjacent surfaces to prevent damage resulting from work of this Section.

3.3 INSTALLATION

- .1 Install parking control equipment in accordance with reviewed shop drawings, manufacturer's written instructions and to meet requirements of authorities having jurisdiction.
- .2 Do welding to CSA W59. Weld exterior seams continuous to provide watertight juncture. File or grind exposed welds smooth and flush.
- .3 Cut grooves in road surface and install vehicle detection loops and lead-in-wires, to reviewed shop drawings.
- .4 Do not fill grooves until installation is approved by Consultant, and tested for proper detection performance.
- .5 Supply and install other electrical wiring, conduit junction boxes, transformers, circuit breakers and auxiliary components required for complete installation in accordance with Division 26.

3.4 FIELD QUALITY CONTROL

- .1 Test and adjust complete system for proper function and leave in perfect working order.
- .2 Arrange for Consultant to witness tests.
- .3 Notify Consultant 21 days minimum prior to testing.
- .4 Submit written inspection reports to Consultant.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for Owner supplied and Contractor installed item work in accordance with the Contract Documents.

1.2 **SUBMITTALS**

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings: Submit shop drawings in accordance with Section 01 00 00 indicating elevations, sections, details, dimensions, materials, gauges, and finishes.
- .3 Certificates: Submit manufacturer's certificates stating that products are in accordance with this specification.
- .4 Closeout submittals: Submit recommended maintenance instructions and listing of recommended maintenance Products for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.

1.3 **QUALITY ASSURANCE**

- 1. Regulatory requirements: All electrical equipment shall have attached labels attesting to CSA or Electrical Safety Authority approval, and shall have magnetic starters for motors, transformers, and overload protection.

1.4 **DELIVERY, STORAGE AND HANDLING**

- 1. Package or crate, and brace products to prevent damage or distortion of equipment in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings or equivalent protection. Provide temporary skids under large or heavy units.
- 2. Do not deliver products to site until conditions are such that no damage will occur to them while in storage.
- 3. Store equipment at site in a manner to prevent damage to equipment.
- 4. Uncrate equipment only before installation.

1.5 **SCHEDULING**

1. Provide equipment or its parts ready for installation in accordance with construction schedule. Verify required delivery date sufficiently before delivery to ensure that construction is not delayed.

2 Products

2.1 **EQUIPMENT**

1. Provide reinforcing and anchorage for built-in products.
2. Insulate between dissimilar metals, and metal and masonry, to prevent electrolysis.
3. Equipment shall include all electrical components required by jurisdictional authorities, and to protect the equipment from damage during operation.
4. Equipment shall include all components, connections, devices and controls required to make it fully and safely operable.

2.2 **FABRICATION**

1. Fit joints and junctions between components tightly, in true planes, and to prevent entry of water to collect in component voids. Cap open ends of sections exposed to view.
2. Fabricate work with materials and component sizes, metal gauges, reinforcing anchors, and fastenings of adequate strength to ensure that it will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended and specified use. Conceal and weld connections wherever possible.
3. Cleanly and smoothly finish exposed edges of materials including holes and cutouts.
4. Provide reinforcing and attached anchorage for built-in products.
5. Provide holes and connections for work installed under other Sections.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
2. Before installation commences, ensure that mounting devices, members and surfaces are satisfactory for fitting, and adequate for securing of work.

3. Take site measurements of construction to which work of this Section must conform, and through which access must be made, before work is delivered to site, to ensure that adaptation is not required which would result in construction delay.

3.2 **INSTALLATION**

1. Obtain from manufacturer or supplier, anchorage information, roughing-in dimensions, templates and service requirements for installation of work of this Section. Also obtain assistance from manufacturer or supplier, for the setting of anchorage devices, and construction of other work incorporated with equipment specified in this Section in order that they function as intended.
2. Install work to meet manufacturer's recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
3. Work shall include rough hardware, fastenings and other items necessary for secure installation.
4. Use only fastenings suitable for materials. Do not use through fastening at floors or walls.
5. Install work straight, plumb, level, and secured to prevent distortion or displacement, or both. Shim as necessary with concealed shims. Where required, use grout on which iron oxide deposits will not form.
6. Secure fixed equipment to building structure or construction as required to maintain it permanently in place, and so that it functions properly with no damaging vibration to the building or itself.
7. Install equipment with connections provided as required for plumbing and electrical services.
8. Mechanical:
 - .1 Provision of mechanical services and connection of equipment to mechanical work is specified in Division 22.
 - .2 Obtain and pay for all permits and connection fees as per authorities having jurisdiction.
9. Electrical:
 - .1 Provision of electrical service and connections of equipment to the services is specified in Division 26.
 - .2 Obtain and pay for all permits and connection fees as per authorities having jurisdiction.

3.3 **REPAIR**

1. Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at site only if approved by Consultant.

3.4 ADJUSTING

1. Verify under work of this Section that installed products function properly, and adjust them accordingly to ensure satisfactory operation.
2. Lubricate equipment as specified by equipment manufacturer.

3.5 CLEANING

1. Clean and polish all surfaces that are exposed to view from any location on completion of installation.
2. Remove packaging materials and debris from installation from the site.

3.6 DEMONSTRATION

1. After start-up, adjusting and cleaning, demonstrate operation of equipment to Owner and Consultant, prior to Substantial Performance. Demonstrations shall be made:
 - .1 When the Work is certified complete by the Consultant.
 - .2 When the Work is turned over to the Owner.
2. Knowledgeable representatives of the manufacturers and installers of the equipment being demonstrated shall be present at time of demonstrations.

3.7 SCHEDULE OF EQUIPMENT

1. Owner supplied and Contractor installed items:
 - .1 Washroom accessories: Washroom accessories as follows, for installation under Section 10 28 13.
 - .1 Soap dispensers.
 - .2 Paper towel dispensers.
 - .3 Toilet paper dispensers.
 - .2 Additional items as indicated by the Consultant.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for patient lift system work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 CAN/CSA C22.2, Canadian Electrical Code.
- .2 ISO 10535, Assistive Products — Hoists for the Transfer of Persons — Requirements and Test Methods.

1.3 **DESIGN REQUIREMENTS**

- .1 Patient lift system to be capable of weighing patients via internal scale. No external scale attachment permitted.
- .2 System to consist of a hand control with LED screen capable of displaying patient's weight, usage and maintenance information.
- .3 System shall have Wifi ready usage analytics and maintenance analytics software available preloaded or as an OEM upgrade.
- .4 Patient lift system to be capable of providing continuous hands free, dynamic body weight support and fall protection in real time by allowing clinical staff to enter a specified offload weight directly into the hand control.

1.4 **SUBMITTALS**

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 00 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations and warranties.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 00 indicating:
 - .1 Elevations, sections, details, materials, operating components, dimensions, gauges, finishes, general room layout and relationship to adjacent construction.
 - .2 Include required clearances and access for servicing.
 - .3 All equipment and structural supports to deck.
 - .4 Obstructions, such as lights and sprinklers.
 - .5 Complete electrical wiring diagrams including electrical schematics and sequence of operation.

- .3 Certificates:
 - .1 Submit manufacturer's certificates stating that products are in accordance with this specification.
 - .2 Submit qualification data to demonstrate compliance as specified herein.
- .4 Closeout submittals: Submit recommended maintenance instructions and listing of recommended maintenance Products for incorporation into Operations and Maintenance Manuals in accordance with Section 01 00 00.

1.5 **QUALITY ASSURANCE**

- .1 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of lift systems of a similar size and nature and that is approved by manufacturer. Submit to Consultant, installer's current certificate of approval by the material manufacturer as proof of compliance.
- .2 Regulatory Requirements: All electrical equipment shall have attached labels attesting to CSA or Electrical Safety Authority approval, and shall have magnetic starters for motors, transformers, and overload protection.

1.6 **DELIVERY, STORAGE AND HANDLING**

- .1 Package or crate, and brace products to prevent damage or distortion of equipment in handling. Label packages and crates, and protect finish surfaces by sturdy wrappings or equivalent protection. Provide temporary skids under large or heavy units.
- .2 Do not deliver products to site until conditions are such that no damage will occur to them while in storage.
- .3 Store equipment at site in a manner to prevent damage to equipment.
- .4 Uncrate equipment only before installation.

1.7 **PROJECT CONDITIONS**

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not store or install products under environmental conditions outside manufacturer's recommended limits.

1.8 **EXTENDED WARRANTY**

- .1 Manufacturer's warranty: Provide manufacturer's warranty naming Owner as beneficiary, for a period of three (3) years from date of Substantial Performance.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Guldmann Inc.
- .2 Or approved alternative.

2.2 **PATIENT LIFT SYSTEM**

- .1 Patient lift system:
 - .1 Acceptable Product: 'GH3+ Ceiling Hoist' by Guldmann Inc. or approved alternative.
 - .2 Patient lift system to be complete with all components and accessories as required for complete installation including but not limited to lift track, spreader bars, slings, threaded rods, struts, lateral braces, brackets, shims, plates, clamps, and fasteners, and shall meet and include the following criteria and features:
 - .1 Safe working load: 605 lbs.
 - .2 Lifting speed: 56 mm (2.2 inches)/second at maximum load, with soft/slow start and stop.
 - .3 Lifting interval, with and without scale: 2499 mm (98.4 inches).
 - .4 Power supply: 33 VAC, 2.5 A; 115/230 VAC.
 - .5 Battery: 24 V NiMH, 2.0 Ah.
 - .6 Battery charging: In rail, continuous AC charge.
 - .7 Motor casing: Impact resistant UL 94 V-0 flame retardant recyclable plastic.
 - .8 IP (Protection Classification): IP20.
 - .9 Hand control:
 - .1 Wired.
 - .2 IP (Protection Classification): IP44.
 - .3 LED screen capable of displaying patient weight, usage and maintenance data.
 - .10 Hanger bar (standard):
 - .1 Includes four (4) suspension points.
 - .2 Suspension points must be hook style to accommodate loop slings, and have no clips or latches.
 - .3 Weight capacity must be equal to or greater than the lift motor
 - .11 Scale: Internal class I, weight displayed on hand control LED screen, no external scale is allowed.
 - .12 Safety:
 - .1 Low battery protection, prevents lift use when battery is low.
 - .2 Accessible emergency stop (pull cord).
 - .3 Tool-less emergency lowering: Electrical and mechanical; Emergency device shall be internal and allow lowering a user in the event of a power failure on the lift case or via hand control.
 - .4 Automatic emergency brake (in case of mechanical failure).
 - .5 Cut off angle: 45° along the rail; 10° across the rail.

- .6 Overload protection: Current limiter for circuit protection in case of overload.
 - .13 Noise level: Maximum 52 dB.
 - .2 Slings:
 - .1 Lifting devices shall include a standard sling bar and pair of universal slings.
 - .2 Sling types to be selected by the Owner before ordering.
 - .3 Rail system:
 - .1 Straight or linear rail design, extruded aluminum with clear anodized finish complete with all accessories and fixings.
 - .2 Track will be suitable for attachment flush with ceiling to the main support structure above and as required to carry full patient lift capacity.
 - .3 Rail system to allow for continuous AC charging of lift motor.
 - .4 Installed rail shall be security tested for 1.5 times greater than the motor's weight capacity and maximum allowable deflection of a horizontal rail shall be no more than 1 mm per 200 mm of track length, in accordance with ISO 10535.
 - .5 Rails must be capable of accommodating stationary locks for lift unit and/or traverse rail with user capability via hand control.
 - .4 Support framing for lift system: In accordance with Section 05 50 00.

3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Before installation commences, ensure that mounting devices, members and surfaces are satisfactory for fitting, and adequate for securing of work.
- .3 Take site measurements of construction to which work of this Section must conform, and through which access must be made, to ensure that adaptation is not required which would result in construction delay.

3.2 INSTALLATION

- .1 Install patient lift system in accordance with reviewed shop drawings, manufacturer's written instructions and to meet requirements of CAN/CSA C22.2.
- .2 Obtain from manufacturer or supplier, anchorage information, roughing-in dimensions, templates and service requirements for installation of work of this Section.

- .3 Install work true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .4 Work shall include rough hardware, fastenings and other items necessary for secure installation.
- .5 Install work straight, plumb, level, and secured to prevent distortion or displacement, or both. Shim as necessary with concealed shims.
- .6 Provision of electrical service and connections of equipment to the services is specified in Division 26.

3.3 **REPAIR**

- .1 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at site only if approved by Consultant.

3.4 **DEMONSTRATION AND TESTING**

- .1 Demonstrate operation of equipment to Owner and Consultant, prior to Substantial Performance. Demonstrations shall be made:
 - .1 When the Work is certified complete by the Consultant.
 - .2 When the Work is turned over to the Owner.
- .2 Knowledgeable representatives of the manufacturers and installers of the equipment being demonstrated shall be present at time of demonstrations.
- .3 Testing:
 - .1 Test lift system in accordance manufacturer's written instructions and demonstrate compliance with ISO 10535.
 - .2 All overhead patient lift systems must be load tested at each anchor point at 1.5 times the weight capacity of the system.

3.5 **CLEANING**

- .1 Clean and polish all surfaces that are exposed to view from any location on completion of installation.
- .2 Remove packaging materials and debris from installation from the site.

3.6 **PROTECTION**

- .1 Protect from damage during construction operations.

END OF SECTION