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# **Project Manual**

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### **Pines Extended Care Facility**

### **Dining Room & Servery Addition**

### **Burns Lake, B.C.**

### **Consultant Project No. 17-110**

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**1 General**

**1.1 GEOTECHNICAL REPORT**

- .1 A copy of a detailed geotechnical investigation report is included as Appendix I to the specification, titled as:

Preliminary Geotechnical Report, Proposed Cafeteria Addition  
Pines Seniors  
Centre, 800 Centre street, Burns Lake, B.C.

Prepared By: GeoNorth Engineering Ltd.  
Date: May 17, 2018  
File: K-4842

- .2 This report, provided by the Owner, records properties of the soils and recommendations for the design of foundations, prepared primarily for the use of the Consultant. The recommendations given shall not be construed as a requirement of this Contract unless also contained in the Contract Documents.
- .3 This report, by its nature, cannot reveal all conditions that exist or can occur on the site. Should subsurface conditions be found to vary substantially from the report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the contract Price accruing to the Owner.

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 GENERAL CONDITIONS**

- .1 The General Conditions based on the Contract and CCDC 2 govern the work performed pursuant to, and the interpretation of, this Section and all other Sections and Schedules of this specification.

**1.2 CODES AND STANDARDS**

- .1 Execute work in accordance with the British Columbia Building Code 2012 edition and its supplements, applicable Provincial, Local Acts, Regulations and all codes and standards specified within the text of this specification.
- .2 Conform to standards specified, all relevant and applicable codes, ordinances and by-laws as amended and revised on date of the Agreement including the Workplace Hazardous Materials Information System Regulations 296/97 and 234/2002.
- .3 In the event of conflict between any codes and standards, the most stringent provision shall apply.

**1.3 PERMITS**

- .1 Contractor to apply for and obtain building permit. The Owner will pay for the Building Permit. Contractor to schedule, process and administer all service connections. All other permit and fees required for the Work, including, but not necessarily limited to, permits and fees for water, sewer, sanitary, gas, exterior signs and connections made on site shall be applied and paid for by the Contractor in the normal manner requested by the City. The Contractor shall pay all fees and deposits required for inspection as required by the City, including Engineering inspection fees and damage deposits.
- .2 The Contractor shall apply for Excavation and Hoarding Permit as required by and in conformance with the City Engineering Department regulations.
- .3 The Contractor shall upon completion of footing and foundation forms deposit with the Consultant a survey certificate by a B.C. registered land surveyor verifying foundation locations.
- .4 The Work has been designed in accordance with the British Columbia Building Code 2012.
- .5 Conform to British Columbia Building Code and to other codes, ordinances, regulations and orders of all authorities having jurisdiction on the performance of the Work. Should conflicts arise between one document or authority and another, obtain clarification from the Consultant before proceeding with the Work.

**1.4 SAFETY**

- .1 Observe and enforce all construction safety measures required by the British Columbia Building Code, WorkSafeBC/Workers' Compensation Board of British Columbia and Municipal statutes and By-Laws.
- .2 In the event of conflict between any provisions of above safety authorities, the most stringent provision will apply.

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**1.5 EXAMINATION OF SITE**

- .1 Ascertain all existing conditions reasonably inferable from examination of the Place of Work and its surroundings and the Contract Documents with respect to surface and sub-surface conditions, access to the Place of Work, restrictions prevailing on adjacent streets, disposal of materials, municipal by-laws with respect to noise, street cleaning, pollution and other conditions having effect on the execution of the Work. Include in the Contract Price all costs associated with the above.
- .2 Claims for additional costs will not be entertained with respect to conditions that would reasonably have been ascertained by an inspection of the Place of Work prior to Tender Closing Date.
- .3 Report promptly to the Consultant any discrepancy, inaccuracy or deviation between the information contained in the Contract Documents and the actual conditions found to be in existence during the performance of the Work.

**1.6 ACCESS TO SITE**

- .1 Do not close or obstruct streets, sidewalks, lanes or other public rights of way without obtaining required permits from the authorities having jurisdiction.
- .2 Maintain adequate traffic control procedures during operations, including delivery and off-loading of materials, on or adjacent to streets, sidewalks, lanes, public rights of way and parking areas available to the public.
- .3 During progress of the Work maintain adequate means of egress from the Project in the event of fire or other emergency. Do not store materials in a manner that will impair means of egress.

**1.7 WORKING LIMITS**

- .1 Confine all operations within the area of new construction and to those areas as indicated on drawings located within the property limits of the Place of Work.

**1.8 SETTING OUT OF WORK**

- .1 Upon entering the Place of Work for the purpose of beginning work, locate all general reference points and protect such points from destruction. Lay out work, be responsible for all lines, elevations and measurements of building, utilities and other work executed under this Contract.
- .2 Verify figures shown on the drawings prior to laying out the work. Notify Consultant of any discrepancy in accuracy or deviation from the information contained in Contract Documents and actual Place of Work conditions.
- .3 The mechanical drawings indicate the general location and route to be followed for pipes and ducts. Install to conserve headroom and minimize the free use of space through which they pass. Keep all ducts, pipes, etc. in ceilings as tight as possible to beams or other limiting members. Where headroom or space limitations appear inadequate notify the Consultant prior to fabrication or installation.
- .4 Mark out locations for all materials and equipment. Check sizes and provide all inserts, cans, bolts, nuts, supports and bases. Arrange for cutting and patching with the appropriate trades.
- .5 Avoid interference between heating, plumbing, drainage, electrical and other equipment.
- .6 Make corrections required to avoid interference with the work of other trades.

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**1.9 CO-ORDINATION AND CO-OPERATION**

- .1 Co-ordination of the Work is to be included in the Contract Price.
- .2 Provide and maintain equipment, materials and labour force necessary for the proper execution of the Work in accordance with the agreed progress schedule.
- .3 Co-ordinate the use and cost of construction plant and equipment, including cranes, hoists, ladders, scaffolds, etc. with the work of the various trades.

**1.10 DEFINITION OF TRADES**

- .1 For convenience of reference the specifications are separated into Divisions and Sections.
- .2 The Contractor is the sole arbiter of apportioning the supply and installation of the Work between the various trades.

**1.11 WORKERS COMPENSATION**

- .1 Provide evidence of compliance with all requirements of (including the making of payments to) the Province of B.C. at the Place of Work with respect to Workers Compensation prior to commencement of work and prior to receiving payment for Substantial Performance of the Work and otherwise as required by the Contract Documents.

**1.12 PROTECTION OF WORK AND PROPERTY**

- .1 Protect adjacent private and public property from damage during the performance of Work.
- .2 Provide adequate protection for finished and partially finished building finishes and equipment during the performance of the Work.
- .3 Protect the Owner's existing premises and persons occupying or visiting them from construction operations. Make good any damage to the existing premises or property of the Owner.
- .4 Protect the Owner's building equipment from construction use, including but not limited to the following; ladders, platforms, refuse containers, trash cans, waste paper containers, recycling bins.

**1.13 QUALITY OF PRODUCTS**

- .1 Incorporate into the Work only new, undamaged materials and equipment of the best quality suitable for the purpose intended.
- .2 In the event of any dispute as to the quality or suitability of materials or equipment, the Consultant will make a decision based on the requirements of the Contract Documents.

**1.14 AVAILABILITY OF PRODUCTS**

- .1 Upon signing the Contract review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of materials or equipment are foreseeable, notify the Consultant in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 Document each request for substitution with complete data substantiating compliance with Contract Documents.
- .3 Request for substitution acknowledges that Contractor:



- .1 Has investigated proposed product and determined that it meets or exceeds in all respects the requirements of the specified product.
- .2 Will provide the same warranty for substitution as for specified product.
- .3 Will coordinate installation and make other changes necessary for work to be complete in all respects.
- .4 Waives claims for additional costs that may subsequently become apparent.
- .4 Substitutions will not be considered when acceptance will require substantial revisions or when submitted on shop drawings or product data submittals without prior written request.
- .5 Consultant will determine acceptability of proposed substitution and will notify Contractor of acceptance or rejection in writing.

**1.15 MANUFACTURER'S DIRECTION**

- .1 Install or erect all products in accordance with manufacturer's recommendations. Obtain written instructions from manufacturer or their appointed agent.
- .2 Notify Consultant in writing of any conflicts between specifications and manufacturer's instructions.

**1.16 WORKMANSHIP**

- .1 To be of the best quality executed by workers experienced and skilled in the respective duties for which they are employed.
- .2 The Consultant or his authorized representative has the right to reject any item that does not conform to an acceptable standard of quality, quietness of operation, finish, appearance or performance. The Contractor must rectify unacceptable material or workmanship to the approval of the Consultant.
- .3 Submit a comprehensive summary of the experience and qualifications of the Site Superintendent to the Consultant for review prior to the award of Contract.

**1.17 WORKER CONDUCT**

- .1 Enforce discipline and good order among workers. Employ fit, skilled workers for the duties assigned to them. The Consultant reserves the right to require the removal of workers deemed incompetent, careless or otherwise objectionable from the site.

**1.18 CUTTING AND PATCHING**

- .1 Cutting or patching of finished surfaces to be performed by the subtrade performing the original finish work.
- .2 Do not endanger any existing work or the structure by cutting. Do not alter the work of any other subtrade without the consent of the Consultant.
- .3 Make good existing surfaces and previously performed work after cutting and patching work.
- .4 Cut and drill with true smooth edges and to minimum suitable tolerances.
- .5 Where welding or cutting is carried out indoors, take necessary precautions to protect adjacent combustible construction.
- .6 Where welding or cutting is carried out indoors, post a continuous fire watch and maintain fire watch for a minimum of one hour after completion of welding or cutting.

- .7 Where welding and cutting is carried out in confined spaces provide mechanical ventilation to WCB requirements.

#### **1.19 CONCEALMENT OF SERVICES**

- .1 In finished areas conceal all pipes ducts and wiring in floors, walls and ceilings; except where indicated otherwise on drawings or in specifications.

#### **1.20 FASTENINGS**

- .1 Use non-corrosive hot dipped galvanized fasteners and anchors for securing exterior work unless stainless steel or other material is specifically requested in the pertaining specification Section.
- .2 Space anchors within their load limit or shear capacity and ensure they provide positive permanent anchorage. Do not use wood or organic material plugs.
- .3 Prevent electrolytic action between dissimilar metals and materials.

#### **1.21 PROTECTION OF WORK IN PROGRESS**

- .1 Adequately protect existing work completed and new work in progress. Repair or replace any damaged work inadequately protected.
- .2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member without written approval of the Consultant.
- .3 Make good any damage or disruption caused to other property, utilities etc. due to the construction work of this Project. Perform repair work to standards, codes of the authorities having jurisdiction after consultation with the appropriate parties and authorities.

#### **1.22 PUMPING AND DRAINAGE**

- .1 Do not permit surface or sub-surface water to accumulate in excavations or crawl space areas. If such conditions develop or are encountered, control and dispose of the water by means of temporary pumps, piping, drainage lines, ditches, dams or other suitable means.

#### **1.23 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities carry out work at times directed by local governing authorities with a minimum disturbance to work, pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services as required. Cap off existing services encountered in a manner approved by the local governing authority having jurisdiction. Stake or otherwise record the location of the capped service.

#### **1.24 METRIC MEASUREMENT AND CO-ORDINATION**

- .1 This Project has been designed using metric dimensions. Drawing dimensions are expressed in imperial dimensions. The specification is written with metric dimension notations.
- .2 Within the specifications the unit symbols for all metric units are included. Decimal numbers are included where products are 'soft converted'. Dimensioning for spacing of products is expressed in whole number millimeters in specifications.
- .3 In general all dimensioning of materials, products and equipment are 'soft converted'. Exceptions are certain products available in metric sizes that are 'hard converted'.

- 
- .4 Supply 'hard converted' products when specified and available.
  - .5 Co-ordinate metric and imperial products in dimensioning and installation.
  - .6 Ensure workers are familiar with metric system of measurement.

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 00 00: General Requirements.
- .2 Section 01 71 23: Field Engineering.

**1.2 GENERAL REQUIREMENTS**

- .1 The General Conditions of the Contract, Supplementary Conditions and Division 1 General Requirements shall be deemed to be part of all sections of the specifications and shall be read in conjunction therewith.
- .2 In addition to general responsibility for complete Work, and unless specified otherwise, the Contractor shall be responsible for general work items specified in Division 1 General Requirements.
- .3 The grammatical style of Division 1 General Requirements is intentionally abbreviated. When a paragraph commences with a verb, the words "The Contractor shall" are inferred. Where a colon (:) is used, the words "shall be" or "to be" are generally inferred. Omitted words or phrases shall be supplied by inference.

**1.3 GENERAL DESCRIPTION OF PROJECT**

- .1 The Work shall include all labour, materials and equipment necessary for the construction of Pines Extended Care Facility, Dining Room & Servery Addition, Burns Lake B.C., as more fully described in the Contract Documents.
- .2 Provide Alternative Price for supply and installation of all work associated with new service access to Loading Bay.

**1.4 WORK NOT INCLUDED**

- .1 The Owner will supply and install the following items:
  - .1 Building identification signage for completed building.
- .2 The Contractor shall cooperate with the Owner and/or suppliers in the delivery of the Owner supplied items. Required scheduling for Owner supplied items shall be included in the Construction Schedule to be prepared by the Contractor.

**1.5 DIVISION OF SPECIFICATIONS**

- .1 For convenience, the specifications have been divided into approximate trade sections. These sections do not, however, limit the responsibility of any Trade Subcontractor or supplier. The Contractor shall define and coordinate the extent of the work of each Subcontractor and shall arbitrate any dispute between Subcontractors regarding limits of responsibility.

**1.6 COORDINATION AND RESPONSIBILITY**

- .1 Coordinate the work of all trades with efficient and continuous supervision and be fully aware of the requirements of every section of the specifications.
- .2 The responsibility as to which subtrade provides required work to be built-in or supplied rests entirely with the Contractor. Differences in interpretation of the specifications or

drawings as to which trade shall provide certain work shall not be the grounds for claims for extras.

- .3 Coordinate the use of construction plant and equipment and access, including cranes, hoists, ladders, scaffolds, etc. with the work of the various trades. The cost of such use by the various trades is subject to whatever arrangement exists between the Contractor and the trades.
- .4 Coordinate the work of each trade to ensure that such work is consistent with the requirements for the work of all trades. Before commencing any work, each trade must report to the Contractor any inconsistency between the work of another trade and the requirements for their work. Any cost incurred by the Contractor or trades to rectify such inconsistencies is included in the Contract Price.
- .5 Coordinate the work of the various trades and personnel to minimize the spread of dust and dirt and to eliminate the possibility of damage to the work of other trades. All work damaged is to be made good by the trade responsible.

#### **1.7 OTHER CONTRACTORS**

- .1 Build in materials furnished and set by other Contractors, including the Owner's Contractors or suppliers, which enter into the Work. No work containing built-in parts furnished by other Contractors shall be done without giving such Contractors a reasonable length of time to set their work, or until permission to proceed has been obtained from the Consultant.
- .2 Upon request from the Contractor, the Consultant will provide to the Contractor the shop detail drawings from other Contractors for any of their work that is to be built into his work, or to which he must make connection.
- .3 Be responsible for informing the consultant of any delays, real or anticipated, as occasioned by the incorporation of work of other Contractors into the Work.

#### **1.8 SCOPE CLAUSES**

- .1 Scope clauses are included in the various trade sections for ease of reference. They shall not be interpreted as limiting the work included in those sections.

#### **2 Products (not applicable)**

#### **3 Execution (not applicable)**

**END OF SECTION**

**1 General**

- .1 Provide Alternative Prices for the work listed.
- .2 Show such Alternative Prices as either a 'Deduction' or an 'Addition' to the Bid Price.
- .3 Do not include Goods & Services Taxes in the Alternative Prices.
- .4 The Base Bid Price will be based upon the Work shown on the drawings and defined in the specifications for this project. These Alternative Prices will not be presumed to alter the Bid Price. Any adjustments to the Bid Price on the basis of these Alternative Prices will be entirely at the option of the Owner.

**1.1 SCHEDULE OF ALTERNATE PRICES**

- .1 Provide an Alternative Price for the supply and installation of all work associated with service road leading to loading bay. Refer to drawings.

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Scheduled preconstruction and progress meetings.

**1.2 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the Work at the call of the Consultant or as required.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Consultants, Owner and affected parties.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the minutes. Include significant proceedings and decisions. Identify action by the parties.
- .7 Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants, affected parties not in attendance, the Consultants and the Owner.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings shall be qualified and authorized to act on behalf of the party each represents.

**1.3 PRECONSTRUCTION MEETING**

- .1 Within 10 days after award of contract (by Notice of Award), request a meeting of parties in contract to discuss and resolve administrative procedures, responsibilities and scheduling.
- .2 Senior representatives of the Owner, Consultant and Engineering Consultants, Contractor's project manager and Contractor's superintendent, to be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include the following:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work, progress scheduling (Section 01 32 16).
  - .3 Schedule of submission of shop drawings, product data, samples, colour chips, (Section 01 33 00).
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
  - .5 Delivery schedule of specified equipment.
  - .6 Site security.
  - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

- .8 Owner provided Products, delivery schedule, or Owner supplied and installed equipment.
- .9 Record drawings.
- .10 Maintenance manuals.
- .11 Take-over procedures, acceptance, warranties.
- .12 Monthly progress claims, administrative procedures, photographs, holdbacks.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.
- .15 Review of Certified Professional related items.

#### **1.4 PROGRESS MEETINGS**

- .1 During course of Work and prior to project completion, schedule progress meetings as required or as requested by the Consultant.
- .2 Contractor's project manager, Contractor's superintendent, major Subcontractors and suppliers involved in Work, Consultant and Engineering consultants, and Owner's representative are to be in attendance.
- .3 Notify parties minimum four days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Pending changes and substitutions.
  - .12 Review proposed changes for affect on construction schedule and on completion date.
  - .13 Action required by.
  - .14 Pending action.
  - .15 Overdue action.
  - .16 Other business.

#### **2 Products (not applicable)**

#### **3 Execution (not applicable)**

#### **END OF SECTION**



**1 General**

**1.1 SUBMISSION**

- .1 After award of the Contract and BEFORE commencement of the Work on the site, a the Contractor shall prepare a detailed construction schedule.
- .2 The Work shall be carried out in accordance with the final approved construction schedule.
- .3 In order to improve the construction schedule, modifications to the schedule may be suggested by the Owner, Consultant or the Contractor during construction and such modifications may be implemented by mutual agreement.
- .4 Unless specified otherwise the Work shall be carried out during the normal working hours of the Contractor.
- .5 Distribute copies of the reviewed schedule to:
  - .1 Job site office.
  - .2 Subcontractors.
  - .3 Other concerned parties.
- .6 Instruct recipients to report to the Contractor within five (5) days, any problems anticipated by the timetable shown in the schedule.

**1.2 SCHEDULES REQUIRED**

- .1 The following categories of schedules shall be submitted:
  - .1 Construction Progress Schedule.
  - .2 Submittal Schedule for Shop Drawings.
  - .3 Submittal Schedule for Product Data, Samples and Mock-ups.
  - .4 Submittal schedule for Owner supplied products.

**1.3 CONTENTS OF SCHEDULES**

- .1 Prepare schedule in the form of a bar chart or a computer generated program similar to Microsoft Office or equivalent.
- .2 Include complete sequence of construction activities by stages.
- .3 Construction Progress Schedule
  - .1 The Construction Progress Schedule shall be in the form of a horizontal bar chart. A separate bar for each major activity of each principal trade, operation or logical work area of the Project. The chart will show a minimum of 20 events/activities and use terminology consistent with the Contractor's reporting system.
  - .2 Include in the events/activities list (described above) the following:
    - .1 Mobilization.
    - .2 Site clearing.
    - .3 Erosion control measures.
    - .4 Site utilities.

- 
- .5 Foundation work.
  - .6 Structural framing.
  - .7 Completion of roof and deck membranes.
  - .8 Specialty Subcontractor work.
  - .9 Equipment installations.
  - .10 Sub-Contractors' Work.
  - .11 Finishing.
  - .12 Testing and Balancing of systems.
  - .13 Commissioning.
  - .3 The Construction Progress Schedule so prepared by the Contractor shall be submitted by the Consultant to the Owner for their review and agreement. The Contractor is to include the cost of any modification to achieve that agreement. The Owner may, at no cost to the Contractor, reproduce the Schedule in a Critical Path Plan. The Contractor shall co-operate in a review of the reproduced Schedule to the extent of indicating its agreement by means of a "sign-off" of the document.
  - .4 The Schedule for Shop Drawings, Product Data and Samples shall contain a list of all Shop Drawings, Product Data and Samples required by the Consultant related to Sections of the Specification and the following deadline dates:
    - .1 Completion.
    - .2 Submission to Consultant for review.
    - .3 Return from Consultant.
    - .4 Allowance for re-work and re-submission.
  - .5 The Submittal Schedule for Owner-Furnished Products built-in shall contain deadline dates for acceptance in order to maintain the Construction Progress Schedule. This Schedule will be based on information provided by the Owner.
  - .6 The Product Delivery Schedule shall list delivery dates of materials and equipment that are critical in order to maintain the Construction Progress Schedule and shall contain information specifically requested by the Consultant.

#### **1.4 UPDATING**

- .1 Updating is the process of recording actual dates on the Progress Schedule.
- .2 Show projected percentage of completion for each item as of the first day of each month.
- .3 Deliver to Consultant:
  - .1 When requested by the Consultant copies of any Schedules or revisions thereto.
- .4 Indicate progress of each activity to date of submission based on existing approved Schedule.
- .5 Show changes occurring since previous submission of Schedules, i.e., on updated Schedule to indicate:
  - .1 Major changes in scope.
  - .2 Activities modified since previous submission.
  - .3 Revised projections of progress and completion.
  - .4 Other identifiable changes.
- .6 Establish methods and procedures of work and control necessary to provide the effective application of planning to progress of the Work.
- .7 Maintain the following minimum requirements in the preparation of the Schedule:
  - .1 Divide the work processes of the Project into definitive identifiable activities.

- .2 Use calendar days as the unit of time measurement for purposes of computation.
- .8 Deliver to Consultant with the application for payment of each month, a project status report derived from evaluation of the schedule.
- .9 Maintain complete and accurate records of the daily progress of the Work.
- .10 Make records available to the Consultant at all reasonable times.
- .11 Ensure these records show dates of commencement and completion of the different parts of the Work and particulars of daily weather conditions.
- .12 Submit a summary of these records to the Consultant monthly.
- .13 Provide a narrative report as needed to define:
  - .1 Problem areas, anticipated delays and the impact on the Schedule.
  - .2 Corrective action recommended and its effect.
  - .3 The effect of changes on Schedules of other contractors.

#### **1.5 DISTRIBUTION**

- .1 The Contractor is to distribute copies of the agreed Schedule and the progress report to the following:
  - .1 Owner.
  - .2 Consultant and Sub-Consultants.
  - .3 Job Site file.
  - .4 Sub-Contractors as appropriate.
  - .5 Other concerned parties.

#### **1.6 SITE INFORMATION**

- .1 In the preparation of all schedules requested in this Section the following information shall be taken into consideration.
  - .1 Site access.
  - .2 Loading areas.
  - .3 Scaffolding.
  - .4 Hoarding.

#### **2 Products (not applicable)**

#### **3 Execution (not applicable)**

**END OF SECTION**

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**1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 32 16: Construction Schedule.
- .2 Section 01 45 00: Quality Control.
- .3 Section 01 60 00: Material and Equipment.
- .4 Section 01 77 00: Contract Closeout.

**1.2 ADMINISTRATIVE**

- .1 Submit to Consultant submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by the submittals shall not proceed until review is complete.
- .3 Review submittals prior to submission to the Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the Work and the Contract Documents. Submittals not stamped, signed, dated and identified as applying to this Project will be returned without being examined and shall be considered rejected.
- .4 Verify field measurements and affected adjacent work are coordinated.
- .5 Contractor's responsibility for errors and omissions in submissions is not relieved by Consultant's review of submittals.
- .6 Contractor's responsibility for deviations in submissions from requirements of Contract Documents is not relieved by Consultant's review.
- .7 Keep one reviewed copy of each shop drawing submission on site.

**1.3 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Refer also amendments thereto under Supplementary General Conditions, if any.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.
- .3 Indicate materials, attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the section under which the adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Adjustments made on shop drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the value of the Work, state such in writing to the

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Consultant prior to proceeding with the Work.

- .5 Submit shop drawings in accordance with Shop Drawings Schedule.
- .6 Be responsible for submitting and for instructing Subcontractors and suppliers to submit, through his office to the Consultant all required shop drawings.
  - .1 Submit shop drawings in pdf electronic format where possible.
  - .2 Where shop drawings are submitted in paper format, submit unreduced drawings in 279 x 432 mm (11" x 17") maximum size, where possible, to allow ease of copy.
    - .1 Submit one (1) copy of all shop and setting drawings or diagrams on print paper, together with four (4) black line prints taken therefrom.
  - .3 Any comments, adjustments or revisions to be drawn to the Contractor's or supplier's attention shall be made on the pdf file or tracing print by the Consultant and returned to the Contractor for printing and distribution. Resubmission of shop drawing pdf files or sepia tracing prints may be required by the Consultant at his discretion. Shop drawings which require extensive correction will be sent back for revisions and resubmission.
- .7 Submit required number of copies of product data sheets or brochures for requirements requested in specification sections and as the Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
- .8 Check all shop drawings for conformity with the drawings and specifications and his contractual requirements before submission to the Consultant. Be responsible for dimensions to be verified and correlated at the job site; for information that pertains solely to the fabrication processes or to the techniques of construction and for coordination of the work of all trades. When submitting shop drawings, notify the Consultant in writing of changes made therein from the Contract Documents.
- .9 If upon review by the Consultant, no errors or omissions are discovered or if only minor corrections are made, the tracing will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through the same procedure indicated above, shall be performed before fabrication and installation of work may proceed.
- .10 Conform to review comments and stamped instructions of each shop drawing reviewed.
- .11 Only drawings noted for revision and resubmission need be resubmitted. Include revisions required by previous reviews before resubmission of shop drawings.
- .12 No new details or information shall be added to shop drawings after they have been fully reviewed.
- .13 No work dependent on shop drawing information shall proceed until review is given and verification received from the Consultant. Be responsible for work performed prior to receipt of reviewed shop drawings. No review comments shall be construed as authorization for Changes in the Work.
- .14 Each Subcontractor or supplier shall fabricate work exactly as shown on shop drawings and if shop practice dictates revision, shall revise shop drawings and resubmit.

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- .15 File one copy of each finally revised and corrected shop drawing on site.
  - .16 Consider this article the minimum requirement. Further instruction contained in any particular specification section governs for that section of the Work.

#### **1.4 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification sections. Label samples as to origin and intended use in the Work.
- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Consultant in writing, at the time of submission of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples 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.

#### **1.5 OPERATING MAINTENANCE MANUALS**

- .1 At Substantial Performance of the Work, submit to the Consultant three (3) copies of operating and maintenance manuals including those required by Mechanical and Electrical Divisions. Submit mechanical maintenance manual information to the Commissioning Authority, who will assemble the information into a Mechanical maintenance manual.

#### **1.6 PRODUCT MAINTENANCE MANUALS**

- .1 Where required by a particular specification section prepare three (3) copies of a plastic finished, hard covered, ring bound maintenance manual of the several and varied floor and wall finishes and fixtures, as called for in the specifications for the Owner's use.
- .2 The manual shall:
  - .1 Have a title sheet, or sheets preceding data on which shall be recorded Project name, date, list of contents, and Contractors and Subcontractors names and addresses.
  - .2 Be organized into applicable sections of work with each section separated by hard paper divider with plastic covered tabs marked by section.
  - .3 Contain only typed or printed information and notes, and neatly drafted drawings.
  - .4 Contain maintenance instructions for the various finishes as specified in various sections.
  - .5 Contain brochures and parts lists on all equipment.
  - .6 Contain a list of manufacturers and trade names of all finishes and coatings applied.
  - .7 Contain sources of supply for proprietary products used in the Work.
- .3 The Contractor shall consider this article the minimum requirement. Further instructions

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contained in any particular specification section govern for that section of the Work.

## **1.7 AS-BUILT DRAWINGS**

- .1 Keep one set of white prints of all Contract drawings and all addenda, revisions, clarifications, Change Orders and reviewed shop drawings, in site office; identify them as "Project As-Built Copy" and have them available at all times for inspection by the Consultant.
- .2 As the Work proceeds, record, clearly and indelibly in red pencil, as-built conditions wherever they deviate from the original directions of the Contract Documents.
- .3 Present the as-built prints for scrutiny at each project meeting and as may be required by the Consultant.
- .4 The deviations that are to be recorded shall include, in general but not necessarily limited to, things that are hidden from view and things of major importance to future operations and maintenance and to future alterations and/or additions. Detailed requirements in this connection are set out in various sections of the specifications.
- .5 Mechanical, plumbing and electrical as-built drawings shall be provided in accordance with relevant clauses within Mechanical and Electrical Divisions.
- .6 In addition to the above requirements, the following AutoCad Submittal shall be provided by the Contractor.
  - .1 Within four (4) weeks of date of Substantial Performance, the Contractor shall arrange with the Consultant for one (1) set of CD Rom of the CAD drawings for the Project. The drawings for this project have been produced by the Consultant using AutoCad.
  - .2 The Consultant shall arrange and pay for the transfer of all revisions shown on the as-built drawings to the AutoCad drawing files. Transfer to information and revisions to the CD Rom shall be carried out by skilled operators fully conversant with the operation and use of AutoCad. These diskettes will then become the Project Record Documents with the current date to each sheet of drawings.
  - .3 When the transfer of all changes and revisions to the CD Rom are complete, the Consultant shall return the set of marked-up-as-built drawings, the complete set of updated CD Rom of the Project Record Drawings and three (3) complete sets of high quality paper plots of each sheet of drawings off the updated CD. The plots shall be high quality laser or electrostatic plots produced onto a high quality plotter paper.

## **1.8 RESERVE REPLACEMENT MATERIALS**

- .1 All reserve replacement (maintenance) materials as required under the various sections of the specifications shall be delivered to the Owner's representative on the site at completion of the Work. Have quantities checked and receive receipt to substantiate deliveries.

## **1.9 PROJECT DOCUMENTATION SUBMITTALS**

- .1 Be responsible for arranging, obtaining, collecting, compiling all clearances, certificates,

permits, guarantees, maintenance manuals, as-built drawings, etc., as required within the various divisions of the specifications or bylaws. Without limiting the generality of the foregoing requirement, or the General Conditions, the following is a consolidated checklist for convenience only. Forward to the Consultant as noted below.

- .2 Provide within seven (7) days of date of Notice of Acceptance of contract and prior to commencement of construction:
  - .1 Performance Bond and Labour and Material Payment Bond each in the amount of fifty percent of the Contract amount.
  - .2 Certified copy of Contractor's complete insurance policies called for in GC 11.1, as amended by Supplementary General Conditions.
  - .3 Construction Schedule (in triplicate).
  - .4 Confirmation of site and managerial personnel to be employed on the Project.
  - .5 Contract Price detailed breakdown (Schedule of Values). Note: The Contract Price breakdown shall be in such form and be itemized as required by the Consultant. The breakdown shall indicate initially all trade breakdown format to the Owner and the Consultant for approval prior to submission of actual Contract Price breakdown.
  - .6 Projected cash flow requirement for the various certificate of payment stages.
  - .7 Building Permit (paid by Owner and issued in the Contractor's name).
  - .8 Signed construction Contract.
- .3 Provide the following:
  - .1 Workers' Compensation Board letter stating that the Contractor and all Subcontractors are in good standing.
  - .2 Copies of all permits and receipts for fees paid.
  - .3 Sample of proposed progress claim form, statutory declaration forms and list of corporate signing officers.
  - .4 List of all plumbing fixtures, equipment and fittings proposed to be installed for approval prior to ordering.
  - .5 List of all mechanical equipment proposed to be installed for approval prior to ordering.
  - .6 List of all electrical fixtures and equipment proposed to be installed for approval prior to ordering.
  - .7 Submit a list of all respective manufacturers and products applicable for all the Sections of Work
  - .8 Samples submittal schedule.
  - .9 Shop drawings submittal schedule.



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- .4 Provide during progress of construction:
    - .1 Copies of test reports, other than those prepared by Owner appointed independent testing agencies.
    - .2 Copies of inspection reports issued by authorities within three (3) days of receipt by the Contractor.
    - .3 Copies of all permits, licenses, certificates and receipts for fees paid.
    - .4 Shop drawings and samples.
    - .5 All applicable permits (i.e. gas, oil, refrigeration, pressure vessels, piping, etc.).
    - .6 Daily record.
    - .7 Revised construction progress schedule (at end of each month).
  - .5 Provide the following prior to Substantial Performance and as a condition thereof:
    - .1 Reconciliation of all Change Orders.
    - .2 Manufacturers' guarantees and warranties, manufacturers' or associations' maintenance recommendations, maintenance manuals and operating instructions, where specified.
    - .3 Workers' Compensation Board letter stating that Contractor and all Subcontractors are in good standing.
    - .4 All reserve, maintenance and replacement materials as required under the various sections of the specifications delivered to the Project and handed over to the Owner.
    - .5 Mechanical testing, balancing and checking of equipment and systems as specified under Mechanical Divisions.
    - .6 Plumbing testing and checking of equipment and systems as specified under Mechanical (Plumbing Section).
    - .7 Certificate from local authority approving the plumbing installation.
    - .8 Certificate from local and/or provincial authority approving the gas/oil installations, venting, etc. installation.
    - .9 Certificates for chemical cleaning and treatment of piping systems, corrosion protection of buried gas piping, if applicable.
    - .10 Certificate from the authority approving electrical installation.
    - .11 Certificate from provincial authority approving the installation of boilers and pressure vessels, if applicable.
    - .12 Occupancy permit from the local authority.
  - .6 Provide the following within thirty (30) days of Substantial Performance:

- .1 As-built drawings.
- .7 Provide the following before release of holdback monies or at Total Performance whichever occurs first and as a condition thereof:
  - .1 Workers Compensation Board letter stating that Contractor and all Subcontractors are in good standing, and have been assessed for and have paid all assessments for the work up to and including the date of Substantial Performance.
  - .2 Release of liens arising out of this Contract.
  - .3 Certification, acceptable to the Owner, stating that all taxes, EI payments, Canada Pension Plan contributions, duties, royalties and all other monies required to be paid by law or statute have been paid in full.
  - .4 Refer to GC 5.5 Payment of Holdback
- .8 For any and all billings, forward to the Consultant:
  - .1 Application for payment.
  - .2 Associated documentation as required and as specified.
  - .3 Coordinate progress billing with cost breakdown.
  - .4 Include gross and net value of Work completed during billing period.
  - .5 Include running total of gross and net value of Work completed by the end of the billing period.

**1.10 SUPPLY OF CRITICAL MATERIALS**

- .1 Submit to the Consultant as may be required or requested, proof of ordering materials and equipment, including those of his Subcontractors.

**1.11 EXTENDED WARRANTIES**

- .1 In addition to warranty requirements to which all work of this Contract is to be guaranteed for one (1) year after the date of issue of the Certificate of Substantial Performance by the Consultant, the Contractor shall note that extended warranty periods are required by the Contract Documents for the Work as specified.
- .2 The Contractor shall, in case of work performed by his Subcontractors and when warranties are required, secure such warranties from the Subcontractors and furnish them to the Owner on or before Substantial Performance of the Project.
- .3 All warranties shall be bound into the operations and maintenance manuals.
- .4 Extended warranties shall commence on termination of the standard one (1) year warranty granted in this Contract and shall be an extension of these same provisions.

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**2**                    **Products (not applicable)**

**3**                    **Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 RELATED WORK AND SECTIONS**

- .1 Section 01 10 00: General Requirements.
- .2 Section 02 41 00: Selective Demolition.
- .3 Section 07 84 00: Firestopping.
- .4 All other Work: as applicable.

**1.2 RESPONSIBILITY**

- .1 Assign alteration work to each trade as applicable. Make good to finish materials after the alteration work of other trades.
- .2 Other Specification Sections relate to this Section without specific mention or description of materials used to patch, match, extend or replace existing work.
- .3 Protect existing building finishes from new construction work.

**1.3 GENERAL**

- .1 Execute Work with least possible interference or disturbance to occupants and normal function of premises. Protect the occupants from injury. Make arrangements with the Owner and Consultant to facilitate the execution of Work as outlined.
- .2 Maintain existing services in other areas of building.
- .3 Materials to be removed and not re-used become the property of the Contractor unless otherwise stated. Remove from the site and disposed of in a legal manner.
- .4 For alterations to Mechanical and Electrical Work refer to Mechanical and Electrical Specifications and Drawings. Where utilities are removed, relocated or abandoned cap, valve, plug or by-pass to make a complete and working installation. Relocate services in existing walls to be removed. Verify location of and limitations imposed by existing services and protect them from damage.
- .5 'Making good' is defined as preparing new surfaces which are identical to adjacent surfaces with similar back-up materials and finished off in such a manner that there is no visible trace at a distance of 900 mm between existing work and the work of new patching or making good; to the extent of completely re-finishing entire surface areas to junctions of walls, partitions and ceilings.
- .6 Make good repainting is described in Section 09 91 00.
- .7 All alteration required to be performed, to be done whether or not shown on the drawings or specified. Example, where a wall is indicated as being removed, make good at floor, ceiling and junction with other walls.
- .8 Where existing items are removed make good to existing surfaces if they are to be exposed.
- .9 Provide, erect, maintain, clear away all temporary strutting, backings, shorings, support and all other temporary work required to properly support and maintain existing construction without disturbance or damage during the work. Include all necessary signs,

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barricades and screens as required for the safety of the structure, workmen and occupants.

- .10 Inform the Consultant before proceeding where exposed non-visible conditions are revealed to be other than indicated in the Contract Documents.
- .11 Should asbestos containing material conditions be observed in the performance of the Work of this Contract, stop work in that area and immediately notify the Owner and the Consultant.
- .12 Consult with the Structural Engineer in performing work of a structural nature. Report conditions to the Structural Engineer that are different to those anticipated or detailed. Do not cut or damage existing beams or columns. Do not remove concrete or masonry in excess of what is required.
- .13 Fill or seal redundant holes (including firestopping) for all trades where existing services are withdrawn.
- .14 Where existing materials are to be re-used, use special care in removal, handling, storage and re-installation to ensure proper function in the completed Work.
- .15 Making good existing flooring substrates is defined as smoothing for conditions of 9 mm or less and is considered as part of the Base Bid regardless of extent. Where existing floor substrates have to be leveled between 10 and 20 mm thickness the Contractor may claim an extra based on approved unit m2 rates.

#### **1.4 FIRE EXITS**

- .1 Do not close off fire exits unless specific written approval is received from the authorities having jurisdiction.
- .2 Fire exits must remain clear and usable to authorities satisfaction at all times. Provide temporary protected walkways where required.

#### **1.5 PREPARATORY WORK**

- .1 The Owner will remove loose furniture from the work areas; remove other required items as part of the Contract.
- .2 Provide ample notification of relocation of utility requirements.
- .3 Provide all necessary dust screens to prevent transmission of dust and dirt to areas where alteration work is not being performed. Provide suitable means of protecting air grilles, louvers etc. to prevent transmission of dirt and dust through the mechanical system.

#### **1.6 DISTURBANCE**

- .1 Conform to the Noise By-Law.
- .2 Ensure minimum disturbance to occupants. Coordinate time for noisy work with the Owner.
- .3 Ensure power interruptions are not caused to the hospital. Provide temporary power where required, to maintain power to the hospital. Provide a minimum of 5 working days notice for minor localized power interruptions for tie-ins and ensure the interruptions are approved by the Owner.

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**2**                    **Products (not applicable)**

**3**                    **Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 REFERENCE STANDARDS**

- .1 Trade contractors and Subcontractors are to comply with the following regulations:
  - .1 WorkSafeBC/WCB Industrial Health and Occupational and Safety Regulations.
  - .2 WorkSafeBC Occupational First Aid Regulations.
  - .3 WorkSafeBC Occupational Environmental Regulations.
  - .4 WorkSafeBC Safe Work Practices for Handling Asbestos.
  - .5 WHMIS Regulations.
  - .6 Transportation of Dangerous Goods Act.
  - .7 Waste Management Act.
  - .8 Any other applicable Act or regulation dealing with the safety and health of workers and the general public.

**1.2 GENERAL**

- .1 Comply with the following practices and procedures.

**1.3 ON SITE SAFETY REPRESENTATION AND SAFETY PROGRAM**

- .1 Employ and pay for a full time Construction Site Health and Safety Officer for the Work in accordance with British Columbia Building Code and WorkSafeBC regulations.
- .2 Provide a Construction Safety Plan and implement a Construction Safety Program in accordance with By-Law requirements.
- .3 Ensure that each Subcontractor retains a Trades Safety Coordinator.
- .4 Be responsible for all safety measures in connection with construction means, methods, techniques, sequences and procedures and comply with all applicable laws and regulations of the City of Burns Lake and the Federal and Provincial authorities concerning construction and public safety.
- .5 Comply with the Workers Compensation Board Industrial Health and Safety Regulations and provide all necessary safety requirements as prescribed by the regulations for the Work.
- .6 Ensure all employees and Subcontractor's employees comply with all Local, Federal, Provincial and Worker's Compensation Boards safe work procedures and regulations.
- .7 Hold weekly safety meetings on site and record minutes of the meetings.
- .8 Take precautions to prevent the overloading of any part of the existing and new structures, false work, form work or scaffolding during the progress of the Work. Make good any damage and any claims from such overloading.
- .9 Do not cut, drill or sleeve any existing or new load bearing members without the written approval of the Consultant.

- .10 Post suitable signs at all entry points to the work site identifying the construction site, hard hat area, safety shoe requirements or any other particular safety requirements. Signs are to be easily read with lettering minimum 75 mm high.

#### **1.4 HOUSEKEEPING**

- .1 Refer to Section 01 77 00 – Closeout Procedures.
- .2 Institute and document written procedures for:
  - .1 Storage, dispensing and use of combustible materials.
  - .2 Storage of hazardous chemicals.
  - .3 Wire management (ie, extension cords).
  - .4 Sanitation of first aid facilities.
  - .5 In-house signage to find office, first aid station, fire fighting equipment, etc.

#### **1.5 PERSONAL PROTECTIVE EQUIPMENT**

- .1 Refer to Industrial Health & Safety Regulations, Personal Protective Equipment.
- .2 Develop, implement and post the following:
  - .1 Respiratory protection program dealing with:
    - .1 Selection criteria of respirators.
    - .2 Worker training in use, maintenance and storage of respirators.
  - .2 Hearing protection program dealing with:
    - .1 Selection and use of hearing protectors.
    - .2 Identification and tagging of sources of noise above 85 decibels (eg, compressors, jack hammers, etc.)
  - .3 Eye protection program dealing with:
    - .1 Selection and use of eye protectors.
    - .2 Screening areas around arc welding, etc.
  - .4 Programs requiring use of other protective equipment and clothing such as gloves, coveralls, fall arresting devices, etc.

#### **1.6 HAZARDOUS WASTE MANAGEMENT**

- .1 Be responsible for the development and implementation of a hazardous waste management program dealing with:
  - .1 Control of spills of hazardous materials.
  - .2 Storage and identification of hazardous wastes.
  - .3 Disposal procedures.



.4 Workers training on emergency procedures.

.3 Provide containers to store hazardous wastes generated from the job.

## **1.7 FIRE PREVENTION AND FIRE FIGHTING**

.1 Develop and implement a fire prevention program that is to include:

.1 Fire fighting practices.

.2 Provision of fire extinguishers.

.3 Workers' training on use of fire extinguishers, etc.

.4 Means of alerting other workers of the emergencies.

.2 Refer to Section 01 50 00: Temporary Facilities and Section 01 57 00: Temporary Controls.

## **1.8 REPORTING OF SERIOUS ACCIDENTS**

.1 Investigate accidents of employees in accordance with the Industrial Health and Safety Regulations.

.2 Report serious accidents immediately to the Construction Safety Officer and provide a full report as per WorkSafeBC regulations.

.3 Forward a copy of the trade contractors' investigation of serious accidents to the Construction Project Coordinator.

## **1.9 REPORTING OF HAZARDOUS WORK CONDITIONS AND ACTS**

.1 Implement a program establishing:

.1 Means for workers to report hazardous conditions or unsafe acts observed at the job site.

.2 Responsibility of the job supervisor for implementing immediate remedial actions.

.3 Steps for workers to follow who refuse to work under conditions of perceived imminent danger.

.2 The Construction Safety Officer can, at any time, stop any work activity or process, the use of any tool or equipment, etc., that he considers to be a danger to the workers safety, or health, or a danger to equipment or facilities.

.3 The Contractor is deemed responsible for any cost arising from such a work stoppage.

## **1.10 ELECTRICAL LOCKOUT PROCEDURES**

.1 Implement electrical lock out procedures consistent with the Canadian Electrical Code.

.2 Lock out power equipment, when unattended, that can be accessed by strangers.

## **1.11 WHMIS**

.1 Maintain a complete set of Material Safety Data Sheets at the job site for all substances brought to the site.

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- .2 When the use of a highly volatile compound is intended, give advance notice to the Construction Safety Officer, and to other workers present in the area.
  - .3 Where the effects of a chemical compound may persist for a period of time beyond the completion of the job, give a copy of the MSDS for that compound to the Owner's building engineer for future reference.
  - .4 Material Safety Data Sheets (MSDS):
    - .1 Consumer Commodity Products: Where a product is not regulated under WHMIS, but may produce harmful effects on a worker, treat such a product as a WHMIS product and provide written information on the harmful health effects, safe handling procedures, first aid and emergency procedures and worker training on the safe use of the product.
    - .2 Product Substitution: Where the use of a product has been identified on the tender documents and the trade contractor decides to substitute that product for another product, the trade contractor shall request permission from the Construction Manager Project Coordinator. Provide reasons for the substitution and a MSDS for the new product. The Construction Manager Project Coordinator reserves the right to grant such permission.

#### **1.12 OTHER PRACTICES AND PROCEDURES**

- .1 The Owner reserves the right to demand the implementation of safe work procedures or practices that will ensure at all times the safe completion of the Work.

#### **1.13 NOISE CONTROL**

- .1 Use the noise abatement measures below to minimize noise levels:
  - .1 Use effective intake and exhaust mufflers on internal combustion engines and compressors.
  - .2 Line or cover hoppers, storage bins and chutes with sound deadening material.
  - .3 Route construction equipment and vehicles so as to cause the minimum disturbance to the public.
  - .4 Locate stationary equipment to minimize noise impact on the public.
- .2 Conform to the local Noise By-Law regarding noise abatement and take all necessary steps to ensure the generation and transmission of noise and vibration due to the work is kept to a minimum.

#### **2 Products (not applicable)**

#### **3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.
- .6 Commissioning.

**1.2 RELATED SECTIONS**

- .1 Section 01 33 00: Submittals: Submission of samples to confirm product quality.
- .2 Section 01 60 00: Material and Equipment: Material and workmanship quality, reference standards.

**1.3 INSPECTION**

- .1 Refer to General Conditions.
- .2 The Owner and the Consultant shall have access to the Work. If part of the Work is in preparation at locations other than the Place of the Work, access shall be given to such work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or the law of the Place of the Work.
- .4 If the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before they are made, uncover the Work, have the inspections or tests satisfactorily completed and make good the Work.
- .5 The Consultant may order any part of the Work to be examined if the Work is suspected to be not in accordance with the Contract Documents. If, upon examination such work is found not in accordance with the Contract Documents, correct such work and pay the cost of examination and correction. If such Work is found in accordance with the Contract Documents, the Owner shall pay the cost of examination and any replacement required.

**1.4 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent inspection/testing agencies will be appointed by the Consultant for the purpose of inspecting and/or testing portions of Work.
  - .1 Compaction testing.
  - .2 Concrete and mortar testing.
- .2 Testing and inspection shall be done on, but shall not necessarily be limited to, the following work:
  - .1 Backfill compaction testing
  - .2 Concrete and mortar testing
  - .3 Reinforcing Steel inspection

- .4 Millwork inspection
  - .5 Waterproofing membrane inspection
  - .6 Roofing and sheet metal inspection
  - .7 Window testing
  - .8 Painting inspection
  - .9 Mechanical and plumbing, testing and balancing systems
  - .10 Electrical systems inspection and testing
- .3 Costs for architectural woodwork inspection, roof and sheet metal inspection, window testing and painting inspection shall be included as part of the extended warranties specified for those sections.
- .4 Costs for testing and balancing of mechanical and plumbing systems shall be included as part of the mechanical subcontract. Refer to Mechanical Divisions. Costs of testing electrical systems shall be included as part of the electrical subcontract. Refer to Electrical Divisions.
- .5 Tests to be carried out shall be as described under the respective specification sections.
- .6 Cooperate and assist testing firms, as authorized by the Owner, to take tests and test procedures on the various parts of the Work, including sufficient prior notice of testing times. Scheduling and expediting of testing procedures will be the responsibility of the Contractor.
- .7 Provide access for equipment required for executing inspection and testing by the appointed agencies.
- .8 Employment of inspection/testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.
- .9 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defects and irregularities as advised by Consultant at no cost to the Owner. The Contractor shall pay all costs for retesting and reinspection.

#### **1.5 ACCESS TO WORK**

- .1 Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

#### **1.6 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 and cure test samples.

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**1.7 REJECTED WORK**

- .1 Refer to General Conditions.
- .2 Remove defective Work which has been rejected by the Consultant as failing to conform to the Contract Documents; whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not. Replace or re-execute in accordance with the Contracts Documents.
- .3 Make good other Contractor's work damaged by such removals or replacements promptly.
- .4 If in the opinion of the Consultant it is not expedient to correct defective Work or Work not performed in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by the Contract Documents. The value of defective Work shall be determined by the Consultant.

**1.8 REPORTS**

- .1 Submit (4) four copies of satisfactory inspection and test reports promptly to the Consultant, other than those prepared by Owner appointed testing agencies.
- .2 Provide copies to Subcontractor, manufacturer or fabricator of work being inspected or tested.

**1.9 TESTS AND MIX DESIGNS**

- .1 Furnish satisfactory test results and mix designs, other than those prepared by Owner appointed testing agencies.
- .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.

**1.10 MOCK-UPS**

- .1 Prepare mock-up for Work specifically requested in the specifications at the first installation of each component. Include for Work of all Sections required to provide mock-ups.
- .2 Construct in locations acceptable to the Consultant.
- .3 Prepare mock-up for Consultant review with reasonable promptness and in an orderly sequence, so as not to cause any delay in the Work. Where curing of materials is necessary, allow sufficient time before inspection for materials to cure.
- .4 Failure to prepare mock-up in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, the Consultant will assist in preparing a schedule fixing the dates for preparation.
- .6 Inform the Consultant a minimum of five days in advance of mock-up inspections. Schedule mock-up inspections with regular site meetings if possible. Ensure trades people performing the Work included in the mock-ups are present at the mock-up reviews.

- .7 Make changes to the mock-ups as directed by the Consultant and/or building envelope inspection agency. Mock-ups once accepted may be used in the finished work and will serve as a standard against which other work will be judged.
- .8 The following minimum items and associated components will be included in mock-ups:
  - .1 Window and Door Rough Openings and Installation:
    - .1 Self-adhered sill membrane and/or deck membrane.
    - .2 Sheathing membrane pre-stripping.
    - .3 Field sheathing membrane.
    - .4 Air barrier sealant at interior of components at sheathing membrane transitions.
    - .5 Flashings.
    - .6 Exterior cladding and trims.
    - .7 Exterior sealant.
  - .2 Parapet Detail:
    - .1 Self-adhered membrane.
    - .2 Roof/deck membrane.
    - .3 Sheathing membrane.
    - .4 Air barrier sealant.
    - .5 Flashings.
    - .6 Cladding.
  - .3 Vent and Penetration Details (electrical, mechanical, hose bib etc.):
    - .1 Vent.
    - .2 Insulation.
    - .3 Self-adhered membrane.
    - .4 Sheathing membrane.
    - .5 Flashings.
    - .6 Air barrier sealant.
    - .7 Exterior cladding and trims.
    - .8 Exterior sealant.
  - .4 Base of Wall Details:
    - .1 Slab membrane.

- .2 Self-adhered membrane.
- .3 Sheathing membrane.
- .4 Air barrier sealant.
- .5 Flashings.
- .5 Air Barrier pre-strip at Roof to Wall:
  - .1 Sheathing membrane.
  - .2 Polyethylene.
  - .3 Air Barrier Sealant.

**1.11 MILL TESTS**

- .1 Submit mill test certificates as required of the specification Sections.

**1.12 EQUIPMENT AND SYSTEMS**

- .1 Submit adjustment and balancing reports for mechanical, electrical systems.
- .2 Refer to Mechanical and Electrical for definitive requirements.

**1.13 CONCRETE TESTING**

- .1 Appoint a testing agency to test materials, review and check the mix designs, check production materials samples, take, test and report on concrete strength, air content and slump.
- .2 Concrete will be tested in accordance with the specified procedures.
- .3 If the testing agency finds concrete that does not conform to specification he has the authority and is expected to reject such concrete. The testing agency will be responsible for obtaining specification from the Consultant.
- .4 If the testing agency at any time suspects that they are not called every time the Contractor is pouring or if the Contractor does not give sufficient notice, the testing agency will immediately notify the Consultant.
- .5 Any costs for retesting of concrete due to failure of the Contractor to inform the testing agency of pouring time in sufficient time or due to concrete not conforming to specification shall be borne by the Contractor.

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Construction aids.
- .2 Traffic controls.
- .3 Office and sheds.
- .4 Project identification.

**1.2 RELATED SECTIONS**

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 57 00 - Temporary Controls.

**1.3 INSTALLATION AND REMOVAL**

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

**1.4 SCAFFOLDING**

- .1 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.

**1.5 HOISTING**

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Operate hoists and cranes by qualified operators.
- .3 Provide hoisting facilities as construction schedule permits. Provide operators for these hoists and ensure complete control of their use.
- .4 Prepare schedules allocating specific times for the use of hoisting facilities by Subcontractors in advance.
- .5 Where hoisting facilities are located on, or operate to, the roof level, provide temporary roofing and/or repairs to the permanent roof as may be necessitated by hoisting facilities and/or activities.
- .6 Allow for periodic maintenance and/or repairs of hoists as required and allow trades working adjacent to the hoists to complete their work.

**1.6 SITE STORAGE / LOADING**

- .1 Refer to General Conditions.
- .2 Confine work and operations of employees to limits indicated by Contract documents.



- .3 Do not unreasonably encumber the site with equipment or materials.
- .4 Do not load or permit to load any part of work with a weight or force that will endanger the work.
- .5 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .6 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

#### **1.7 CONSTRUCTION PARKING**

- .1 Parking will not be permitted on site for construction workers.

#### **1.8 SECURITY**

- .1 Be responsible for security as required to suit construction progress and for watching the Site.
- .2 Subcontractors shall make their own arrangements to ensure the security of their own equipment, materials and work, in cooperation with the Contractor.
- .3 Designate certain areas of the Site to be used as temporary lockfast stores.
- .4 Neither the Consultant nor the Owner will be responsible for any loss or damage to the building, to materials, equipment or other property of the Contractor.

#### **1.9 OFFICES**

- .1 Provide and maintain in clean condition during progress of work, adequately lighted, heated and ventilated space for:
  - .1 Separate meeting facilities.
  - .2 Separate Contractor's office with space for Contractor's normal site office staff and filing and layout of Contract Documents.
  - .3 Worker's lunch room.
- .2 Provide shared office space for the Owner's representative and Consultant, complete with telephone, plan table, desk, chairs, a "Plan Hold" plan rack capable of holding four (4) sets of contract drawings. Office shall have windows and shall be properly insulated and be complete with heat and lighting.
- .3 Provide and maintain all other temporary weathertight store rooms and sheds as required.
- .4 Maintain all temporary offices and sheds in good condition and relocate as necessary or directed.
- .5 Subcontractors may provide their own offices as necessary. Direct the location of these offices.
- .6 Provide the following minimum equipment in the office:

- .1 telephone and email on separate lines.
- .2 photocopier with 11" x 17" image capacity.
- .3 email communication capability with Consultant and sub-consultants.
- .4 electronic digital software compatible with Microsoft Office Suite.
- .7 Provide adequate required first aid facilities.
- .8 Provide and pay for a FTP site from Contract Signing until 30 days after Substantial Completion for the posting and transfer of construction related information and documents including such items as the following:
  - .1 Drawings.
  - .2 Specifications.
  - .3 Quotations.
  - .4 Change Orders.
  - .5 Shop Drawings.
  - .6 Progress claims.
  - .7 Site reports.
  - .8 Site photos, etc.

**1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

**1.11 SAFETY AND FIRST AID**

- .1 Provide First Aid facilities on site in compliance with requirements of Industrial Health and Safety Regulations of WorkSafeBC/Workers' Compensation Board of British Columbia.
- .2 Provide and maintain an accident prevention program to the requirements of the WorkSafeBC/Workers' Compensation Board of British Columbia.
- .3 Be solely responsible for all safety measures concerning construction and public safety in connection with construction means, methods, techniques, sequences and procedures. Comply with all applicable laws and regulations of the local authority and WorkSafeBc/Workers' Compensation Board.
- .4 Hold weekly safety meetings on site.
- .5 Ensure Contractor's and Subcontractor's employees comply with all Local, Provincial and WorkSafeBC/Workers' Compensation Board safe work procedures and regulations.
- .6 Provide all necessary safety requirements as prescribed by the regulations for the Work.

**1.12            SIGNAGE**

- .1        No signs or advertisements, other than warning signs, are permitted on site.

**2                Products (not applicable)**

**3                Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Temporary utilities.

**1.2 RELATED SECTIONS**

- .1 Section 01 50 00 - Temporary Facilities.
- .2 Section 01 57 00 - Temporary Controls.

**1.3 INSTALLATION AND REMOVAL**

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

**1.4 SANITARY FACILITIES**

- .1 Provide and maintain sufficient temporary outside chemical toilet facilities in accordance with local health authorities for the duration of the Work. Toilet facilities to be housed in a weather tight, elevated floored structure. Keep the toilet in a clean and sanitary condition until completion of the Work then remove from the site.

**1.5 WATER SUPPLY**

- .1 Provide and pay for temporary water service as required. Pay for all water used for construction purposes.
- .2 Provide distribution system from the connection point as required to facilitate the completion of the Work, including all the requisite piping connections, valves, hoses and storage facilities. Pay all costs for supply, installation, maintenance and removal. Make same available for the use of all trades.

**1.6 TEMPORARY HEATING**

- .1 Provide and pay for all temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders not permitted.
- .3 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress, unless indicated otherwise in specifications.
- .4 Ventilate heated areas keep building free of exhaust or combustion gases.
- .5 Provide all temporary local heating before temporary enclosure is complete to protect and to dry all work during cold weather.
- .6 Permanent heating system of building, or portions thereof, may be used when available and approved by the Consultant and subject to satisfactory arrangements for operation and maintenance by qualified personnel. Be responsible for any damage occurring to permanent heating system.

- .7 When temporary heating is no longer required, or as soon as the permanent heating system is approved for use, dismantle the temporary heating system and operate the permanent heating system, assuming all responsibility thereafter. Prior to acceptance of the building by the Owner, return all permanent heating equipment used for temporary heating to new condition, and replace filters, bearings, etc. as necessary.
- .7 Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is so certified by Consultant.
- .8 Pay costs for maintaining temporary heat, when using permanent heating system. All charges from B.C. Hydro and Fortis Gas pertinent to the Work shall be to the Contractor's account, up to the certified date of Substantial Performance of the Work.
- .9 Be responsible for damage to work due to failure in providing adequate heat and protection during construction.

#### **1.7 TEMPORARY POWER AND LIGHT**

- .1 Provide for temporary power during construction for temporary lighting and operating of power tools. Provide lockable, weatherproof distribution panel, include for wiring, extension cables and plugs, all in accordance with the Canadian Electrical Code and Local Authorities approval.
- .2 Energize temporary service only after receiving approval from the City's Electrical Inspector.
- .3 The Contractor, at its own expense, shall be responsible for hook-up to B.C. Hydro power source, at approved location, and provide temporary power outlets and/or panels for small tools only as necessary for himself and the various subcontractors and wiring from temporary power source to these outlets and/or panels.
- .4 Install and maintain all temporary power service in accordance with Canadian Electrical Code standards for such work and applicable bylaws. Alter, adapt, connect and disconnect services as necessary and remove on completion.
- .5 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.
- .6 Provide temporary lighting for access and performance of the Work throughout work areas as required by WCB evenly distributed, and at intensities to ensure proper installation and applications are achieved.
- .7 The electrical distribution system shall be in accordance with the Contractor's standard equipment.
- .8 Pay costs for maintaining temporary power and light. All charges from B.C. Hydro pertinent to the Work shall be to the Contractor's account, up to the certified date of Substantial Performance of the Work.

#### **1.8 TEMPORARY TELEPHONE**

- .1 Provide and pay for minimum two temporary telephone lines for own use and use of Consultant.

- .2 Provide separate line email equipment for own use and use of trades and Consultant.
- .3 Long distance or toll calls to be paid for by the party making the call.

**1.9 FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Open and burning rubbish are not permitted on site.
- .3 Take all necessary precautions to eliminate fire hazards and instruct Superintendent to make periodic inspections to ensure proper preventative measures are being complied with by all personnel working on the site.
- .4 Store paint and/or oil covered rags in covered metal containers. Remove rubbish daily from building and site.
- .5 Comply with Provincial and City fire safety requirements during the period of construction and other regulations pertaining to fire protection during construction work.
- .6 Provide additional fire safety measures considered necessary to protect existing facilities where torch cutting and electric welding are required for the Work. Provide a suitable fire extinguisher adjacent to all welding operations.
- .7 Precautions shall be taken at all times to prevent fire by spontaneous combustion.
- .8 Install "No Smoking" signs where volatile fumes or liquids are present or are being used.
- .9 Be responsible for any damage incurred due to lack of or improper protection.
- .10 Maintain site access around the entire building for fire fighting vehicles.

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.

**1.2 RELATED SECTIONS**

- .1 Section 01 50 00: Temporary Facilities.
- .2 Section 01 51 00: Temporary Utilities.
- .3 Section 01 74 19: Construction Waste Management and Disposal.

**1.3 INSTALLATION AND REMOVAL**

- .1 Provide temporary controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

**1.4 HOARDING**

- .1 Apply and pay for a hoarding permit. Submit application to City Engineering Department accompanied by drawings of the proposed hoarding. Indicate hoarding line on a site plan marked in red.
- .2 Construct and maintain hoarding in accordance with British Columbia Building Code 2012.
- .3 Erect hoarding, around entire perimeter of each construction area, designated to protect the public, workers, public and private property from injury or damage.
- .4 Provide physical barrier under suspended working platforms to contain accidentally dropped equipment and materials and protect the public below.
- .5 Provide site hoarding, of chain link fencing or modular interlocking metal panels minimum 1800 mm high, protecting public and private property from injury or damage. Provide lockable gates within hoarding for access to site by workers and vehicles.
- .6 Provide barriers around trees and plants designated to remain. Protect from damage.
- .7 Construct all construction operations outside the hoarding in accordance with the directions and regulations of the City and other authorities having jurisdiction.
- .8 Remove temporary hoarding and gates on completion of the Work.

**1.5 GUARD RAILS AND BARRICADES**

- .1 Obtain hoarding permit from Village of Burns Lake and construct site hoarding.
- .2 Provide, maintain and relocate as necessary all perimeter guard rails and/or barricades to the building and at all floor and roof openings, etc. within the buildings. Such protection

will be to the requirements of WorkSafeBC. Remove and replace such guard rails and barricades to accommodate the Work.

- .2 Provide, maintain and adjust any other guard rails, barricades or safety platforms required by law and authorities having jurisdiction for protection of the Work and the workmen and for protection of the public.
- .3 Provide, erect, and maintain adequate temporary barricades, warning signs, and lights for the protection of the public at all closures, detours, and points of danger where the Work occurs outside the hoarding area. Such protection shall be to requirements of the Owner and/or local authorities having jurisdiction.
- .4 Take precautions necessary to minimize the spread of dust and dirt from the Site onto adjacent properties and streets. Be responsible for cleaning operations necessary through failure to exercise such precautions, to regulations of local authorities having jurisdiction.

#### **1.6 WEATHER ENCLOSURES**

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure.

#### **1.7 DUST TIGHT SCREENS**

- .1 Provide dust tight screens of minimum 6 mil poly or partitions to localize dust generating activities, and for the protection of occupants, workers and finished areas of work. Tape seal poly seams and to perimeter of openings.
- .2 Maintain protection until work is complete.
- .3 Control dust generating activities by maintaining negative pressure within work area.
- .4 Vacuum dust with HEPA filtered equipment.

#### **1.8 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to the work.
- .2 Locate proper access to the site for delivery of materials.
- .3 Comply with traffic requirements of the City and other authorities having jurisdiction and obtain approval from the City Engineering Department for site ingress and egress locations, use of sidewalks, street access, use of parking and delivery facilities, etc., relevant to this Contract.
- .4 Maintain access for fire trucks to site during the construction period to the satisfaction of the City and other local authorities having jurisdiction.
- .5 Keep adjacent existing driveways, walkways, roadways, and lanes, clear at all times.



**1.9 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain flagpersons, traffic signals, barricades and flares, lights, or lanterns as required to perform the work and protect the public.

**1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance work.
- .2 Be responsible for damage incurred.

**1.11 PROTECTION OF BUILDING FINISHES AND EQUIPMENT**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of work. Repair or replace any damaged work inadequately protected.
- .2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member without written approval of the Consultant.
- .3 Make good any damage or disruption caused to other property, utilities etc. due to the construction work of this Project. Perform repair work to standards, codes of the authorities having jurisdiction after consultation with the appropriate parties and authorities.
- .4 Provide necessary screens, covers, and hoardings as required.
- .5 Be responsible for damage incurred due to lack of or improper protection.

**1.12 CLEANING STREETS AND LANES**

- .1 Maintain existing streets, sidewalks, and lanes affected by the Work of this contract in clean condition as required by the Village of Burns Lake.
- .2 Protect adjacent property. Do not drive heavy, cleated or flanged equipment over streets, lanes or sidewalks without protection with heavy planks.

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 74 19: Construction Waste Management and Disposal.
- .2 Appendix I.

**1.2 DESCRIPTION OF WORK**

- .1 Work Included: General requirements for environmental protection. This section is not intended to identify all and /or specific requirements. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.
- .2 Comply with Federal, Provincial and local regulations pertaining to water, air, solid waste, special waste and noise pollution.

**1.3 ENVIRONMENTAL PROTECTION**

- .1 Preserve the natural resources within Project boundaries and where applicable, outside the adjacent limits of Work in their existing condition and restore to an equivalent or improved condition upon completion of the Work.
- .2 Confine construction activities to areas indicated.
- .3 Provide environmental protection prior to commencement of excavation or fill.
- .4 Prevent any oil or hazardous substances, including substances from construction equipment from entering storm sewers, ground drainage areas and local bodies of water.
- .5 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .6 Do not discharge water containing suspended materials into watercourses, sewer, or drainage systems.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Federal, Provincial and Municipal requirements.
- .8 Cover soil stockpiles to prevent erosion and blowing dust.
- .9 Cover or wet down dry materials and refuse to prevent blowing dust and debris.
- .10 Prevent sandblasting and other extraneous materials from contaminating air beyond application area by providing temporary controls.
- .11 Fires and burning of rubbish on site is not permitted.

**1.4 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect water course, trees and plants on site and adjacent properties.

- .2 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance of damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .3 Restrict tree removal to areas indicated or designated.
- .4 Provide dust control for temporary roads.
- .5 Provide truck wash down area to prevent tracking dirt off site.

## **1.5 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Cover and stake material piles with poly to reduce runoff during rainfall.

## **1.6 EROSION AND SEDIMENT CONTROL**

- .1 Implement and monitor sediment and erosion control in compliance with all municipal, provincial or federal acts and regulations.
- .2 Conduct an on site orientation meeting with the Consultant at project start up and review requirements for an Erosion and Sediment Control Plan to ensure requirements are met throughout the Work.
- .3 Components may include but are not limited to the following:
  - .1 Silt Fences: check daily, remove sediments weekly.
  - .2 Seeding: as required to stabilize disturbed areas.
  - .3 Diversion Channels: check daily for erosion of slopes, remove sediments weekly.
  - .4 Straw mats / Geotextile: as required, check daily, remove sediments weekly.
  - .5 Top Soil Stock Pile: maintain cover, check for erosion.
  - .6 Vehicle Wash: plan designated area and enforce for all vehicles entering and leaving the site.
- .4 Reporting:
  - .1 Report on erosion and sediment control at regular site meetings using the Summary Form appended to this Section. Detail the control measures used, their site locations, regular monitoring and any modifications required.
  - .2 Submit current Erosion and Sediment Control Summary Form with each Application for Payment.

## **2 Products**

### **2.1 SEDIMENT CONTROL**

- .1 Refer to Drawing for Erosion Sediment Control Criteria.

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**3 Execution**

**3.1 PLACEMENT**

- .1 Refer to Sediment Control Plan, Temporary Sediment Control Facility and Erosion Sediment Control Criteria drawings. The latest issued drawings govern.

**3.2 MAINTENANCE**

- .1 Maintain integrity of sediment control as long as necessary to contain sediment runoff. Inspect all temporary sediment control immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct deficiencies.
- .2 Make daily review of location of temporary sediment controls in areas where construction activities have changed natural contours and drainage runoff to ensure that temporary sediment controls are properly located for effectiveness.
- .3 Where deficiencies exist, install additional temporary sediment control.
- .4 Do not remove temporary sediment control until Consultant directs that it be removed.
- .5 At completion of grading phase or as directed by Consultant, remove and dispose of any silt accumulations, and dress area to give a pleasing appearance.

**3.3 CLEAN UP**

- .1 Remove all debris from the Work, upon completion.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Reference standards.
- .2 Product quality, availability, storage, handling, protection, transportation.
- .3 Manufacturer's instructions.
- .4 Workmanship, coordination and fastenings.

**1.2 RELATED SECTIONS**

- .1 Section 01 45 00: Quality Control: Quality control and inspection of Work.

**1.3 REFERENCE STANDARDS**

- .1 Within the text of the specifications, reference may be made to the following standards:
  - ACI - American Concrete Institute
  - AISC - American Institute of Steel Construction
  - ANSI - American National Standards Institute
  - ASTM - American Society for Testing and Materials
  - ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
  - AWCC - Association of Wall and Ceiling Contractors of B.C.
  - AWMAC-Architectural Woodwork Manufacturers Association of Canada.
  - BCBC - British Columbia Building Code
  - BCFC - British Columbia Floor Covering Association
  - CaGBC- Canada Green Building Council
  - CAN - National Standard of Canada
  - CEC - Canadian Electrical Code (published by CSA)
  - CEMA - Canadian Electrical Manufacturer's Association
  - CGSB - Canadian General Standards Board
  - CISC - Canadian Institute of Steel Construction
  - CLA - Canadian Lumbermen's Association
  - CPCA - Canadian Painting Contractors' Association
  - CPCI - Canadian Prestressed Concrete Institute
  - CRCA - Canadian Roofing Contractors Association
  - CRI - Carpet & Rug Institute
  - CSA - Canadian Standards Association
  - CWC - Canadian Wood Council
  - EPA - Environmental Protection Agency
  - FSC - Forest Stewardship Council
  - FM - Factory Mutual Engineering Corporation
  - IAQ - Indoor Air Quality
  - IEEE - Institute of Electrical and Electronic Engineers
  - IPCEA - Insulated Power Cable Engineers Association
  - IRC - Institute for Research in Construction
  - ISO - International Standards Organization
  - MPDA - Master Painters & Decorators Association of B.C.
  - MSDS - Material Safety Data Sheet
  - NAAMM- National Association of Architectural Metal Manufacturers
  - NBC - National Building Code of Canada
  - NEC - National Electrical Code of Canada
  - NEMA - National Electrical Manufacturers Association

NFC - National Fire Code of Canada  
NLGA - National Lumber Grades Authority  
RCABC - Roofing Contractors Association of B.C.  
SCAQMD - South Coast Air Quality Management District  
SMACNA - Sheet Metal and Air Conditioning Contractors National Association  
TTMAC - Terrazzo, Tile and Marble Association of Canada  
UL - Underwriters Laboratories Incorporated  
ULC - Underwriters' Laboratories of Canada  
WCLIB - West Coast Lumber Inspection Bureau  
WHMIS - Workplace Hazardous Materials Information System  
WRCLA - Western Red Cedar Lumber Association  
WWPA - Western Wood Products Association

- .2 Conform to these standards, in whole or in part as specifically requested in the specifications.
- .3 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.
- .4 The cost for such testing will be born by the Owner in the event of conformance with Contract Documents or by the Contractor in the event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of bids, except where a specific date or issue is specifically noted.

#### **1.4 QUALITY**

- .1 Refer to General Conditions.
- .2 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, the Trade Contractor shall furnish evidence as to type, source and quality of products provided.
- .3 Defective Products, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. The Trade Contractor shall remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should any dispute arise as to the quality or fitness of Products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in the specifications, the Trade Contractor shall maintain uniformity of manufacture for any particular or like item throughout the building.
- .6 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.
- .7 Ensure all products are asbestos free. The materials manufacturer shall advise the Consultant of any toxic products or by-products (such as PCB's).

## **1.5 AVAILABILITY**

- .1 Immediately upon signing Contract, review Product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of Products are foreseeable, notify the Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In the event of failure to notify the Consultant at commencement of Work and should it subsequently 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.

## **1.6 RECEIVING, STORAGE, HANDLING AND PROTECTION**

- .1 The Contractor shall:
  - .1 Handle and store products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
  - .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seals and labels intact and only remove from packaging or bundling when required in the Work.
  - .3 Store products subject to damage from weather in weatherproof enclosures.
  - .4 Store cementitious products clear of earth or concrete floors, and away from walls.
  - .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
  - .6 Store sheet materials, lumber and siding on flat, solid supports and keep clear of ground. Slope to shed moisture.
  - .7 Store paints, volatile liquids and other flammable products in a separate fireproof cabinet to conform to British Columbia Building Code requirements.
  - .8 Store and mix paints in a heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
  - .9 Remove combustible materials from areas in which welding or cutting is to take place and provide flameproof tarpaulins and approved type fire extinguishers as means of readily available protection.
  - .10 Remove and replace damaged Products at own expense and to the satisfaction of the Consultant.
  - .11 Remove combustible materials from areas in which welding or cutting is to take place and provide flameproof tarpaulins and approved type fire extinguishers as means of readily available protection.
  - .12 Comply with all regulations pertaining to labeling, provision of material safety datasheets, handling and storage of "Controlled Products" as defined by the WorkSafe BC's Workplace Hazardous Materials Information System (WHMIS).

- .2 Materials shall be delivered, stored, handled and applied in strict accordance with manufacturer's instructions and shall be delivered with type, grade, and brand name clearly identifiable and seals intact.
- .3 All materials shall be used strictly according to manufacturer's printed directions or recommendations unless specifically stated otherwise in these specifications.
- .4 Storage shall be as recommended by the manufacturer, materials kept dry, stored under cover at the recommended temperature.
- .5 Any damaged materials shall be rejected and removed from the site.

#### **1.7 OFF-SITE STORAGE**

- .1 The Contractor shall provide at his own cost all necessary off-site storage required for all material and equipment until it is required to be installed in accordance with the master schedule. All equipment to be stored shall be placed indoors in a dry atmosphere.

#### **1.8 TRANSPORTATION**

- .1 Pay costs of transportation of Products required in the performance of Work.
- .2 Transportation cost of Products supplied by the Owner will be paid for by the Owner. Unload, handle and store such Products.

#### **1.9 MANUFACTURER'S INSTRUCTIONS**

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

#### **1.10 WORKMANSHIP**

- .1 Provide workmanship of the best quality, 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, workers deemed incompetent, careless, insubordinate or otherwise objectionable.
- .3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Consultant, whose decision is final.

#### **1.11 CO-ORDINATION**

- .1 Insure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.



**1.12 CONCEALMENT**

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform the Consultant if there is a contradictory situation. Install as directed by Consultant.

**1.13 REMEDIAL WORK**

- .1 Refer to General Conditions.
- .2 Perform remedial work required to repair or replace the parts or portions of the Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with the materials affected. Perform in a manner to neither damage nor endanger any portion of Work.

**1.14 LOCATION OF FIXTURES**

- .1 Consider the location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform the Consultant of a conflicting installation. Install as directed.

**1.15 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, color and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the affected specification section.
- .4 Space anchors within their load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.16 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.

**1.17 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with a minimum of disturbance to Work and pedestrian and vehicular traffic.

- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in a manner approved by authority having jurisdiction, stake and record location of capped service.

**1.18 SERVICES AND EQUIPMENT**

- .1 No services, plant, equipment or motorized device installed as a permanent part of the Work shall be used for construction purposes save by specific written agreement of the Construction Manager concerning conditions of use and compensation for wear and tear.

**1.19 TEMPORARY AND TRIAL USE OF EQUIPMENT**

- .1 The Owner shall be permitted temporary or trial use of electrical and mechanical equipment or any other equipment being provided under the Contract before final acceptance of the Project, for such reasonable time as the Consultant considers sufficient for proper testing.
- .2 Any damage or breakdown due to faulty materials or workmanship shall be made good to the satisfaction of the Consultant. Refer also to Mechanical and Electrical Divisions.

**1.20 OWNER'S EQUIPMENT**

- .1 The Contractor shall make the works ready to receive the Owner's equipment, fixtures and devices where indicated on the drawings.
- .2 Preparation shall include all necessary roughing-in, conduit, piping, depressions,

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00: Submittals.

**1.2 QUALIFICATIONS OF SURVEYOR**

- .1 Engage a qualified land surveyor registered in British Columbia, acceptable to the Owner for survey requirements.
- .2 Submit name and address of appointed surveyor to Consultant.

**1.3 SURVEY REFERENCE POINTS**

- .1 Existing bench marks are designated on the legal survey drawing attached.
- .2 Locate, confirm and protect bench marks prior to starting site work. Preserve permanent reference and grid points during construction.
- .3 Make no changes or relocations without prior written notice to Consultant.
- .4 Report to Consultant when a reference or grid point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. Pay for reestablishing lost or destroyed reference or grid points.

**1.4 SURVEY REQUIREMENTS**

- .1 Establish permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Stake slopes and berms.
- .5 Establish pipe invert elevations.
- .6 Stake batter boards for foundations.
- .7 Establish foundation, column locations and floor elevations.
- .8 Establish lines and levels for mechanical and electrical work.
- .9 Provide and maintain substantial batter boards at all corners of the buildings and establish benchmarks at floor levels, giving exact level of finished floor.
- .10 Verify accuracy of site dimensions shown on drawings.
- .11 Verify that present, or known future restrictions, are not violated by construction on the site or lines of traverse to all public utilities.

- 
- .12 Verify before commencing Work at adjacent public property, that no plans for altering clearances, set-backs, easements, grades or otherwise have been made by local authorities, subsequent to their approval of contract documents, and which would affect the original intent.

**1.5 RECORDS**

- .1 Maintain a complete, accurate log of control and survey work as it progresses.

**1.6 SUBMITTALS**

- .1 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .2 Upon completion of footing and foundation forms, deposit with the Consultant a survey certificate by a B.C. registered land surveyor verifying foundation locations.
- .3 Proceed with foundation work only after validation of locations.
- .4 At Substantial Performance of the Project, submit certificate to the Consultant signed by registered Surveyor certifying that floor elevations, inverts at storm and sanitary manholes and exact location of foundations for building are in conformance with the Contract Documents.

**1.7 EXISTING CONDITIONS**

- .1 Promptly notify the Consultant in writing if existing conditions at the place of the Work differ materially from those indicated in the Contract Documents, or a reasonable assumption of probable conditions based thereon.

**2 Products (not applicable)**

**3 Execution (not applicable)**

**END OF SECTION**

**PART 1      General**

**1.1      DEFINITIONS**

- .1      Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .2      Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.
- .3      Separate Condition: Refers to waste sorted into individual types.

**1.2      CONSTRUCTION WASTE MANAGEMENT PLAN**

- .1      Within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner, the Contractor shall submit to the Owner and Consultant a Waste Management Plan. The Plan shall contain the following:
  - .1      Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight).
  - .2      Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.
  - .3      List of compulsory materials to be recycled, shall include, at minimum, the following materials:
    - .1      Old corrugated cardboard.
    - .2      Clean dimensional wood, palette wood.
    - .3      Concrete/Brick/Concrete Block/Asphalt.
    - .4      Scrap Metal.
    - .5      Gypsum Board
    - .6      Paint (return to Paint Depot).
    - .7      Plastics.
    - .8      Landclearing debris.
- .2      Meetings: Contractor shall conduct Project Waste Management meetings. Meetings shall include subcontractors affected by the Waste Management Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:
  - .1      Pre-bid meeting.
  - .2      Pre-construction meeting.
  - .3      Regular job-site meetings.
- .3      Materials Handling Procedures: prevent contamination of materials to be recycled and salvaged and handle materials consistent with requirements for acceptance by designated facilities. Where space permits, source separation is recommended. Where materials must be co-mingled they must be taken to a processing facility for separation off site.

- .4 Transportation: The Contractor may engage a hauling subcontractor or self haul or make each subcontractor responsible for their own waste. Compliance with these requirements is mandatory.
- .5 If requested submit, to the Consultant and/or Owner way-bills, invoices and other documentation confirming that all materials have been hauled to the required locations.

### **1.3 WASTE MANAGEMENT IMPLEMENTATION**

- .1 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.
- .2 Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project.
- .3 Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Consultant.
- .4 Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling to be used by all parties at the appropriate stages of the Project.
- .5 Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for recycling and salvage. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. The requirement for separation will only be waived if the Contractor can demonstrate to the Owner/Consultant that there is insufficient room to accommodate it. If this is the case the materials must be sent to a processing facility for separation off site.
- .6 Application for Progress Payments: The Contractor shall submit with each Application for Progress Payment a summary of waste materials, recycled, salvaged and disposed of by the Project using the form appended to this specification or a form generated by the Contractor containing the same

### **1.4 DISPOSAL OF WASTES**

- .1 Burying of rubbish and waste materials is prohibited.
- .2 Disposal of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers is prohibited.
- .3 Burning of construction waste is prohibited.
- .4 Separate, store and dispose of hazardous wastes in accordance with the requirements of the authorities having jurisdiction including the Provincial Waste Management Act, BC Special Waste Regulation and Greater Vancouver Regional District Solid Waste Management Specification.

### **1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in protected locations.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.

- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Prevent contamination of materials to be recycled. Handle material consistent with requirements for acceptance by designated facilities.
- .6 Clean contaminated materials before placing in collection containers.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.

## **1.6 SCHEDULING**

- .1 Coordinate work with other activities at site to ensure timely and orderly progress of the work.
- .2 Designate an on-site person responsible for instructing workers and overseeing and recording results of the Construction Waste Management Plan.
- .3 Distribute copies of the Construction Waste Management Plan to all affected site workers and sub-contractors.
- .4 Provide on-site instructions for appropriate separation, handling and recycling to be used by all parties during the Work.

## **PART 2 Products**

### **2.1 NOT USED**

## **PART 3 Execution**

### **3.1 APPLICATION**

- .1 Do work in compliance with CWM.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

### **3.2 CLEANING**

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

### **3.3 DIVERSION OF MATERIALS**

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, and consistent with applicable fire regulations. Mark containers or stockpile areas. Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable, recyclable, material is not permitted.

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- .3 Submit enclosed or similar Waste Tracking & Management Plan form for construction waste to Consultant at completion of project.

**3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT**

.1			
Province	Address	General Inquires	Fax
British Columbia	Ministry of Environment Lands and Parks 810 Blanshard Street, 4 <sup>th</sup> Floor Victoria, BC V8V 1X4	(250) 387-1161	(250) 356-6464
	Waste Reduction Commission Soils and Hazardous Waste 770 South Pacific Blvd., Suite 303 Vancouver, BC V6B 5E7	(604) 660-9550	(604) 660-9596

**END OF SECTION**



**1 General**

**1.1 SECTION INCLUDES**

- .1 Cleaning.
- .2 Project record documents.
- .3 Spare parts and maintenance materials.
- .4 Take over procedures.
- .5 Warranties.

**1.2 RELATED SECTIONS**

- .1 Section 01 74 19: Construction Waste Management and Disposal.
- .2 Section 01 45 00: Quality Control, Test and Inspection Reports.
- .3 Individual Specifications Sections: Specific requirements for operation and maintenance data.

**1.3 PROGRESSIVE CLEANING**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2 Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Provide and use clearly marked separate bins for recycling.
- .6 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

- .13 High quality, non-toxic, Ecologo certified cleaning products are to be used to ensure a healthy indoor environment and safe working environment for workers. Use of non-compliant cleaning products may negatively affect the indoor air quality testing pre-occupancy. The Environmental Choice Program's Ecologo labelling and rating system offers a clear set of acceptable performance standards for products in the cleaning and janitorial sector. Refer to <http://www.ecologo.org>.

#### **1.4 FINAL CLEANING**

- .1 Refer to General Conditions.
- .2 Remove waste products and debris other than that caused by the Owner, other contractors or their employees, and leave the Work clean and suitable for occupancy by Owner.
- .3 Remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner or other Contractors.
- .4 Use professional cleaning company to execute final cleaning.
- .5 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .6 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors, ceilings, fixtures and equipment.
- .7 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .8 Clean, vacuum or seal, or prepare floor finishes as recommended by manufacturer.
- .9 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .10 Clean off all marks and dirt from aluminum and clean and polish all glass.
- .11 Adjust all door hardware and leave clean and polished.
- .12 Broom clean and wash exterior walks, steps and surfaces.
- .13 Remove dirt and other disfigurements from exterior surfaces.
- .14 Clean, roofs, gutters, downspouts, around roof drains and drainage systems.
- .15 Sweep and wash clean site paved areas.
- .16 Clean equipment and fixtures to a sanitary condition. Clean or replace filters of mechanical equipment.
- .17 Supervise requirements for special clean down under a particular specification Section.
- .18 Use only cleaning materials that will not create health hazards or damage property or material surfaces. Minimize VOC content.
- .19 Remove labels and trademarks, except where required by law or where required to provide product identification such as model numbers etc.

- .20 High quality, non-toxic, Ecologo certified cleaning products are to be used to ensure a healthy indoor environment and safe working environment for workers. Use of non-compliant cleaning products may negatively affect the indoor air quality testing pre-occupancy. The Environmental Choice Program's Ecologo labelling and rating system offers a clear set of acceptable performance standards for products in the cleaning and janitorial sector. Refer to <http://www.ecologo.org>.

## **1.5 PREREQUISITES TO SUBSTANTIAL COMPLETION**

- .1 The commissioning must be complete, except for functional testing and controls training, prior to Substantial Completion, unless approved in writing by the Owner's Project Manager.
- .2 All Testing and Balancing work and the commissioning must be complete prior to Functional Completion, unless approved in writing by the Owner's Project Manager. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:
  - .1 Completed and signed start-up and prefunctional checklist documentation.
  - .2 Requested trend log data.
  - .3 Submission of final approved TAB report.
  - .4 Completion of all functional testing.
  - .5 Required training of Owner personnel completed and approved.
  - .6 Submission of the approved O&M manuals.
  - .7 All identified deficiencies have been corrected or are approved by the Owner to be excepted from this milestone.
- .3 Fire Safety Plan: Engage and pay for a qualified person or company to prepare a fire safety plan and documents conforming to current requirements of Local Fire Authority and BC Fire Code. Include additional sections on Earthquake Preparedness/Response and Major Incident Response.
  - .1 Submit to Consultant, Owner and Local Fire Department 45 days prior to Substantial Completion for review. Make any revision requested.
  - .2 After completion submit two (2) hard copies in 3-ring binders with printed and laminated sheets for each section and one (1) copy in electronic format using .doc or .docx text and .dwg or .vsd for site/building plans.
  - .3 Complete and pay for all applications, registrations, permits as required.

## **1.6 FINAL INSPECTION AND DECLARATION PROCEDURES**

- .1 Contractor's Inspection: The Contractor and all Subcontractors shall conduct an inspection of the Work, identify deficiencies and defects; repair as required. Notify the Consultant in writing of satisfactory completion of the contractor's Inspection and that corrections have been made. Request a Consultant's Inspection.
- .2 Consultant's Inspection: Consultants and the Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. Correct Work accordingly.

- .3 Final Inspection: When the items noted above are complete, request a final inspection of the Work by the Owner, Consultants, and the Contractor. If Work is deemed incomplete by the Consultant, complete the outstanding items and request a reinspection. Reinspection costs to be paid by the Contractor.
- .4 Declaration of Substantial Performance: When the Consultants consider deficiencies and defects have been corrected and it appears requirements of the Contract have been substantially performed, make application for certificate of Total Performance. Refer to General Conditions for specifics to application.  
Provide the following prior to Substantial Performance of the Work:
  - .1 Reconciliation and completion of all change orders.
  - .2 WorkSafeBC/Worker's Compensation Board letter stating that Trade Contractor and all Subcontractor's are in good standing.
  - .3 Mechanical testing, balancing and checking of equipment and systems specified under Mechanical.
  - .4 Plumbing testing and checking of equipment and systems specified under Mechanical.
  - .5 Certificate from local authority approving plumbing installation.
  - .6 Certificate from local and/or provincial authority approving the gas installations, venting, etc.
  - .7 Certificate from the authority approving electrical installation.
  - .8 Certificate from authority approving the installation of boilers and pressure vessels.
  - .9 Letters of Assurance where required as a condition of the Work.
  - .10 Occupancy permit from the local authority.
  - .11 All manufacturer's inspections, certifications, guarantees and warranties.
  - .12 All maintenance manuals, operating instructions, maintenance and operating tools, replacement parts or materials.
  - .13 Certification by all testing, cleaning or inspection authorities or associations.
  - .14 Copies of all Commissioning Reports.
  - .15 List of items to be completed or corrected, including the time required to perform the Work as well as the proposed completion date.
- .5 Commencement of Lien and Warranty Periods: The date of the Owners acceptance of the submitted declaration of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period unless required otherwise by the lien statute of the Place of the Work.
- .6 Declaration of Total Performance: When the Consultants consider final deficiencies and defects have been corrected and it appears requirements of the Contract have been totally performed, make application for certificate of Total Performance. Refer to General Conditions for specifics to application. If Work is deemed incomplete by the Consultant, complete the outstanding items and request a reinspection.
- .7 Final Payment: Following completion of the lien period, submit claim for final payment in accordance with the General Conditions.

#### **1.7 SCHEDULE OF REQUIRED DOCUMENTATION FOR OCCUPANCY PERMIT**

- .1 Obtain and submit the following documents to the Local Authority having jurisdiction in one single submission when applying for occupancy permit.
  - .1 Application for occupancy permit.
  - .2 Assurance of Field Review from all Consultants, as follows:

- .1 Prime Consultant.
- .2 Consulting Structural Engineer.
- .3 Consulting Mechanical Engineer.
- .4 Consulting Electrical Engineer.
- .5 Sprinkler Engineer.
- .6 Soils Engineer.
- .7 Landscape Architect.
- .8 Consulting Civil Consultant.
- .3 Fire Alarm Verification Certificate.
- .4 Letter from ULC listed Fire Alarm Monitoring Agency.
- .5 Sprinkler Material & Test Certificate.
- .6 Final Gas Inspection.
- .7 Roofing Certification.
- .8 Assurance of window and glazed railings design according to Part 4.
- .9 Letter re: safety glass from window supplier.
- .10 Final inspections from Plumbing, Gas, Sprinkler and Electrical Inspectors.
- .11 Fire Safety Plan.
- .12 'As-Built' Record Drawings from Contractor including all subtrades.
- .13 Maintenance manuals.

## **1.8 SYSTEMS DEMONSTRATION**

- .1 Prior to final inspection, demonstrate operation of each system to the Owner.
- .2 Instruct personnel in operation, adjustment, and maintenance of equipment and systems, using provided operation and maintenance data as the basis for instruction.
- .3 Refer also to Division 22 plumbing, Division 23 Heating, Ventilating and Air-Conditioning and Division 26, Electrical.

## **1.9 OPERATING AND MAINTENANCE MANUALS**

- .1 Submit to the Consultant two (2) copies of maintenance, operating and instruction manuals.
- .2 Separately bound manuals are to be prepared for the following trade work:
  - .1 Building: Architectural elements, fixtures, finishes, casework, hardware, specialties, etc.
  - .2 Mechanical: Heating ventilating, air conditioning, etc.

- .3 Plumbing: Plumbing, fire sprinklers, etc.
- .4 Electrical: Power, lighting, fire alarm system, data, security, etc.
- .3 Provide maintenance manuals in hard and electronic format as specified hereafter, giving full operating and maintenance instructions for each system and major piece of equipment, as well as, maintenance instructions for building elements, fixtures and finishes.
- .4 Manuals are to contain pertinent maintenance operational and installation instruction information on equipment, materials cleaning and lubrication schedules, filters, overhaul, replacement, adjustment schedules, and emergency procedures as applicable. Instructions in manuals shall be in simple language so as to guide the Owner in the proper operation and maintenance of building material, components, equipment and systems.
- .5 Include all items covered by Change Orders.
- .6 Update the manuals periodically during the installation and commissioning phase of the Work so that the manuals are final by the scheduled turnover date.
- .7 Include equipment supplied by the Owner and pre-tendered equipment.
- .8 Binders:
  - .1 Binders shall be ACCO Canadian Co. Ltd. or approved substitution as follows:
  - .2 ACCO Inview D-Ring Binders – colour Black
    - 1 inch – 41805-0
    - 2 inch - 41807
  - .3 ACCO expanding bar-lock catalogue binder – colour Black
    - 3 to 5 inches – 05436-0
- .9 Pages:
  - .1 Descriptions and lists are to be neatly typed or printed on 216 mm x 280 mm heavy bond paper. Duplicate pages shall be made by electrostatic dry copier.
  - .2 The maximum paper size for schedules and diagrams is 280 mm x 432 mm. Larger paper sizes will be accepted for diagrams only if a mylar sepia is provided for each sheet.
  - .3 Alphabetical index tab separators are to be used in each manual to identify each information “Section”.
- .10 Manual contents shall be organized into applicable categories of Work, parallel to specifications divisions and sections.
- .11 Architectural manuals shall include in general, but shall not necessarily be limited to, the following:
  - .1 List of all Subcontractors, manufacturers, suppliers, complete with addresses and telephone and facsimile numbers.

- .2 Copy of hardware schedule and paint schedules, complete with the actual manufacturer, supplier and identification names and numbers.
- .3 All manufacturer's equipment, materials, products, data, details, identification, list, schedules of maintenance, operational and installation instruction information as required in accordance with the various sections of the specification.
- .4 All extended guarantees, warranties, maintenance bonds, certificates, letters of guarantees, registration cards, as called for in the various sections of the specification, with the following information:
  - .1 Name and address of subject.
  - .2 Commencement date (Substantial Performance of the Work) of guarantees and warranties.
  - .3 Duration and expiry date of guarantees and warranties.
  - .4 Signature and seal of the Contractor, installer, manufacturer and/or supplier as applicable.
- .5 Complete set of all final reviewed shop drawings.
- .6 Certificates of Inspection.
- .7 Test reports and certificates as applicable.
- .8 Confirmation letters of all extra, reserve, replacement materials as required in accordance with various sections of the specification has been properly handed over and received by the Owner in good order.
- .9 Confirmation letters of all portable units, equipment, materials such as fire extinguishers, special tools, keys for all equipment and/or panels, elevator pads/accessories, keys to millwork, casework, has been properly handed over and received by the Owner in good order.
- .10 Provide care, cleaning and recommended maintenance instructions for finishes and materials as specified.
- .12 Mechanical:
  - .1 Provide an index with the following headings:
    - .1 Mechanical Drawing List
    - .2 Description of Systems
    - .3 Mechanical System Troubleshooting
    - .4 Suggested preventative maintenance schedule, belt schedule, lubrication schedule
    - .5 Subtrade and supplier list, equipment repair manuals
    - .6 Chemical treatment certificates, hydrostatic and air test certificates
    - .7 Balancing report
    - .8 Valve tag schedule, piping colour code
    - .9 Equipment start up reports
    - .10 Guarantee certificate, final inspection certificates, warrantee certificates
    - .11 Sprinkler Shop Drawings
    - .12 Vibrations Isolation Shop Drawings
    - .13 Air Handling Unit & A/C Unit Shop Drawings
    - .14 Fan Shop Drawings
    - .15 Grille Shop Drawings
    - .16 Radiant Heating Shop Drawings

- .17 Sump Pump Shop Drawings
  - .18 Plumbing Fixtures and Drains Shop Drawings
  - .19 Controls "As Built" Drawings
  - .20 WHMIS Information
  - .21 Fire Protection Plan
- .2 Under each of the above headings, provide the following information, arranged under separate tabs, for each system and major piece of equipment:
- .1 Descriptive and Technical Data Include detailed description of the system and components, an explanation of how each component interfaces with others and the location of each thermostat and all controls.
  - .2 Operating Procedures
    - .1 Provide complete and detailed operation of each major component.
    - .2 Include starting procedure, exact switch and control location.
    - .3 Describe operation of component controls, changes required for summer or winter operation and method of making changes.
    - .4 Describe trouble shooting sequence when settings can not be maintained.
    - .5 Describe safe guards to check if equipment goes off line.
    - .6 Describe fire protection and smoke control.
  - .3 Maintenance and Lubrication
    - .1 Provide detailed preventive maintenance schedule for each of the major components including daily, weekly, monthly, semi-annual and yearly checks and tasks.
    - .2 Describe lubrication and maintenance procedures for equipment components such as bearings, drives, motors and filters. Include recommended lubricants.
    - .3 Compile this information for each typical piece of equipment.
    - .4 Provide a belt schedule.
  - .4 List of Equipment Suppliers and Subcontractors
    - .1 Provide a complete list of equipment Suppliers and Subcontractors and service representatives including address and telephone numbers.
    - .2 Outline procedures for purchasing parts and equipment.
    - .3 Provide a detailed description including drawings, dimensions, parts list and repair manual for each piece of equipment specified.
  - .5 Certification and Test Results
    - .1 Include copies of the following:
      - .1 Pre-operational cleaning reports and chemical treatment
      - .2 Hydrostatic and air tests performed on piping systems
      - .3 Equipment alignment certificates
      - .4 Balancing reports for air and water systems
      - .5 Valve tag identification schedule including location, service and normal position
      - .6 Pipe colour code
      - .7 Inspection and approval certificates for plumbing and gas systems and heating and ventilation systems
      - .8 Equipment startup reports



- .9 Warranty certificates
- .6 Shop Drawings
  - .1 Include copy of all reviewed shop drawings.
- .13 Electrical
  - .1 Provide an index with the following headings:
    - .1 Switch Gear and Distribution
    - .2 Lighting Fixtures and Lamps
    - .3 Fire Alarm System
    - .4 Emergency Generator System
    - .5 Mechanical Motor Control Equipment.
    - .6 Communication Systems
    - .7 Security System
  - .2 Under each of the above headings, provide the following information, arranged under separate tabs, for each system and major piece of equipment:
    - .1 Descriptive and Technical Data
    - .2 Maintenance and Operating Procedures
    - .3 Wiring Diagrams
    - .4 Spare Parts List
    - .5 Service Representatives
    - .6 Suppliers for Replacement Parts
    - .7 Test Results
    - .8 Certifications and warranties
    - .9 Trouble Shooting Data
    - .10 Preventive Maintenance Program Complete With Checklists
  - .3 Shop Drawings
    - .1 Include copy of all reviewed shop drawings as noted in the Schedule of Maintenance Manual Submittals, or as requested by the Consultant.
- .14 Submit to the Consultant two (2) copies of plumbing/mechanical and electrical manuals in accordance with this section and to detailed requirements specifically set out in the various sections of the specification as applicable.
- .15 Electronic Copies of Manuals:
  - .1 In addition to the printed copies, submit electronic copies of all operating and maintenance data as specified under clause 1.7.
  - .2 Submit data on "read only" CDs. Provide two (2) copies of each CD for the Owner and 1 copy to the Consultant.
  - .3 Do not provide separate CDs for each major section. Use more than one CD only if the volume of data exceeds the capacity of a single CD. Professionally label each CD and CD jewel case, including the name of the Owner, project and CD title.
  - .4 Organize electronic data using searchable directories and sub-directories as generally described in clause 1.7. Prior to assembling the electronic data, submit to the Consultant a detailed list of the proposed directory/sub-directory structure

including proposed files names. File names to be easily recognizable without the need to open the document to know what information the file contains. Directory structure and file naming is subject to the approval of the Consultant.

- .5 Provide information in Portable Document Format (PDF). Break down large files into sections and use bookmark structure for easy navigation.

#### **1.10 RECORD DOCUMENTS AND SAMPLES**

- .1 Documents: Maintain at the site one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to the Contract.
  - .5 Review shop drawings, product data and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in Field Office apart from documents used for construction. Provide files, racks and secure storage.
- .3 Label and file in accordance with section number listing in Table of Contents of this Project Manual. Label each document 'Project Record' in neat, large, printed letters.
- .4 Maintain record documents in a clean, dry and legible condition. Do not use record documents and samples available for inspection by Consultant.

#### **1.11 RECORDING AS-BUILT CONDITIONS**

- .1 Record information on a set of black line opaque drawings, provided by Owner.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .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 locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .2 Field changes of dimension and detail.
  - .3 Changes made by change order.
  - .4 Details not on original Contract Drawings.
  - .5 References to related shop drawings and modifications.

- .6 Correspondence, site clarifications, site instructions, and changes made by authorities having jurisdiction.
- .7 Deviations from things hidden from view, things of major importance to future operations, maintenance and alterations and/or additional work, detailed requirements in connection with various systems, landscaping, plumbing, mechanical and electrical sections of the specifications.
- .5 Specifications: Legibly mark each item to record actual construction, including manufacturers, trade name, and catalog number of each project actually installed, particularly optional items and substitute items.
- .1 Changes made by addenda and change orders.
- .6 Other Documents: Maintain manufacturer's certifications, inspection certifications and field test records required by individual specification sections.
- .7 The Consultant will produce revised CAD drawings from Consultant's digital drawing files that include all recorded 'as-built' condition information from the site 'record drawings'. Submit record CD of revised drawing files and one set of prints from revised drawing files.
- .8 Sign each drawing and provide a Certificate of Record signed by persons authorized to sign on behalf of the Contractor. Deliver record set of drawings to the Owner through the Consultant. Provide Certificate of Record as illustrated in the following paragraph:
- .9 Certificate of Record  
  
I/We (name of Contractor) hereby certify that the set of record drawings attached hereto, comprised of (number) sheets, is a complete and total record of the building as constructed. I/We further certify that the drawings show accurately all structural details, all mechanical and electrical services, exposed or hidden and that the Owner may fully rely on their accuracy in any future contemplated repairs, modifications or additions to this work.  
  
Signed by Contractor: \_\_\_\_\_  
Name of Contractor: \_\_\_\_\_  
Per: \_\_\_\_\_  
Date: \_\_\_\_\_  
Witnessed by: \_\_\_\_\_  
Date: \_\_\_\_\_
- .10 Acceptance of as-built drawings subject to review and approval of Consultant.
- .11 Accompany Certificate of Record by a transmittal listing each drawing number, title and date.

## **1.12 SPARE PARTS AND MAINTENANCE MATERIALS**

- .1 Spare parts and maintenance materials provided shall be new, not damaged or defective, and of the same quality and manufacture as Products provided in the Work. If requested, furnish evidence as to type, source and quality of Products provided.

- .2 Defective Products will be rejected, regardless of previous inspections. Replace products at own expense.
- .3 Store spare parts and maintenance materials in a manner to prevent damage, or deterioration.
- .4 Provide spare parts, special tools, maintenance and extra materials in quantities specified in individual specification Sections.
- .5 Provide items of same manufacture and quality as items in the Work.
- .6 Where extra stock of materials is requested follow the following sequence:
  - .1 Submit an actual figure of area and number of packaged cartons required to the Consultant for approval at the time of sample or shop drawing submittal or prior to placing order for materials.
  - .2 Identify packaged cartons required for extra stock upon delivery to site. Check for compliance and label accordingly.
  - .3 Temporarily store and protect all extra stock.
  - .4 At Project Close-Out arrange with Owner's representative for handover of extra stock at an agreed location and obtain signed receipt for acceptance of products.
  - .5 Submit one copy to Consultant and include one copy in Operating and Maintenance Manuals.

#### **1.13 EQUIPMENT AND SYSTEMS – MAINTENANCE MANUALS**

- .1 Each Item of Equipment and Each System: Include description of unit or system and component parts. Give function, normal operation characteristics and limiting conditions. Include performance curves with engineering data and tests and complete nomenclature and commercial number or replaceable parts. List factory selected or provided colours.
- .2 Panelboard Circuit Directories: Provide electrical services characteristics, controls and communications and electrical panel schedules.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: Include start-up, break-in and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown and emergency instructions. Include summer, winter and any special operating instructions.
- .5 Maintenance Requirements: Include routine procedures and guide for troubleshooting, disassembly, repair and reassembly instructions and alignment, adjusting, balancing and checking instructions.
- .6 Provide service and lubrication schedule and list of lubricants required.
- .7 Provide filter schedules.
- .8 Include manufacturer's printed operation and maintenance instructions.
- .9 Include sequence of operation by controls manufacturer.
- .10 Provide original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.

- .11 Provide installed control diagrams by controls manufacturer.
- .12 Provide Contractor's coordination drawings with installed colour code piping diagrams.
- .13 Provide charts of valve tag numbers, with location and function of each valve keyed to flow and control diagrams.
- .14 Provide list of original manufacturer's spare parts, current price and recommended quantities to be maintained in storage,
- .15 Include test and balancing reports as specified in Section 01 45 00 - Quality Controls and Mechanical and Electrical.
- .16 Include approved shop drawings and product data.
- .17 Include prefinished equipment and materials colour list.
- .18 Additional Requirements: As specified in individual specification sections.

**1.14 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials and Finishes: Include product data with catalogue number, size, composition and colour and texture designations. Provide information for reordering custom manufactured products. Include hardware list, paint schedule with product code.
- .2 Instructions for Cleaning Agents and Methods: Precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.
- .3 Moisture Protection and Weather-Exposed Products: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: As specified in individual specification sections.

**1.15 WARRANTIES**

- .1 Separate each warranty with index tab sheets keyed to the Table of Contents listing.
- .2 List Subcontractor, supplier and manufacturer, with name, address, and telephone and fax number of responsible principal.
- .3 Obtain warranties executed in duplicate by Contractors, suppliers and manufacturers within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the date of Substantial Performance is determined. Warranties to be issued for each Phase of construction as applicable.
- .5 Verify that documents are in proper form and contain full information.
- .6 Co-execute submittals when required.
- .7 Retain warranties until time specified for submittal.

**2**                    **Products (not applicable)**

**3**                    **Execution (not applicable)**

**END OF SECTION**

**1 General**

**1.1 REQUIREMENTS INCLUDED**

- .1 Furnish all labour, materials, tools, equipment and services required for the execution of the demolition and removal of the existing facilities to accommodate new construction, renovations as specified and as indicated and to facilitate the new arrangement.
- .2 The following descriptions of existing conditions are based on copies of the original construction drawings for the building provided by the Owner and site investigations by the Consultant. The Consultant does not guarantee the descriptions of existing conditions and actual construction may vary from each of the descriptions. Evaluate descriptions relative to actual conditions and construction. No subsequence allowance will be made on behalf of the Contractor on account of any difference appearing in the actual construction from any conditions represented in the following descriptions.
- .3 The work of this section includes, but is not necessarily limited to the following:
  - .1 Refer to drawings for extent of Work.
  - .2 Refer to Civil, Structural, Landscape and Mechanical and Electrical for additional items relating to those trades.

**1.2 RELATED REQUIREMENTS**

- .1 The Owner will remove or relocate all furnishings, stores and other movable items required prior to the Contractor commencing work in related areas.
- .2 Remove other fixed items, as indicated on the drawings or tagged by the Owner. Store and protect for re-installation after construction.

**1.3 SALVAGE AND RECYCLABLE MATERIALS**

- .1 Demolition materials contained within the existing building or on site are subject to salvage as outlined in the Capital Regional District requirements.
- .2 Survey the building and site for materials that can be salvaged and recycled.
- .3 Ensure that salvageable materials are properly removed and stored on site by skilled workers.
- .4 Remove salvageable materials from the site as they are accumulated.
- .5 Provide a salvage credit toward the overall demolition cost.
- .6 Remove and protect Owner tagged items for reuse in the renovation work.

**1.4 SUBTRADE REQUIREMENTS**

- .1 Each subtrade is to coordinate its work with the work of this section as to the amount of demolition and cutting out required and as to termination conditions to be left at the junction of existing work to remain.
- .2 Each subtrade is to be responsible to ensure that all demolition and cutting does not destroy more than is required or needed for the renovation work.

- .3 All areas of responsibility for demolition and cutting out are to be thoroughly coordinated by the Contractor.
- .4 Any demolition and cutting out carried beyond the necessary renovation requirements are the responsibility of the Contractor and are to be replaced at no cost to the Owner.

## **1.5 QUALITY ASSURANCE**

- .1 A foreman/supervisor who is fully conversant with all demolition and cutting out and who is aware of all subtrade input for the renovation work is to be present at all times during demolition.

## **1.6 JOB CONDITIONS**

- .1 Obtain prior approval from the Consultant for proposed sequence and method of demolition or removal of existing facilities including the method for removal of debris and containment of dust.
- .2 Contact the Owner prior to any necessary service interruption of services to existing facilities and obtain permission for interruption at a specific time.
- .3 Take necessary precautions to fully protect existing adjoining surfaces, equipment, furnishings and stores against damage from dust, water or the like, during installation of new work, cutting of new openings in existing walls, ceilings, or roofs and/or removal of existing work.
- .4 Contractor to obtain permission from School prior to commencing with any demolition work that is scheduled to occur during school hours.

## **1.7 SCHEDULING**

- .1 Schedule demolition work with the Owner.

## **1.8 PROTECTION**

- .1 Perform hazardous materials removal prior to demolition work.
- .2 Prevent movement, settlement, or other damage to adjacent structures, utilities, and parts of building to remain in place. Provide bracing and shoring required.
- .3 Keep noise, dust, and inconvenience to occupants to minimum.
- .4 Protect building systems, services and equipment.
- .5 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .6 Provide curbs and covers to roof openings.
- .7 Take adequate measures to protect existing building and finishes scheduled to remain, from the elements and from wind driven precipitation when roof is removed, when existing exterior windows and exterior wall finishes are removed.

## **2 Products (not applicable)**

## **3.1 DEMOLITION**

- .1 Obtain and pay for required permits from authorities having jurisdiction.



- 
- .2 Environmental:
    - .1 Remove contaminated, hazardous or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
  - .3 Separate from general waste stream any salvageable and recyclable materials. Handle salvaged material in the same manner as for similar new materials.
  - .4 Stockpile materials in neat and orderly fashion. Stockpile materials in accordance with applicable fire regulations in a secure area that is not accessible by the general public or the student body.
  - .5 Provide collection areas for collection of miscellaneous metals in the area of demolition.
  - .6 Remove stockpiles of salvageable and recyclable materials promptly once collection of materials is complete.
  - .7 Demolish and/or dismantle work in an orderly manner. Cut out and form new holes and spaces and strip finishes as required. Do all minor and miscellaneous demolition required to let the Work come together as shown and as scheduled.
  - .8 Demolish and/or remove existing work specified under clauses 1.1.3 and as indicated on the drawings and as required to accommodate alterations and new construction.
  - .9 Complete demolition work to produce clean exposed portions of the existing building with structural items exposed to the required extent, free from loose, weak or insecure material and stripped of extraneous items. Clean up debris ready for work to follow.
  - .10 Carry out concrete and masonry removal by first sawing the termination lines of the removed portions. Remove concrete and masonry in sections small enough to be removed by hand or shoveled into a wheel barrow or other such convenience for removal.
  - .11 Drill through concrete and masonry using diamond drills.
  - .12 Cut through plaster with masonry saw.
  - .13 Remove existing doors and hardware with as little damage as possible. Store in protected area until construction schedule permits re-installation. Handle to prevent damage.
  - .14 Demolish concrete slabs to complete extent on finished grade.
  - .15 At end of each day's work, leave work in safe and stable condition.
  - .16 Demolish to minimize dusting. Keep materials wetted.
  - .17 Do not bury any material on site.
  - .18 Remove and dispose of demolished materials in accordance with authorities having jurisdiction.

### **3.2 CUTTING**

- .1 Because of noise and vibration, the use of impact tools for cutting concrete and masonry will not be allowed except with the Owner's specific prior written approval.
- .2 Mark all holes passing through existing concrete structure on site for inspection by the Consultant or his authorized representative prior to drilling and cutting.

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- .3 Obtain Consultant's approval for procedures and methods of drilling, coring and cutting.
  - .4 Size coring for conduit, pipes and vents for the opening required. Verify coring locations on the job site.

### **3.3 PROTECTION**

- .1 Fully protect the existing building at all times during the work of this Section. Provide and install temporary bracing, framing, screens and hoardings. No areas of demolition shall create a hazard to the student body.
- .2 Provide adequate fire protection in all work areas.
- .3 Make all repairs and replacements to adjacent work caused by the work of this Section.

### **3.4 EXISTING SERVICES**

- .1 Bring to the immediate attention of the Consultant existing services found in walls, partitions, ceilings and floors which are not covered on the mechanical, plumbing and electrical drawings.

### **3.5 DEBRIS**

- .1 Condemned material becomes the Contractor's property. Remove such debris from the site. Keep debris clear and maintain passageways and exits. Keep all work areas clean at all times.
- .2 Remove debris from the site promptly. Do not accumulate debris within the existing building or on the site.
- .3 Cover all debris while in transit to prevent dusting and litter.
- .4 Dispose of all debris in accordance with local regulations.

### **END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Structural drawings: Cast-In-Place Concrete.
- .2 Section 04 22 00: Concrete Unit Masonry.
- .3 Section 05 50 00: Metal Fabrications.
- .4 Section 06 10 00: Rough Carpentry.
- .5 Section 07 11 00: Dampproofing.
- .6 Mechanical.
- .7 Electrical.

**1.2 DESCRIPTION OF WORK**

- .1 Supply all labour, materials, equipment and accessories required to perform the following concrete finishing work of horizontal slabs where shown on the drawings and as specified herein as follows:
  - .1 Steel trowel finish to building floor slabs to receive floor sheet finishes or where concrete is left exposed.
  - .2 Wood float finish to building floor slabs to receive membranes.
  - .3 Grind, fill and patch to concrete walls and slabs scheduled to have exposed finish or waterproofing or dampproofing applied.
  - .4 Trowelled safety nosings and tactile warning areas on concrete stairs.

**1.3 REFERENCE STANDARDS**

- .1 Do concrete floor finishing to Class A in accordance with CAN/CSA 3-A 23.1-14, unless specified otherwise.
- .2 Do exposed concrete work in accordance with CAN/CSA A23.4, Precast Concrete – Materials and Construction.
- .3 WorkSafe BC Industrial Health and Safety Regulations of Workers Compensation Board.

**1.4 SUBMITTALS**

- .1 Submit formwork drawings for all architectural concrete showing layouts, ties, reveals and details including mechanical and electrical coordination to Consultant for review.
- .2 Submit concrete mix design to Consultant for review.
- .3 Submit one sample of safety stair tread to Consultant for approval.

**1.5 QUALIFICATIONS**

- .1 Perform work of this Section by qualified journeymen and tradesmen.

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**1.6 SAMPLE PANELS**

- .1 Provide sample panels of floor sealers for Consultant approval prior to application on floors.
- .2 Provide sample panel of ground filled and patched concrete for Consultant approval prior to application of waterproofing and painting.
- .3 Provide sample panel of architectural concrete finish on site, for review by Consultant prior to placing any architectural concrete.
  - .1 Assembly all parties involved for a site meeting prior to concrete placement to review requirements and establish procedures.
  - .2 Samples to include board formed cast-in-place wall.
  - .3 Sample to include tie-hole plugs.

**1.7 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Formwork Materials: To Structural drawings.
- .2 Concrete Reinforcement: To Structural drawings.
- .3 Concrete Materials: To Structural drawings.
- .4 Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz/yd.<sup>2</sup>, complying with AASHTO M 182, Class 2.
- .5 Moisture-Retaining Cover: Complying with ASTM C 171. Acceptable products, waterproof paper, polyethylene film, polyethylene-coated burlap.
- .6 Floor Sealer: Acceptable product, Sika Canada Flortec 22, medium gloss acrylic resin compound.

**Part 3 Execution**

**3.1 FORMED SURFACES FINISHING**

- .1 Clean surfaces to receive waterproofing. Remove dust, dirt, wax, oil, and grease.
- .2 Filling surfaces irregularities:
  - .1 Cut out tie wires to a depth of 40 mm.
  - .2 Grind off all projections and external corners.

- 
- .3 Rake out holes, honeycombs, open joints and porous areas.
  - .4 Make cuts square or under cut to a depth of 25 to 40 mm.
  - .5 Cut cracks to a minimum width of 25 mm.
  - .6 Do not cut V-grooves or cone shaped recesses.
  - .7 Clean out areas thoroughly with wire brush and by vacuuming.
  - .8 Moisten thoroughly with water.
  - .9 Fill openings solidly with pointing mix.
- .3 Sacked Finish: Perform finishing while concrete is still green.
- .1 Remove all fins on concrete surfaces by grinding.
  - .2 Predampen the surface.
  - .3 Spread a loose slurry of filler over the surface with clean burlap pads or sponge rubber floats.
  - .4 Filler to consist of one part cement and one and one-half parts sand passing the No.16 sieve by damp loose volume.
  - .5 Remove surplus by scraping and then rubbing with clean burlap. Cure the finish in an approved manner.

### **3.2 FLOOR SURFACE FINISHING**

- .1 Comply with CSA-A23.1, Table 21 Slab and Floor Finish Classifications, for Class A Institutional and Commercial Floors:
  - .1 Interior floor surfaces to receive resilient sheet, tile, carpet or exposed flooring – Flat, FF 25 and FL 20.
  - .2 Exterior walks, pads and floor slabs under exterior decks - Moderately flat graduated slope with no puddles.
- .2 The following surface finish is to be used.
  - .1 Hand Screeded and Steel Trowel Finish: To floor slabs intended as working surfaces or to receive waterproofing, and floor coverings including exposed concrete floors.
- .3 Trowel Finish: Finish in accordance with CSA-A23.1 and as follows:
  - .1 Do not work concrete until ready for floating.
  - .2 Deposit concrete uniformly, vibrate with a power screed, bull float in two directions and steel trowel to produce a smooth, dense surface with maximum abrupt irregularities of 1 mm and level to within 6 mm in 3 000 mm .
  - .3 Bring finish to a smooth surface free from defects and blemishes; trowel until the required surface is obtained.
  - .4 Grind areas not complying with specified tolerances and at floor services and inserts until tolerances are met using power grinding equipment suitable for the intended purpose.
  - .5 Where drains are shown, slope slabs to the drains, whether or not shown on the drawings. Minimum slope to drains 3 mm in 300 mm; unless indicated otherwise.

- .6 Level hollows or voids in concrete floors. Use manufactured leveling compound applied in strict accordance with manufacturer's directions.
- .7 Tool all crack control joints and construction joints as indicated on the structural drawings. Coordinate tooling with concrete finishing; if necessary retool joints at completion of finishing to give full size joint with clean and sound substrate ready for sealant.
- .8 Edge tool 60 mm nosings with tool joint lines at 20 mm centers to concrete stairs with broom finish on remainder of tread. Tool joint lines parallel to stair run at 20 mm centres forming tactile warning area 750 mm x width of stairs located 300 mm from top riser at top of stair flights.
- .9 Floor Hardener: Shake apply non-metallic floor hardener to areas scheduled for concrete finish. Apply hardener in accordance with manufacturer's instructions.
- .10 Floor Sealer: Spray apply liquid floor sealer to floors in accordance with manufacturer's instructions. Apply two coats to areas.
- .4 Broom Finish: Screed surfaces level or sloped as detailed on the drawings.
  - .1 Wood float and lightly steel trowel.
  - .2 Lightly broom finish by drawing broom perpendicular to the length of the area leaving a sand textured finish. Finish panel edges with smooth edging trowel.
  - .3 Provide tooled crack control joints to concrete sidewalks and paving at approximately 1 500 mm centres with expansion control joints and asphaltic fiberboard at approximately 6 metre centres. Review layout of expansion joints and control joints with Consultant prior to executing work.
- .5 Curing: Cure and protect the surface of finishes in accordance with CAN 3-A23.1. See Section 03 30 00 for general curing and protection requirements. **Use products compatible with adhesive to be used in installation of: Division 09 Flooring. If in doubt, do not use curing agents, after troweling apply cover to floor slabs and maintain in moist condition until concrete has cured.**

### 3.5 PROTECTION OF FINISHED SURFACES

- .1 Keep traffic that will affect or otherwise disturb the curing procedures of the finished surfaces for a period of seven days minimum.
- .2 Protect floors from rain out. Replace floor slabs damaged by rain.
- .3 Protect floors from contamination by oil, paint or other deleterious materials.
- .4 Provide special protection to concrete floors intended for sealed exposed concrete finish.

### 3.6 CLEAN UP

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

### END OF SECTION

**1 General**

**1.1 RELATED SECTIONS**

- .2 Structural drawings: Cast-in-Place Concrete.
- .4 Section 05 50 00: Metal Fabrications.
- .5 Section 06 10 00: Rough Carpentry.
- .6 Section 07 21 00: Board Insulation.
- .7 Section 07 21 29: Spray Urethane Insulation.
- .8 Section 07 27 00: Air Barriers.
- .10 Section 07 62 00: Metal Flashing and Trim.
- .11 Section 07 84 00: Fire Stopping.
- .12 Section 08 11 00: Metal Doors and Frames.
- .13 Section 08 44 00: Curtain Wall.
- .14 Section 09 21 16: Gypsum Board.
- .17 Section 09 91 00: Painting.
- .18 Mechanical.
- .19 Electrical.

**1.2 REFERENCES**

- .1 CAN3-A165.1 Series - 04(R2009) CSA Standards on Concrete Masonry Units.
- .2 CSA A179-04(R2009) Masonry Mortar and Grout.
- .3 CAN 3/CSA S304.1-04(2010), Masonry Design for Buildings.
- .4 CSA A371-04(2009), Masonry Construction for Buildings.
- .5 CSA G30.18-09 Reinforcing Steel Grade 400.
- .6 CAN3-A370-04(R2009) Connectors for Masonry.
- .7 Refer to Structural General Notes.
- .8 British Columbia Building Code 2012.

**1.3 QUALITY ASSURANCE**

- .1 Requirements of Regulatory Agencies: Installation to comply with governing regulations and to approval of authorities having jurisdiction.

- .2 Qualifications: Masonry contractor shall be a member in good standing of the Masonry Institute of British Columbia and be qualified under the Technical Masonry Certification (TMC) program.
- .3 Concrete masonry practices and work standards to conform where applicable to the "Concrete Masonry Handbook" published by the Portland Cement Association and CSA A-371.
- .4 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with British Columbia building Code.

#### **1.5 SUBMITTALS**

- .1 Submit two (2) full size samples of each type of masonry to Consultant for approval. Samples to indicate the standard colour variation. Include manufacturer's code numbers for colour and texture.
- .2 Submit samples of thru-wall flashing to Consultant for approval.
- .3 Submit shop drawings sealed by a professional Structural Engineer registered to practice in the Province of British Columbia indicating design details complying with Part 4 of the BC Building Code.
- .4 Letters of Assurance: Provide Letters of Professional Assurance as required by the BC Building Code for design review and field review by the registered professional Engineer who signed and sealed the shop drawings upon completion of the work.

#### **1.6 SAMPLES AND MOCK-UP PANEL**

- .1 Construct a sample mock up panel of masonry veneer approximately 1.2 square metres in area .Construct panel on site and independent of actual walls.
- .2 Incorporate substrate, sheathing, membrane flashings, insulation, thru-wall flashing, masonry anchorage, jointing, coursing, mortar and control joint.
- .3 Use materials and workmanship intended for the job.
- .4 Cooperate with other Sections involved in the mock up panel.
- .5 Do not commence masonry veneer until the mock-up panel is inspected and approved by the Consultant.
- .6 Maintain and protect mock-up panel on site until the completion of the work of this Section. Remove the panel from the site after completion of the work.

#### **1.7 PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Deliver all units on pallets and protect with polyethylene sheets. Replace units stained or chipped or materials affected by inadequate protection.
- .2 Store cementitious materials in accordance with the requirements of CSA Standard A5 and A224. Store aggregates in accordance with the requirements of CSA Standard CAN 3-A23.1
- .3 Stack units to avoid chipping. Protect from weather and soil. Keep all materials clean, dry and stored off the ground.
- .4 Deliver cement, lime and mortar ingredients with manufacturer's seals and labels intact.



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**1.8 SITE CONDITIONS**

- .1 Consult with and cooperate with other Sections in advance. Build in or make provision for installation of work to avoid cutting, patching and making good.
- .2 Do not work or install materials under temperatures and conditions below the recommended level specified by recognized standards of manufacture. Cold weather work to conform to CAN3-A371-94.
- .3 Do not lay block units when temperature is 5 degrees C or less without providing hoarding and equipment for heating block and mortar materials. Temperature of water when placed in the mixer is not to exceed 60 degrees C, the resultant mortar to be at a temperature between 10 to 30 degrees C.
- .4 Do not add antifreeze liquid, salts or other substances to lower the freezing point of the mortar.

**1.9 PROTECTION**

- .1 During construction protect corners and openings from accidental damage.
- .2 Keep expansion joint voids and cavities clear of mortar.
- .3 Provide temporary bracing during installation of masonry. Maintain in place until building structure provides permanent bracing.
- .4 Cover unfinished walls exposed to the elements at day's end to prevent infiltration of weather.

**1.10 ENVIRONMENTAL REQUIREMENTS**

- .1 Cold weather requirements
  - .1 Supplement Clause 5.15.2 of CSA-A371 with following requirements:
    - .1 Maintain temperature of mortar between 5°C and 50°C until batch is used.
  - .2 Hot weather requirements
    - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
    - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
  - .3 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
  - .4 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

**1.11 TESTING**

- .1 Testing of grout and mortar mixes is to be performed by a firm appointed by the Consultant.
- .2 Cost of testing will be paid by Owner.
- .3 Provide free access to all portions of the work and co-operate with appointed firm.
- .4 Submit proposed mortar mix design to testing firm for approval prior to commencement of work.

- .5 If mixes do not conform with requirements, re-establish and re-submit for further testing. Pay all costs for required re-testing.

## **1.12 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused masonry and metal materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Special fire resistant and standard concrete block units as scheduled: to CAN3-A165.1-Series as modified below.
  - .1 Classification: H/15/A/M except as modified by fire resistance requirements specified below.
  - .2 Fire resistant characteristics: aggregate used in units and equivalent thickness of units to the British Columbia Building Code for fire-resistance ratings indicated.
  - .3 Size:
    - .1 Metric modular 90, 140, 190 and 290 x 190 x 390 mm.
    - .1 Texture and colour:
      - .1 Standard grey, smooth.
  - .4 Special shapes:
    - .1 Provide purpose-made shapes for lintels and bond beams.
    - .2 Closed end blocks.
- .2 Water: Clean and free of injurious amounts of salts, oil, acid, alkali, organic matter and other deleterious substances.
- .3 Control joint filler: W.R.Grace Rodefyll fibre expansion filler or acceptable substitution.
- .4 Metal lath: CSA Standard, galvanized corrugated diamond mesh.
- .5 Connectors: to CSA-A370 and CSA-S304.
  - .1 Corrosion protection: to CSA-S304, galvanized to CSA-S304 and CSA-A370. Use stainless steel in all exterior cavity wall locations.

### **2.2 MORTAR**

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: CSA A179.
- .3 Use aggregate passing 1.18 mm sieve where 10 mm thick joints are indicated.
- .4 Mortar for exterior masonry above grade:  
Loadbearing and Non-loadbearing: Type S based on Proportion specifications for field mixed mortar.

- .5 Following applies regardless of mortar types and uses specified above:  
Mortar for grouted reinforced masonry: Type S based on Proportion specifications.  
Proportion specification for mortar manufactured off-site.
- .6 Non-staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.
- .7 Grout: to CSA A179.
- .8 Exterior mortar colour for masonry to match masonry units.
- .9 Water: potable, clean and free of deleterious amounts of acids, alkalies or organic materials.

## **2.3 MIXES**

- .1 Mortar mixes and grout to CSA A179.
- .2 Pointing mortar: Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

## **2.4 REINFORCING, ANCHORS AND ACCESSORIES**

- .1 Ladder masonry joint reinforcing to CSA G36.4/G30.15 as indicated on drawings.
- .2 Reinforcing as indicated on drawings.
- .3 Bar reinforcement: to CSA-A371 and CSA G30.18, Grade 400 MPa.
- .4 Masonry connectors and materials to CAN A370 and CSA S304.
- .5 Corrosion protection: to CSA-S304, galvanized to CSA-S304 and CSA-A370.

## **2.5 FABRICATION**

- .1 Fabricate reinforcing in accordance with CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.
- .2 Fabricate connectors in accordance with CSA-A370.
- .3 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .4 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
- .5 Ship reinforcement and connectors, clearly identified in accordance with drawings.

## **3 Execution**

### **3.1 EXAMINATION**

- .1 Examine work of other trades related to the Work of this Section for defects or discrepancies, report defects in writing to the Consultant.
- .2 Examine all details of the Work of other Sections as related to this Section.

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**3.2 PREPARATION**

- .1 Clean off and prepare surfaces as necessary to receive masonry, removing all dust, dirt and anything likely to reduce bond.
- .2 Supply and install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371, CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .3 Prior to placing concrete or grout, obtain Consultant's approval of placement of reinforcement and connectors.
- .4 Place and grout reinforcement in accordance with CSA-S304.1, CAN3-A371, and CSA-A179.

**3.3 INSTALLATION**

- .1 Concrete block units.
  - .1 Bond: running.
  - .2 Coursing height: 200 mm for one block and one joint as indicated.
  - .3 Jointing: Flush.
- .2 Concrete block lintels.
  - .1 Install reinforced special shape concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
  - .2 End bearing: not less than 400 mm, or as indicated on drawings.
- .3 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.
- .4 Lay all masonry units true to line, level and with accurately spaced courses. Keep reveals plumb and true. Corners fully bonded.
- .5 Clean off excess mortar immediately and clean masonry units.
- .6 Fill beds and vertical end joints evenly and solidly with mortar. Squeeze joints tight. Fully bed all webs adjacent to vertical grout filled cores.
- .7 Build in mechanical and electrical items in block coursing and sawn blocks. Chipping of blocks not permitted. Damaged units to be removed and replaced prior to grouting. Coordinate location of structural filled cores with location of recessed services and washroom accessories.
- .8 Do not shift or tap masonry units after mortar has taken initial set. Remove and replace mortar where adjustment is necessary.
- .9 Pre-determine setting out so that full length blocks occur beneath lintel bearings.
- .10 Exposed shells not allowed in completed work.
- .11 Install jamb, corner and end blocks into wall construction, building in all door anchors, anchor bolts, nailer strips, rough bucks and plates for the work of other trades.
- .12 Lintel blocks to bear 400 mm minimum at each jamb. Place rebar and concrete fill and allow to set before continuing the block wall as indicated on the drawings.
- .13 Carry up work, with no portion more than 1 200 mm above another at any time. Rack back between levels.
- .14 Reinforce and fill block cells with masonry grout specified at following locations:

- .1 Ends of free and abutting walls.
- .2 Jambs of openings.
- .3 Courses under plates requiring bearing.
- .4 Fixings for fixtures and other work built into and fixed to block, example, brackets, bearers, bolts and inserts. Fill block cells three courses deep.
- .5 Bond beams.
- .6 As noted on the drawings.
- .15 Support all concrete grout fill with expanded metal in the mortar joint below.
- .16 Provide clean out holes at the inside base for each lift of all grouted cores if grout pours exceed 1 200 mm in height.
- .17 Clean out vertical cores prior to grouting.
- .18 Pour grout in maximum 1200 mm lifts. Wait 15 to 60 minutes before the next lift to allow settlement and absorption of excess water.
- .19 Consolidate grout at time of pouring with flexible cable vibrator, re-consolidate later before grout loses plasticity.
- .20 Do not grout until masonry mortar has cured minimum 24 hours.
- .21 Install through wall flashing at base of wall, at shelf angle supports, at heads of doors and windows.
- .22 Install control joints at maximum 15 m spacings for reinforced masonry.

### **3.4 REINFORCEMENT**

- .1 Install steel reinforcement as indicated on structural drawings.
- .2 Consultant to inspect cores and reinforcement prior to sealing clean-out holes and grouting.

### **3.5 WORKMANSHIP**

- .1 Perform work to CSA Standard A371 and to the following tolerances:
  - .1 Variation from Mean Plane: Walls true within 3 mm when tested with a 3 000 mm straight edge.
  - .2 Variation from Plumb: Surfaces of walls, plumb within 1: 500.
  - .3 Variation from Level: For any course, maximum 6 mm in any structural bay or 6m distance.
  - .4 Variation in Sizes of Wall Openings: Maximum 6 mm from designated size of wall openings.

### **3.6 PROTECTION**

- .1 Protect corners and openings from accidental damage during construction.

- .2 Provide adequate bracing of walls during erection.
- .3 Protect masonry from freezing for 96 hours after grouting.

### **3.7 CUTTING AND PATCHING**

- .1 Cut masonry units exposed in finished work with approved type power saw. Grind and cut units before services are installed where electrical conduits, outlets or switch boxes occur.
- .2 Obtain approval of Consultant before cutting any part or area that impairs appearance or strength.

### **3.8 POINTING AND CLEANING**

- .1 After completion fill all holes and cracks, remove loose mortar and cut out defective work. Clean thoroughly all exposed surfaces. After initial set of mortar, strike joints and wipe wall surfaces with damp sponge, or burlap. Restrike joints.

### **3.9 CLEAN UP**

- .1 Remove all debris from the Work, upon completion, clean up all mortar splashes and droppings and leave areas broom clean.
- .2 Clean surfaces of mortar and any stains.
- .3 Clean interior faces of chases from overhanging mortar, including bottom of chase.
- .4 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural Drawings: Cast-in-Place Concrete.
- .2 Section 04 22 00: Concrete Unit Masonry.
- .3 Section 09 91 01: Painting.
- .4 Mechanical.
- .5 Electrical.

**1.2 SCOPE**

- .1 Provide and install all miscellaneous metal items indicated on the drawings and specified and scheduled.

**1.3 REFERENCE STANDARDS**

- .1 CAN/CSA S16.1, Limit States Design of Steel Structures.
- .2 CAN/CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel.
- .3 CSA W59-03(2008), Welded Steel construction (Metal Arc Welding).
- .4 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
- .6 ASTM A269, Specification for seamless and welded austenitic stainless steel tubing for general service.
- .7 City of Vancouver Building By-Law 2012.
- .8 CISC Code of Standard Practice.
- .9 CAN/CSA S136, Cold Formed Steel Structural Members.

**1.4 DESIGN CRITERIA**

- .1 Design free-standing handrails and guardrails in all areas to meet minimum Code loading requirements. Loading on guardrails to conform to Code requirements for guardrails in public buildings.
- .2 Provide handrails and railings to allow for thermal movements resulting from change in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections and other detrimental effects.
- .3 Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

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**1.5 SITE DIMENSIONS**

- .1 Check dimensions for all miscellaneous metal items on site. Be responsible for the correctness of such measurements and report to the Consultant in writing prior to commencing work, all discrepancies between measurements at building and those shown on the drawings.
- .2 Verify location of anchor bolts and embedded steel. Ensure that work prepared by other trades is at a proper elevation, on line, level and true.

**1.6 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- .2 Indicate materials, core thickness, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, accessories and erection details. Indicate location, type size and extent of all welds. Splices not indicated on shop drawings will not be accepted.
- .3 Submit engineered shop drawings for handrails, guardrails, stairs, ladders and all other structural items prepared, signed and sealed by a Registered Professional Structural Engineer licensed in British Columbia. Design and fabricate work in accordance with City of Vancouver Building By-Law.
  - .1 The engineer is to submit the following Schedules:
    - .1 Submit Schedule B-1, 'Assurance of Professional Design and Commitment for Field Review' and Schedule B-2, 'Summary of Design and Field Review Requirements' with shop drawings.
    - .2 Submit Schedule C-B, 'Assurance of Professional Field Review and Compliance' promptly on completion of work.
- .4 Submit loading table appropriate to span of Bar Grating for review by Consultant.
- .5 Samples: Provide samples of the following materials for Consultant review prior to ordering materials for fabrication:
  - .1 Metal grating.

**1.7 QUALITY ASSURANCE**

- .1 Perform work of this Section by a Contractor with a minimum two years experience in the fabrication and working of metals including, cutting, bending, forming and finishing.
- .2 Fabricators to be certified by the Canadian Welding Bureau in Accordance with CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.
- .3 Welding to conform to CSA W59.

**1.8 INSPECTION AND TESTING**

- .1 Allow free access to all parts of the work at all times for the purposes of inspection.
- .2 Prior to commencement of work provide a schedule of shop fabrication.
- .3 The Consultant may reject at any time during the process of the work a piece of material for any member that he may find defective or not in accordance with the detailed



drawings. The material may be rejected notwithstanding any previous acceptance and components so rejected shall be replaced at no expense to the Owner. In case of dispute, the decision of the Consultant shall be final.

- .4 Inspection and testing of metal fabrications to be carried out by a certified testing laboratory in accordance with CAN/CSA S16.
  - .1 Testing agency to submit letters of assurance sealed by a professional engineer certified in British Columbia that the testing complies with the requirements of CAN/CSA S16, including the frequency of tests and that the structural steel complies with the project specifications and design requirements.
  - .2 Perform non-destructive critical welds testing.
  - .3 Contractor to pay for all testing.

## **1.9 CO-OPERATION**

- .1 Schedule manufacture and installation to conform to the Construction Schedule.
- .2 Co-operate with other trades, make connection to and adjustments for other work.
- .3 Deliver and set in place miscellaneous metal items to be built into adjoining work.
- .4 Protect the work of other sections from damage by the work of this Section.

## **1.10 DELIVERY STORAGE AND HANDLING**

- .1 Fabricate large assemblies to permit safe, easy handling to place of installation.
- .2 Store assemblies above ground.
- .3 Exercise care in handling, storing and installing all material to prevent bending, twisting or structural or visual damage.
- .4 Correct damaged material; where damage cannot be repaired, replace the item at no additional cost to the Owner.

## **1.12 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Steel shapes and plates: to CAN/CSA-G40.21-350W.
- .2 Plates and flat bars: to CAN3-G40.21-300W.

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- .3 Structural sections: to CAN3-G40.21-350W, Class C.
  - .4 Fasteners: aluminum, cadmium plated steel, stainless steel, finished to match adjacent material.
  - .5 Steel handrail pipe: to ASTM A53 Grade B, standard weight.
  - .6 Handrail brackets, where not detailed: Wagner Style P-3 cast malleable iron.
  - .7 Welding materials: to CSA W59.
  - .8 Bolts and anchorbolts: to ASTM A307.
  - .9 High strength bolts to ASTM A325.
  - .10 Grout: non-shrink, non-metallic, natural aggregate grout, flowable, 24h, minimum compressive strength 40 MPa.
  - .11 Sand: Specially graded and processed to suit epoxy grout mix design.

## **2.2 FABRICATION**

- .1 Use new metals free from defects and of alloys of the best commercial quality suitable for the intended use.
- .2 Use only metals free of excessive rust, mill scale and discolouration.
- .3 Fabricate work square, true, straight and accurate to required size, with joints closely fitted, flush with adjacent surfaces and properly secured. Execute work in accordance with reviewed shop drawings.
- .4 Use counter-sunk, self-tapping, shake-proof flat headed screws on items requiring assembly by screws or as indicated. Fasteners to be same material, colour and finish as metal fastened unless noted otherwise.
- .5 Where possible, fit and shop assemble work, ready for erection.
- .6 Fabricate curved work to smooth, uniform, constant radii as indicated.
- .7 Weld to avoid distortion, discolouration or damage to the members.
- .8 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .9 Provide all required holes in metalwork for attachment or attaching other materials.
- .10 Reinforce all work to suit the purpose intended and to withstand design loads.
- .11 Provide temporary bracing as required to maintain alignment during shipment and installation.

## **2.3 FINISHES**

- .1 Exterior Steel and as noted: Galvanizing: hot dipped galvanizing with zinc coating 600 g/m<sup>2</sup> to CAN/CSA-G164. Galvanized steel scheduled for painting is not to be treated with chromate or similar passivation treatments.
- .2 Shop coat primer: to CAN/CGSB-1.40.

- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 Zinc Rich Paint: to CGSB1-GP-181M, high zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing minimum 94% zinc dust by weight.
- .5 Bituminous paint: to CAN/CGSB-1.108.

## **2.4 SHOP PAINTING**

- .1 Apply one shop coat of primer to metal items, with exception of galvanized steel, aluminum or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale and grease to a minimum dry film thickness of 1.0 to 1.5 mils. Do not paint when temperature is lower than 7°C.
- .3 Clean surfaces to be field welded; do not paint.
- .4 Clean all metal prior to painting to completely remove millscale, rust and spatter.
- .5 Clean interior and exterior metal to be painted in accordance with SSPC-SPI Solvent Cleaning followed with SSPC SP.6 Commercial Blast Cleaning.
- .6 Do not use temporary shop primers for exterior and interior painted steel work. Where non-complying primers are used, remove same from all surfaces and prime surfaces in accordance with the requirements of Section 09 91 00 for painted steel work at no additional cost to the Owner.

## **2.5 PIPE RAILINGS, GUARDRAILS AND HANDRAILS**

- .1 Steel: formed to shapes and sizes as indicated.
- .2 Prime finish interior handrails, railings and brackets for site painting.
- .3 Galvanized finish exterior handrails, railings and brackets for site painting.
- .4 Handrail brackets: Manufactured formed metal, profiled rail support with round diameter wall mounting plate and centre opening for 10 mm expansion or lag bolt.

## **2.6 MISCELLANEOUS ITEMS**

- .1 As detailed or indicated on drawings.
- .2 Prime finish for site painting where indicated.
- .3 Galvanized finish where indicated.
- .4 Items include, but are not limited to the following:
  - .1 Galvanized steel pipe bollards, concrete filled set in concrete base and concrete filled with anchor plate.
  - .2 Covers and frames.
  - .3 Imbeds for cast-in-place concrete.
  - .4 Galvanized roof access ladder.
  - .5 Miscellaneous steel shown on architectural drawings.

- .6 Concrete masonry wall restraining angles.
- .7 Galvanized loose support angles for brick masonry.

### **3 Execution**

#### **3.1 ERECTION**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts, shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16, or weld. Prevent bolt nuts from loosening. Use security fasteners in all inmate areas.
- .7 Provide cast-in-place sleeves for exterior railings and guard rails. Grout pipe rail supports in place level with adjacent surfaces.
- .8 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .9 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .10 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
- .11 Prime metal surfaces to be placed in contact with concrete and masonry with two coats of bituminous paint.
- .12 Isolate connections of dissimilar metals.

#### **3.2 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

#### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural drawings: Cast-In-Place Concrete.
- .2 Section 03 35 00: Concrete Finishes.
- .3 Section 04 22 00: Concrete Unit Masonry.
- .4 Section 05 50 00: Metal Fabrications.
- .5 Section 06 20 00: Finish Carpentry.
- .6 Section 07 21 13: Board Insulation.
- .7 Section 07 21 16: Blanket Insulation.
- .8 Section 07 26 13: Above Grade Vapour Retarder.
- .9 Section 07 52 00: Modified Bituminous Roofing.
- .10 Section 07 61 13: Sheet Metal Roofing.
- .11 Section 07 62 00: Metal Flashing and Trim.
- .12 Section 08 11 00: Metal Doors and Frames.
- .13 Section 08 11 16: Aluminum Doors and Frames.
- .14 Section 08 44 00: Curtain Wall.
- .15 Section 09 21 16: Gypsum Board.
- .16 Section 09 91 00: Painting.
- .17 Section 10 28 00: Toilet, Bath and Laundry Accessories.
- .18 Mechanical.
- .19 Electrical.

**1.2 REFERENCES**

- .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA O121- 08(R2013), Douglas Fir Plywood.
- .4 CAN/CSA-O141- 05 (R2014), Softwood Lumber.
- .5 CSA O151-09(R2014), CSP Plywood.
- .6 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

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**1.3 WORK INCLUDED**

- .1 The work is based on the installation of services to the electrified hardware and exit control equipment capable of supporting operations specified in the Sequence of operation listed in Section 08 71 00, a supply only Section.
- .2 The contractor shall be responsible for the complete supply of services to all system components specified herein, including access related peripheral hardware applications on the controlled portal where specified. This Contractor shall not include the supply of actual hardware devices or installation services included for in Section 08 71 00 or Division 6.
- .3 Reference 08 71 00 Finish Hardware for supply of mechanical and electrified finish hardware.

**1.4 QUALITY ASSURANCE**

- .1 All lumber to be in accordance with NLGA Standard Grading Rules for Canadian Lumber and shall bear the grading stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 All lumber to be marked at mill and end-marked, delivered to site with certificates as to species, grades, stress grades, seasoning, moisture content, and other evidence as required by the Consultant to show compliance with specifications.
- .3 All lumber to be properly air dried and seasoned and shall not exceed a maximum moisture content of 19% for exterior use and 12% for interior use lumber.
- .4 All plywood types and grades to be in accordance with CSA and COFI requirements and shall bear the registered certification stamp of an agency certified by COFI.
- .5 All preservative treated lumber shall be in accordance with CAN/CSA-080 requirements and shall bear the stamp of an approved independent inspection agency.
- .6 Only qualified journeymen carpenters who have a "Tradesman Qualification Certificate of Proficiency" from a recognized trade school with a minimum of three (3) years of local experience shall be engaged in rough carpentry work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

**1.5 DELIVERY AND STORAGE**

- .1 Arrange for materials delivery in accordance with construction schedule.
- .2 Protect materials from weather during transit to the job site.
- .3 Store materials on site in a manner that protects them from damage and exposure to moisture.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

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**2 Products**

**2.1 MATERIALS**

- .1 Lumber: Unless specified otherwise, softwood, S4S, moisture content maximum 18% for exterior, maximum 12% for interior in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, and fascia backing, urea formaldehyde free:
  - .1 Board sizes: "Standard" or better grade.
  - .2 Dimension sizes: "Standard" light framing or better grade.
  - .3 Post and timbers sizes: "Standard" or better grade.
- .3 Panel Materials: Panel standards, type, grade and thickness as specified on drawings in accordance with the following standards:
  - .1 Douglas Fir Plywood (DFP): to CSA 0121-08, standard construction.
  - .2 Canadian Softwood Plywood (CSP): to CSA 0151-04, standard construction.
  - .3 Poplar Plywood (PP): to CSA 0153-M1980(R2003), standard construction.
- .4 Equipment and Accessories Blocking: blocking to suit Owner's performance requirements for installed equipment.
- .5 Provide electrical equipment backboards for mounting electrical/telephone equipment as indicated. Use 19 mm thick GIS fire retardant treated plywood, installed from floor base level to 2400 mm off finished floor. Use 19 mm x 38 mm furring around perimeter and at maximum 300 mm intermediate spacing behind panels.

**2.3 ACCESSORIES**

- .1 Nails, spikes and staples: to CSA B111, stainless steel where used outside the moisture barrier.
- .2 Stainless steel Type 316L connectors and fasteners for pressure preservative treated wood.
- .3 Bolts, washers, driftpins, dowels, etc. to CSA B33.1, galvanized in exterior locations and treated wood.
- .4 General purpose adhesive: to CSA 0112 Series.
- .5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

**2.4 OTHER MATERIALS**

- .1 Air Seal: Closed cell polyurethane or polyethylene.

**2.5 FINISHES**

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for all exterior work.

**2.6 WOOD PRESERVATIVE**

- .1 Pressure Impregnation Wood Preservative:

- .1 Lumber: CAN/CSA - 080.20, non-arsenic, non-chromium pressure treated wood produced in accordance with ACQ Preserve standard ACQ-01-02 and the appropriate AWPA Standards.
- .2 Plywood: CAN/CSA - 080.27, CCA.
- .2 Wood in contact with concrete, masonry, at roof upstands in flat roofs: Pressure treatment minimum 1.95 kg/square metre to ACQ-01-02, green tint, water borne, alkaline copper quaternary (ACQ) preservative. Material to bear Canadian Wood Preservers Bureau (CWPB) stamps. Sizes indicated.
- .3 Use Hem-Fir incised lumber for treatment.
- .4 Treat cut surfaces with two brush coats of copper naphthanate preservative.
- .5 Where work to follow may be adversely affected by staining or other problems due to the use of preservatives, follow manufacturer's recommendations and apply a sealer or aluminum paint to treated wood in preparation for other trades.

## **2.7 FIRE RETARDANT TREATMENT**

- .1 Conform to the following requirements when tested in accordance with ASTM E-91a and CAN/ULC S102 and CAN/CSA O80 Series:
  - .1 Flame spread: 25 or less.
  - .2 Fuel Contributed: 25 or less.
  - .3 Smoke Developed: 50 or less.
- .2 Fire-retardant treated wood to bear Underwriter's Laboratories of Canada (ULC) label complying with above. Use kiln or air dried wood to maximum moisture content of 18%, or 12% where stain finish is indicated, treated with salts, then kiln dried to 18% again.
  - .1 Acceptable manufacturer, Timber Specialties Flameproof or approved substitution.
- .3 Fire-retardant treated wood to bear ULC label or be accompanied by certificate acceptable to Consultant showing compliance with ULC approved treatment. Wood treated in accordance with retardant manufacturer's instructions to provide required ULC rating.

## **3 Execution**

### **3.1 PREPARATION**

- .1 Re-treat preservative treated surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .2 Preservative treated material as follows:
  - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
  - .2 Wood furring on outside surface of steel stud walls.
  - .3 Wood in contact with concrete slabs on grade.
- .3 Ensure plates and joists are below 15% moisture content before framing structure.



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**3.2            INSTALLATION**

- .1        Comply with requirements of Minor Combustible Components of the City of Vancouver building By-Law, supplemented by the following paragraphs.
- .2        Install members true to line, levels and elevations, square and plumb.
- .3        Construct continuous members from pieces of longest practical length.
- .4        Install spanning members with 'crown edge' up.
- .5        Frame for air tightness as shown on drawings.
- .6        Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .7        Install furring and blocking as required to space-out and support casework, shelving, cabinets, wall and ceiling finishes, facings, fascia, soffit, washroom accessories, grab bars and other work as required.
- .8        Align and plumb faces of furring and blocking to tolerance of 1:600.
- .9        Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .10       Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners. Minimum size curbs 50 x 250 nominal unless indicated otherwise.
- .11       Construct curb members of single pieces. Form corners by lapping side members alternately.
- .12       Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .13       Countersink bolts where necessary to provide clearance for other work.
- .14       Use stainless steel fasteners for all wood exposed to the exterior and at pressure preservative treated wood.
- .15       Do finish carpentry to Architectural Woodwork Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .16       Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .17       Form joints to conceal shrinkage.
- .18       Back prime all fascia, trim and soffit material scheduled to receive paint or stain finish. Prime cut edges.
- .19       Fastening.
  - .1        Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
  - .2        Provide heavy duty fixture attachments for wall mounted cabinets.
  - .3        Apply water resistant building paper over wood members in contact with masonry or cementitious construction.

- .4 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .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.
- .6 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .7 Install finishing hardware items to cabinet work in accordance with manufacturer's instructions.
- .8 After installation fit and adjust operating hardware.

### **3.3 PLYWOOD SHEATHING**

- .1 Fasten as required and stipulated in the City of Vancouver building By-Law or as indicated. Use corrosion resistant or hot-dipped galvanized fasteners in all exterior locations.
- .2 Plywood Floor and Wall Sheathing: Lay sheets with face grain perpendicular to framing. Locate end joints over solid bearing and stagger adjacent rows of sheathing minimum 800 mm throughout the area.
- .3 Install underlayment for resilient flooring on plywood flooring at Mobile storage areas.

### **3.4 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 06 40 00: Architectural Woodwork.
- .3 Section 08 11 00: Metal Doors and Frames.
- .4 Section 08 11 16: Aluminum Doors and Frames.
- .5 Section 08 14 00: Wood Doors.
- .6 Section 08 71 00: Finish Hardware.
- .7 Section 09 21 16: Gypsum Board.
- .8 Section 09 21 16: Non-Structural Metal Framing.
- .9 Section 09 91 00: Painting.

**1.2 REFERENCES**

- .1 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
- .2 CSA B235.4 - 1972 Wood Screws.
- .3 CSA O121- 08(R2013), Douglas Fir Plywood.
- .4 CAN/CSA O141- 05(R2014), Softwood Lumber.
- .5 CAN/CGSB – 11.3-M87, Hardboard.
- .6 ANSI A208.2-16, Medium Density Fiberboard (MDF).
- .7 AWMAC Quality Standards for Architectural Woodwork.
- .8 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

**1.3 SITE CONDITIONS**

- .1 Inspect all conditions on which this work depends, starting work implies acceptance.
- .2 Verify all dimensions on site.

**1.4 DELIVERY AND STORAGE**

- .1 Store all finish carpentry materials and millwork items in a clean dry place on the site. Protect from damage and adverse moisture and temperature conditions.
- .2 Take delivery of, store and be responsible for all Millwork and Finish Hardware.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

- .2 Do not dispose of unused materials into landfill.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Softwood lumber: unless specified otherwise, S4S, kiln dried to 6% maximum moisture content for interior work, 12% for exterior work, selected for clear finish:
  - .1 CAN/CSA O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 AWMAC custom grade, moisture content as specified.
- .2 Hardwood lumber: Plain sawn, S4S, kiln dried to 6% maximum moisture content for interior work, selected for clear finish.
- .3 Finger jointed Pine window sills with bullnosed edge.
- .4 Fascia: Combed Cedar 50 mm minimum thickness
- .5 Interior Paneling: Western Red Cedar, kiln dried, T&G v-joint, 1 x 4 nominal, EV1S, WRCLA1, A Clear Grade conforming to NLGA 201b/WCLIB 106-a.
- .6 Interior Ceiling Panels: Conform to Section 8 of the Architectural Woodwork Standards for Custom Grade wall panels, coffered and flat as indicated.
  - .1 Species: Douglas Fir Plywood.
  - .2 CNC perforated panels, 25 mm diameter holes, pattern indicated.
  - .3 Blocking: Continuous at panel reveals, matching panel core, painted matt black.
  - .4 Accessories:
    - .1 25 mm thick mm ductliner, without manufacturer's labels. Factory coated black pigmented mat on surface and edges.
- .7 Window Sills: Sanded Poplar plywood with finger jointed Pine edge.
- .8 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .9 Wood screws: to CSA B35.4 electroplated, type and size to suit application.

## **3 Execution**

### **3.1 PREPARATION**

- .1 Condition materials to temperature and humidity of location of installation for minimum 72 hours prior to installation.

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**3.2 INSTALLATION**

- .1 Do finish carpentry to Architectural Woodwork Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.
- .4 Back prime all fascia, trim and soffit material scheduled to receive paint or stain finish. Prime cut edges.
- .5 Fastening.
  - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
  - .2 Apply water resistant building paper over wood members in contact with masonry or cementitious construction.
  - .3 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
  - .4 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.
  - .5 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
  - .6 Provide heavy duty fixture attachments for wall mounted cabinets.
  - .7 Install finishing hardware items to cabinet work in accordance with manufacturer's instructions.
  - .8 After installation fit and adjust operating hardware.

**3.3 WOOD DOOR STORAGE AND PROTECTION**

- .1 Store doors flat on a level surface in a dry, well-ventilated building. Seal all edges of doors if stored at job site for more than one week.
- .2 Cover doors to keep clean and avoid discolouration with an opaque covering that does not permit light penetration. Covering must allow air circulation.
- .3 Protect doors from extremes of heat and/or humidity conditions. Maintain relative humidity of between 30 and 60 percent.
- .4 Handle doors with clean gloves. Do not drag doors across one another or across other surfaces.

**3.4 DOOR PREPARATION AND INSTALLATION**

- .1 Prepare all new doors to receive finish hardware.
- .2 Install all hollow metal doors and wood doors at locations indicated and in accordance with door schedule.
- .3 Hang all hollow metal and wood doors to open and close smoothly with no binding. Maintain an even margin between door and jamb on all sides sufficient to allow free action of the door.
- .4 Readjust and check all doors upon completion of the work correcting any restrictions to the free action of the door caused by paint, moisture or improper fixing of hardware.

- .5 Clearance on doors at head and jambs to be 3 mm and 5 mm at threshold except where scheduled to be undercut. Bevel latch edge of doors allowing for swing clearance.
- .6 Remove and replace doors as necessary for finishing, including finishing of all edges.

### **3.5 FINISH HARDWARE INSTALLATION**

- .1 Install all finish hardware for doors as listed under Door Schedule and approved hardware schedule. Hardware supplied under Section 08 71 00.
- .2 Receive, store and be responsible for all finish hardware.
- .3 Provide lockable space at site for storage of hardware and appoint a responsible person to distribute and record all transactions dealing with finish hardware. This person to be the only person authorized to handle keys.
- .4 Install hardware in accordance with manufacturer's instructions and templates. Fit accurately, securely and adjust carefully.
- .5 Locate all hardware in accordance with manufacturer's recommendations.
- .6 Check all items delivered to ensure they conform to the final approved hardware schedule. Examine hardware list and all contract documents for the true quantities of hardware required, their exact location, function and operation and check delivered items to ensure that all requirements are met.
- .7 Align weather stripping for exterior doors for full contact and ensure a tight seal around full perimeter of doors. Cope all intersecting members to ensure leak proof corners and fix all members securely in position. Install weather stripping prior to door final adjustments.
- .8 Install all thresholds at exterior doors in a full bead of sealant along both exposed edges.
- .9 Coordinate installation of hardware with Painting Subcontractor. Remove all hardware from doors to be finished, store and safeguard and re-install after finishing.
- .10 Adjust all hardware as necessary at completion of the project to ensure complete and satisfactory operation.
- .11 Mount hardware in accordance with recommended locations as listed under Canadian Metric Guide for Steel Doors and Frames prepared by the Canadian Steel Door and Frame Manufacturers Association.

### **3.6 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 06 20 00: Finish Carpentry.
- .3 Section 07 92 00: Joint Sealants.
- .4 Section 09 21 16: Gypsum Board.
- .5 Section 12 36 40: Solid Surface Countertops.
- .6 Mechanical.
- .7 Electrical.

**1.2 DESCRIPTION**

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 specification Sections apply to this Section.
- .2 This Section includes the supply, fabrication, delivery to the site and installation of architectural woodwork as indicated on the drawings and as specified.
- .3 Include all clear, kiln dried, dressed or resawn material exposed to view in a finished building interior, including casework, doors, trim and other wood-related products.
- .4 Supply cabinet hardware by this Section.
- .5 Coordination of Mechanical and Electrical services within architectural woodwork.

**1.3 QUALITY ASSURANCE STANDARDS**

- .1 The reference Standard is the Architectural Woodwork Manufacturers Association of Canada (AWMAC), Architectural Woodwork Standards, Edition 2. It is referred to as the Architectural Woodwork Standards and will form part of the project specification.
- .2 Reference to Custom grade is as defined in the Architectural Woodwork Standards.
- .3 Items not given a specific grade, grade will be Custom grade as defined in the Architectural Woodwork Standards.
- .4 All architectural woodwork must meet the requirements of the AWMAC Architectural Woodwork Standards.
- .5 References to part and item numbers mean those parts and items contained within the AWMAC Architectural Woodwork Standards.
- .6 Materials and installation to be in metric measurement.

**1.4 SUBMITTALS**

- .1 Shop Drawings:
  - .1 Prepare and submit shop drawings for review by the Consultant in accordance with Section 01 33 00.

- .2 Show construction details of all architectural woodwork and general arrangements, typical and special installation conditions, materials being supplied and all connections, attachments, anchorage and location of exposed fastenings, as applicable. Indicate plastic laminate seam locations.
  - .3 Incorporate plans, elevations, sections and details. Show and specify all thickness, types and finishes and all cabinet hardware.
  - .4 Do not fabricate until the shop drawings and other related submittals are reviewed by the Consultant.
- .2 Samples:
- .1 Submit substitute cabinet hardware from specified items to the Consultant for approval.
  - .2 Submit three 150 mm long samples of edge banding to the Consultant for approval prior to fabrication.
  - .3 Provide a mock-up sample of a cabinet, which may be incorporated into the work. The mock-up sample is to display representative veneer quality and be complete with specified hardware. Obtain approval from Consultant and AWMAC inspector of mock-up sample prior to fabrication of the remaining millwork.
  - .4 Submit minimum 300 x 300 mm stain samples for wall paneling for approval by Consultant.
  - .5 Submit sample of wall panels, minimum 300 x 300 mm size indicating panel veneer, finish and exposed and reveal edge treatment for approval by Consultant.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle architectural woodwork in accordance with Section 10 of the Architectural Woodwork Standards.
- .2 The Consultant will reject damaged materials or materials which do not comply with the specifications. Replace damaged or unacceptable materials with acceptable materials.

#### **1.6 ENVIRONMENTAL CONDITIONS**

- .1 Install materials only in areas with a constant and minimum temperature of 15°C and to materials with a maximum moisture content of 12%.

#### **1.7 COOPERATION**

- .1 Cooperate with other trades and do all cutting, trimming etc in order to accommodate the work of others.
- .2 Coordinate and sequence installation with Mechanical and Electrical for plumbing and electrical work.

#### **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with 01 74 19 – Construction Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.



- .3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Construction Waste Management Plan.
- .4 Dispose of unused finish and adhesive materials at hazardous material collections site.
- .5 Do not dispose of unused finish and adhesive materials into sewer system, into streams, lakes, onto ground or in other locations where it will pose health or environmental hazard.

## **2 Products**

### **2.1 GENERAL**

- .1 Use clean stock only and comply with AWMAC Architectural Woodwork Standards for the following grades.
- .2 Added urea-formaldehyde based products are not allowed.
- .3 MDF: Industrial Grade Medium Density Fiberboard (MDF) manufactured with a formaldehyde-free binder, density 769 kg/m<sup>2</sup>, conforming to ANSI A208.2-2002. Moisture resistant MDF panel to be used in all high moisture locations.
- .4 Softwood Plywood: to CSA O151.
- .5 CSA O153, Poplar Plywood G2S, sanded faces.
- .6 Softwood lumber: unless specified otherwise, S4S, moisture content 12 % or less in accordance with following standards:  
CAN/CSA-O141.  
NLGA Standard Grading Rules for Canadian Lumber.  
AWMAC custom grade, moisture content as specified.
- .7 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .8 Post formed plastic laminate on MDF window sills.
- .9 Nails and staples: to CSA B111.
- .10 Wood screws: type and size to suit application.
  - .1 Stainless steel Robertson head wood screws and stainless steel finishing washers on exposed fasteners.
- .11 Splines: wood.
- .13 Stainless Steel:
  - .1 Stainless steel shape: Type 302/304, Mill polished No. 4 to ASTM A167, Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  - .2 Stainless Steel Sheet: to ASTM A 167-96, Type 316, with #4 finish. 1.58 mm and 1.98 mm thickness.

### **2.2 CASEWORK**

- .1 Conform to Section 10 of the Architectural Woodwork Standards as applicable.
- .2 Casework for Plastic Laminate Finish:

- .1 AWMAC Quality Grade: Custom. Locations as noted on the drawings, generally millwork, storage cupboards and shelving.
- .2 Construction: Conform to Section 10 of the Architectural Woodwork Standards for Flush Overlay Casework. Close voids and cavities at inside corners and behind end fillers of upper cabinets. Refer to drawings for construction details.
- .3 Exposed Parts: Plastic laminate on MDF. Underside of upper cabinets are considered exposed surface.
- .4 Semi-Exposed Parts: Plastic laminate on veneer core plywood.
- .5 Shelving: Plastic laminate finish on veneer core plywood.
- .6 Edge Banding: Conform to Section 10 of the Architectural Woodwork Standards, edge as indicated.
  - .1 3 mm ABS edging, colour matched to plastic laminate.
- .7 Concealed Parts: Backer to manufacturer's option.
- .4 Cabinet Hardware: Supply and install all cabinet hardware as follows:
  - .1 Drawer Slides:
    - .1 Concealed Undermount Roller Bearing Slide, Full extension, easy close, Eclipse Accuride C3132EC.
      - .1 Length to suit.
      - .2 Weight capacity: 45 kg/pair.
  - .2 Shelf Standards and Brackets:
    - .1 Adjustable standards mortise mounted – BHMA B04071, B04073; closed shelf rest for standards B04081, B04083.
  - .3 Hinges:
    - .1 Blum 120 degree, full overlay, soft close or similar product by Mepla.
  - .4 Catches: Roll-it magnetic, Amerock T9783 magnetic, Ajax Hardware Corp. 28 magnetic or approved substitution.
  - .5 H1: Pulls: Richelieu 95100-171, stainless steel finish.
- .5 Countertops and Backsplashes:
  - .1 Plywood: Veneer core, water resistant type.
  - .2 Solid Surface Counter Tops: Refer to Section 12 36 40.
- .6 Plastic Laminates:
  - .1 Laminated plastic for flatwork and exposed finishes: to NEMA type A5, 1.27 mm thick.
  - .2 Laminated plastic backing sheet: NEMA Grade BKL, not less than 0.5 mm thick or same thickness and colour as face laminate.

- .3 Laminated plastic liner sheet: Grade GP, 0.5 mm thick, white colour.
- .4 PL1: Laminate:
  - .1 Manufacturer: Nevamar.
  - .2 Texture: As noted in Materials and Finishes List.
  - .3 Colour: Spa White S7040T.
- .5 Cabinet interiors: white Melamine.
- .7 Adhesives and sealants: Interior adhesives, sealants and sealant primers low VOC content.

### **2.3 FACTORY FINISHING**

- .1 Factory Finishing: finished to AWMAC Architectural Woodwork Standards Post Catalyzed Lacquer premium standard with stain and 220 grit sanding prior to topcoats. Satin sheen level.
  - .1 Submit duplicate stain and finish samples to the Consultant that show the complete finished appearance.
  - .2 Minimum size samples 300 x 300 mm.
  - .3 Record the following information on the sample:
    - .1 The Project.
    - .2 The Consultant.
    - .3 The Millwork Manufacturer.
    - .4 The stain number or identification of specific finishes that apply in a stepped sequence arrangement.
    - .5 Submit two or more sets of samples illustrating the potential range of finish variations within the veneer range.
    - .6 Cover and protect finish samples from sunlight exposure.
  - .2 Apply finishes in accordance with Section 5 of the AWMAC Manual.
  - .3 Field touch-up to include the filling and touch-up of exposed job-made nail and screw holes, refinishing of raw surface resulting from job fitting, repair of job-inflicted scratches and mars and final cleaning up of the finished surfaces.

## **3 Execution**

### **3.1 EXAMINATION**

- .1 Inspect as built conditions where millwork is to be installed. Report any defects in the work of other Sections that may affect the installation of millwork to the Consultant.

### **3.2 JOB CONDITIONS**

- .1 Install architectural casework under job conditions specified under Section 10 of the Architectural Woodwork Standards.

- .2 Install architectural countertops under job conditions specified under Section 11 of the Architectural Woodwork Standards.

### **3.3 INSTALLATION**

- .1 Coordinate installation of architectural woodwork with Mechanical and Electrical services.
- .2 Coordinate installation of steel and stainless steel supports for Millwork.
- .3 Cabinet and casework: Install in accordance with Section 10 of the Architectural Woodwork Standards.
- .4 Countertops: Install in accordance with Section 11 of the Architectural Woodwork Standards.
- .5 Wood Panels: Install wood panels according to manufacturer's recommendations and AWMAC Architectural Woodwork Standards Section 8.
  - .1 Adhere to filled and sanded smooth wood substrate.
  - .2 Use manufacturer recommended adhesive.
- .5 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .6 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets. Anchor free standing units to floor.
- .7 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm oc, 75 mm from edge. Make flush hairline joints.
- .8 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .9 Seal all countertop cutouts with a coloured latex sealer.
- .10 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- .11 Fit hardware accurately and securely in accordance with manufacturer's directions.
- .12 Apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where approved. Slightly bevel arrises.
- .13 For site application, offset joints in plastic laminate facing from joints in core.

### **3.4 CLEANING**

- .1 As installation progresses and upon completion clean up debris, packaging and left over materials.
- .2 Clean millwork and cabinet work, inside cupboards and drawers and outside surfaces.

### **3.5 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.

- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**3.6 PROTECTION**

- .1 Protect millwork from damage until building is accepted for use by Design Builder.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural drawings: Cast-In-Place Concrete.
- .2 Section 03 35 00: Concrete Finishes.
- .3 Section 07 21 00: Board Insulation.

**1.2 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.2- M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
  - .2 CAN/CGSB 37.3- M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.

**1.3 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00: Submittals Procedures.
- .2 Product data: manufacturer's printed product literature, MSDS data, specifications and application instructions for waterproofing materials.

**1.4 WORK INCLUDED**

- .1 Provide all labour, materials and equipment necessary for the installation of bituminous damp proofing to exterior foundation walls from within 100 mm of finished grade to elevation indicated.

**1.5 DELIVERY AND STORAGE**

- .1 Deliver all materials in original, undamaged wrappers or containers indicating date of manufacture, brand, and standards to which product conforms. Do not use products over 12 months old.
- .2 Store materials in a dry place at not less than 5 degrees C.
- .3 Store solvent based materials away from excessive heat and open flame.
- .4 Protect building materials from damage by:
  - .1 Fully covering stored materials.
  - .2 Elevating stored materials off ground.
  - .3 Disposing of materials with evidence of moisture damage.

**1.6 ENVIRONMENTAL CONDITIONS**

- .1 Apply materials in environmental conditions specified in manufacturer's literature.
- .2 Do not apply in rainy weather.

**1.7 PROTECTION**

- .1 During application protect the work of others from the Work of this Section.

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- .2 After completion of damp proofing application protect the Work from damage until cured.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 Construction Waste Management and Disposal.
- .2 Divert materials to municipal hazardous materials depot.
- .3 Divert unused wood, paper and metal materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 FOUNDATION DAMPPROOFING**

- .1 Spray or brush applied membrane conforming to CAN/CGSB 37.16-M89 and/or ASTM D4479/4479M, Type 1.
- .1 Acceptable products, Henry/Bakor700-01 or Henry/Bakor 710-11 or acceptable substitution.
- .2 Drainage Composite: High strength drainage composite consisting of a three dimensional, high impact polystyrene core with a polymeric sheet adhered to the back of the core and a high-strength non-woven filter fabric bonded to the individual dimples of the molded polystyrene core; conforming to ASTM D-1621 for strength and ASTM D-3776 for weight, approximately 10 mm total thickness. Acceptable product MiraDRAIN 8000.
- .3 Insulation: Refer to Section 07 21 13.

## **3 Execution**

### **3.1 SURFACE PREPARATION**

- .1 Before applying dampproofing:
- .1 Wire brush concrete to remove all loose material from surface to be treated.
- .2 Patch form tie holes and finish flush with adjacent surfaces. Allow patching to cure prior to application of dampproofing.
- .3 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound.

### **3.2 PROTECTION**

- .1 Cover walls and adjacent work where materials are used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Clean drainage systems of construction debris or excess membrane when work is complete.

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**3.3 FOUNDATION DAMPPROOFING**

- .1 Examine the surfaces to receive the membrane and report any discrepancies to the Consultant in writing prior to installing the waterproofing system.
- .2 Mask off adjacent areas and surfaces to prevent contact from membrane product during application.
- .3 Install membrane product on test area of each substrate to confirm compatibility of substrate with membrane.
- .4 Apply membrane in accordance with manufacturer's specific application specifications.
- .5 Do dampproofing in accordance with CAN/CGSB-37.3 except where specified otherwise.
- .6 Do not apply to wet surfaces.
- .7 Apply primer coat by brush or spray. Use manufacturer recommended material. Apply at rate of 2.03 square metre per litre. Completely cover all holes and cracks.
- .8 Allow primer to cure and dry.
- .9 Apply mastic to construction joints and all form tie holes prior to application of dampproofing.
- .10 Apply continuous, uniform coating to entire exterior faces of foundation walls from 100 mm below finished grade level to and including tops of foundation wall footings.
- .11 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.
- .12 Apply full bodied coating by brush at 0.68 square metres per litre. Apply two coats, total thickness minimum 60 mils.
- .13 Allow to cure and dry prior to commencement of backfilling.
- .14 Drainage Composite:
  - .1 Place and secure drainage panels to substrate according to manufacturer's written instructions. Use adhesives and adhesive strips (sheet flashing that does not penetrate waterproofing) as recommended by manufacturer.
  - .2 Overlap edges of dimpled core and ends of geo-textile to maintain continuity.
  - .3 At termination at grade install termination bar over waterproofing and drainage composite. Mechanically fasten with Hilti shotpins.
  - .4 Protect installed panels during subsequent construction.
- .7 Insulation: Refer to Section 07 21 00.

**3.4 CLEAN-UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

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**Part 1 General**

**1.1 DESCRIPTION OF SYSTEM**

- .1 Thermally broken exterior wall rain screen cladding supports, attached through exterior wall sheathing to wind bearing substrates.

**1.2.1 RELATED SECTIONS**

- .1 Section 04 22 00: Concrete Unit Masonry.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 07 21 13: Board Insulation.
- .4 Section 07 46 23: Wood Siding.
- .5 Section 07 46 46: Fibre Reinforced Cementitious Panels.
- .6 Section 09 25 13: Stucco.
- .7 Mechanical.
- .8 Electrical.

**1.3 REFERENCES**

- .1 British Columbia Building Code 2012.
- .2 CSA - S136-12, Cold Formed Steel Structural Members.
- .3 ASTM A653/A653M – 15e1 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A792/A792M – 10(2015) - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .5 ASTM A924/A924M – 17a, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .6 ASTM B209-10, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .7 ASTM B211-12e1, Standard Specification for Aluminum and Aluminum Alloy Rolled or Cold Finished Bar, Rod, and Wire.
- .8 ASTM B221-12, Standard for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .9 CGSB 1 -GP - 181 M Standard for: Coating, Zinc Rich, Organic Ready Mix.

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## **1.4 DESIGN CRITERIA**

- .1 Base design on Limit States Design principals using factored loads and resistances.
- .2 Determine loads and load factors in accordance with the British Columbia Building Code.
- .3 Determine resistances and resistance factors in accordance with the British Columbia Building Code and CSA-S136.
- .4 Design and size components to withstand seismic loads and displacement as calculated in accordance with British Columbia Building Code using an importance category of 'High'. Design and size components to accommodate a 1% interstory displacement.
- .5 Conform to the requirements of specified fire rated assemblies as noted required in assembly schedule.
- .6 Provide bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on sheathing to resist torsion or minor axis buckling.
- .7 Confine maximum deflections under specified loads to the following:
  - .1 Wall studs supporting material susceptible to cracking – L/360.
  - .2 Wall studs supporting material not susceptible to cracking – L/240.
- .8 Design and size components to withstand seismic loads and sway displacement.
- .9 Design components or assemblies to accommodate specified erection tolerances of the structure utilizing rain screen design. Design ventilating system assembly to accommodate movement of air into the rain screen cavity and move water vapour out.
- .10 Base resistances for sheet metal screws on the manufacturer's lower bound test values multiplied by the appropriate resistance factor,  $\phi_c$ , given in CSA - S136.
- .11 Thermal Barriers: Thermally isolate metal components from each other and support wall. Engineered thermally broken system to meet the minimum R-values required in the British Columbia Building Code and ASHRAE 90.1 2010.
  - .1 Framing system must not degrade complete wall assemblies thermal resistance by more than 17% and conform to ASHRAE 90.1 prescriptive U-value of wall assembly for appropriate climate zone.

## **1.5 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01300 – Submittals thermally broken exterior wall cladding supports.
  - .1 Each shop drawing submitted to bear the stamp and signature of a qualified professional structural engineer registered and licensed to practice in the province of British Columbia.
    - .1 The engineer is to submit the following Schedules:

- .1 Submit Schedule S-B, 'Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional' with shop drawings.
- .2 Submit Schedule S-C, 'Assurance of Professional Field Review and Compliance by Supporting Registered Professional' promptly on completion of work.
- .2 Indicate design calculations, including comprehensive analysis of design loads, dead loads, live loads, wind loads, seismic loads and thermal movement.
- .3 Indicate all thermally broken exterior wall cladding assemblies, all details, reinforcement, and method of assembly. Show fabrication and installation details, fastening details, field jointing and splicing anchor reinforcing, and structural supports. Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thickness, exclusive dimensions, openings, requirements of related work and critical installation procedures.
- .4 Submit thermal analysis report indicating assembly effective U-values for the exterior thermally broken framing system.
- .5 Submit three copies of engineering calculations and manufacturer's product data verifying the capacity of the members and the ability of the assemblies to meet the design requirements.
- .6 Submit three certified copies of mill reports covering chemical and mechanical properties, and coating designation of steel used in this work.
- .7 Test Data: Independent test results or engineered analysis for performance signed by independent agency representative.
- .8 Manufacturer's Instructions: Include installation instructions, clearances, special procedures, and conditions requiring special attention.
- .9 Do not fabricate until all submittals are reviewed.
- .10 Submit three copies of field review reports as required in Section 3.4.
- .11 Samples: Submit duplicate samples of each component and fastener in system assembly; minimum 300 mm length of lineal framing members.

## **1.6 QUALITY ASSURANCE**

- .1 Manufacturer:
  - .1 Documented minimum 5 years experience designing and supplying work of this Section.
  - .2 Maintain locally available technical product representation available to meet at project site as needed for meetings and inspections of work.
- .2 Installer:
  - .1 Trained and authorized by manufacturer as qualified to install work of this Section.

- .2 Employ full-time on-site superintendent or foreman to overseeing installation during work of this Section.
- .3 Submit documented successfully completed projects of equivalent scope and quality upon request by Consultant.

#### **1.7 MOCK-UP**

- .1 In conjunction with requirements of window and exterior wall assembly Sections, provide a mock-up of complete system at location directed by Consultant.
- .2 Provide as required to illustrate substrate, air barrier, insulation, framing, flashing, thermal isolation, and treatments at fenestrations, corners, and transitions.
- .3 Verify mock-up as conforming to manufacturer's instructions and provisions of Contract Documents.
- .4 Do not begin work of this Section until after inspection by manufacturer's representative is complete and mock-up has been accepted in writing by Consultant.
- .5 Protect and maintain accepted mock-up as standard of quality for work of this Section.
- .6 Accepted mock-ups may be incorporated into the work of this Section.

#### **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Conform to manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- .2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .3 Store and handle to keep clean, dry, and protected from damage due to weather and construction activities.

#### **1.9 WARRANTY**

- .1 Submit manufacturer's standard 10 year materials warranty covering defective materials and cold-formed metal framing system.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01742 - Waste Management and Disposal.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.

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**Part 2 Products**

**2.1 MATERIALS**

- .1 Acceptable products are listed below. Proposed alternative thermally broken exterior wall cladding supports require submission of system testing and approval of Consultant.
- .2 Thermal Spacer: 100% Pultruded glass fibre and thermoset polyester resin insulation clip.
  - .1 Thermal spacer thickness for top, base and web: 4.8 mm nominal.
  - .2 Thermal spacer depth: 89 mm. Depth tolerance +/- 0.127 mm.
  - .3 Spacer fasteners: High hex head washer head with sharp twin lead threaded design of heat treated corrosion resistant coated steel.
    - .1 Fastener for wood framing: High hex head washer head with sharp twin lead threaded design of heat treated corrosion resistant coated steel.
    - .2 Fastener for Cast-in-place concrete and concrete masonry units: ¼ - 15 x 143 mm long concrete screw with hex head.
      - .1 Acceptable material: Leyland Industries Inc., Concrete Screw with DT2000 coating, or acceptable substitution.
      - .2 Embedment depth: 38 mm, except when into hollow concrete masonry unit, not less than 25 mm.
  - .4 Z-Girts: 18 gauge thick galvalume AZM 150 coating 38 mm x 25 mm x 32 mm.
  - .5 Acceptable product, Cascadia Windows Inc., Cascadia Clip.
- .3 Insulation: Refer to Section 07 21 13.
- .4 Air/Vapour Barrier Membrane: Refer to Section 07 27 00.
- .5 Exterior Sheathing and Strapping: Refer to Section 06 10 00.

**Part 3 Execution**

**3.1 GENERAL**

- .1 Fabricate and erect to the approved shop drawings. Submit modifications, other than minor dimensional changes, required to accommodate as-built conditions.

**3.2 PREPARATION**

- .1 Pre-drill concrete masonry unit substrate to 13 mm deeper than anticipated embedment depth of fastener into substrate.
- .2 Use drill diameter approximately 1.6 mm less than screw diameter in accordance with fastener manufacturer's written recommendations.

- .3 Sub-framing: Ensure thermal spacer type is selected to accommodate orientation of vertical and horizontal sub-framing.

### **3.3 INSTALLATION**

- .1 Thermal support system Installation:
  - .1 Fasten thermal support system directly to substrate at maximum 660 mm on centre vertically and 400 mm maximum on centre horizontally or as indicated on approved Shop Drawings.
  - .2 Install thermal support system according to manufacturer's recommendations.
  - .3 For semi-rigid insulation batts or boards, score or cut insulation down its centerline to 50% maximum of its depth to enable fitting insulation in correct position.
  - .4 Fold edges of insulation board back to enable friction fitting in correct position. Position edges of partially folded board into space between girts and thermal spacers and flatten partially folded board against substrate.
  - .5 Ensure insulation is tightly fitted with sides of insulation slightly compressed at each insulation spacer.
  - .6 Install corrosion resistant stick pins or other mechanical insulation retention devices 400 mm maximum on centre along centerline of insulation batts or boards and in accordance with insulation manufacturer's written recommendations.
  - .7 Use sufficient number of stick pins or retention devices to ensure insulation remains flat and in correct position.
  - .8 Use minimum 3 stick pins or retention devices for each 1.2 m long batt or board.
  - .9 Ensure insulation pieces are in contact with no linear gaps between spacers.

### **3.4 INSPECTION**

- .1 Provide periodic field review during construction by the thermally broken exterior cladding support Design Engineer. Submit reports in accordance with Paragraph 1.5.
  - .1 Include the cost of this field review in the cost of the work of this Section.
- .2 Provide the necessary cooperation to ensure that the inspection can proceed.
- .3 The inspection does not relieve the Contractor of his responsibility for the performance of the contract. The Contractor is solely responsible for quality control. Provide supervisory and quality control procedures.
- .4 Materials or workmanship not conforming to the requirements of the contract documents may be rejected at any time during the progress of the work.

### **3.5 ADJUSTING**

- .1 Inspect and adjust after installation. Replace or repair defective work.

- .2 Adjust, and reconfigure as necessary to accommodate cladding systems for installations over work of this Section. Do not reuse pre-drilled holes unless fastener size is increased.

**3.6 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural drawings: Cast-In-Place Concrete.
- .2 Section 03 35 00: Concrete Finishing.
- .3 Section 04 22 00: Concrete Unit Masonry.
- .4 Section 06 10 00: Rough Carpentry.
- .5 Section 07 21 00: Cladding Support System.
- .6 Section 07 21 16: Blanket Insulation.
- .7 Section 07 27 00: Air Barriers.
- .8 Section 09 21 16: Gypsum Board.
- .9 Section 09 24 23: Cement Parging.
- .10 Mechanical.
- .11 Electrical.

**1.2 REFERENCES**

- .1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .2 CAN/ULC S114, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
- .3 CAN/ULC-S701-11, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4 CAN/ULC-S702-14, Thermal Insulation, Mineral Fibre, for Buildings.

**1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Store packaged material in original containers with manufacturer's labels and seals intact.
- .2 Prevent damage to materials during handling and storage. Keep materials under cover and free from damp conditions.

**1.4 PROJECT CONDITIONS**

- .1 Ensure temperature of surrounding areas is within recommended range. Avoid concentrated or irregular heating. Ensure proper ventilation.
- .2 Do not start work until conditions are satisfactory. Commencement of work signifies acceptance of conditions.
- .3 Consult other trades in advance and make provisions for work of other trades to avoid cutting and patching.



- 
- .4 Protect surrounding surfaces from damage.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

**2 Products**

**2.1 MATERIALS**

- .1 Foundation and Underground Insulation: Extruded Polystyrene Insulation; to CAN/ULC-S701, Type 4 shiplapped joints, thickness indicated. RSI 0.87/25.4 mm. Acceptable product, Dow Styrofoam SM, Owens-Corning Foamular 250.
- .1 Adhesive for polystyrene: to CGSB 71-GP-24M.
- .2 Location: Foundation Insulation, Column and Loading Bay foundations.
- .2 Exterior Wall Insulation: Mineral Fiber Insulation: Conforming to CAN/ULC-S702, Mineral thermal Insulation for buildings, Type 1.
- .1 Non-combustible: CAN4 S114, Test for Non-Combustibility.
- .2 Surface Burning characteristics, CAN/ULC S102:
- .1 Flame spread – 0.
- .2 Smoke Developed – 0.
- .3 Moisture Resistance: ASTM C 1104 – 0.03%.
- .4 Water Vapour Permeance: ASTM E, 96 Water Vapour Transmission – 1 895 ng Pa.s.m2.
- .5 Dimensional stability: ASTM C 356, <2% @ 650°C.
- .6 Thermal Resistance: ASTM C 518, R 4.0/4.3/inch.
- .7 Density: ASTM C 165, 176 kg/m3.
- .8 Compressive Strength: ASTM C165, 58.5 kPa at 10%.
- .9 Thickness: 1.25", two offset layers.
- .10 Acceptable product, Roxul Inc. Rockwool Comfortboard 80.
- .3 Joint Sealing Tape: Pressure sensitive, air-resistant tape type recommended by vapour retarder manufacturer, 50 mm width.
- .4 Sealant: One component silicone sealant, Dow Corning 795, CGE Silpruf or Tremco.

**3 Execution**

**3.1 INSPECTION**

- .1 Ensure that subgrade substrates to receive insulation are compacted, level and free of obstructions.

**3.2 WALL INSULATION INSTALLATION**

- .1 Follow directives of surface preparation required in the manufacturer's literature.
- .2 Install insulation over air/vapour barrier membrane on framing using mechanical fasteners.
- .3 Butt edges tightly.
- .4 Cut and trim insulation around service penetrations.
- .5 Offset joints minimum 150 mm between layers.

**3.3 FOUNDATION INSULATION INSTALLATION**

- .1 Follow directives of surface preparation required in the manufacturer's literature.
- .2 Install rigid insulation over dampproofing membrane on concrete substrate. Install rigid insulation around column and Loading Bay wall foundations for frost protection.
- .3 Apply adhesive to back of vertically installed insulation boards per notched trowel method as recommended by manufacturer. Offset joints between layers of insulation.
- .4 Cut and trim insulation around service penetrations. Caulk joints.

**3.4 ADJUSTING**

- .1 Make good all defects to installation or defects to other work caused by this installation.

**3.5 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 04 21 13: Brick Unit Masonry.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 07 26 13: Above Grade Vapour Retarder.
- .4 Section 09 21 16: Gypsum Board.
- .5 Mechanical.
- .6 Electrical.

**1.2 REFERENCES**

- .1 CAN/ULC-S702-14, Thermal Insulation, Mineral Fibre, for Buildings.

**1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Store packaged material in original containers with manufacturer's labels and seals intact.
- .2 Prevent damage to materials during handling and storage. Keep materials under cover and free from damp conditions.

**1.4 PROJECT CONDITIONS**

- .1 Ensure temperature of surrounding areas is within recommended range. Avoid concentrated or irregular heating. Ensure proper ventilation.
- .2 Do not start work until conditions are satisfactory. Commencement of work signifies acceptance of conditions.
- .3 Consult other trades in advance and make provisions for work of other trades to avoid cutting and patching.
- .4 Protect surrounding surfaces from damage.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Construction Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.

**2 Products**

**2.1 MATERIALS**

- .1 Mineral Fiber Insulation: Conforming to CAN/ULC-S702, Mineral thermal Insulation for buildings, Type 1.

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- .1 Non-combustible: CAN4 S114, Test for Non-Combustibility.
  - .2 Surface Burning characteristics, CAN/ULC S102:
    - .1 Flame spread – 0.
    - .2 Smoke Developed – 0.
  - .3 Moisture Resistance: ASTM C 1104 – 0.03%.
  - .4 Water Vapour Permeance: ASTM E, 96 Water Vapour Transmission – 1 895 ng Pa.s.m<sup>2</sup>.
  - .5 Dimensional stability: ASTM C 356, <2% @ 650°C.
  - .6 Thermal Resistance: ASTM C 518, RSI 2.45 – 89 mm stud; RSI 3.85 – 140 mm stud.
  - .7 Density: ASTM C612, outer layer - 100 kg/m<sup>3</sup>, inner layer – 60 kg/m<sup>3</sup>..
  - .8 Acceptable product, Roxul Inc. Rockwool Comfortboard 80 on exterior, ComfortBatt on interior.
- 
- .2 Batt Insulation - Acoustic: to CSA A101 M83. Type 1, formaldehyde free. Thickness as indicated, where thickness not indicated - minimum 90 mm.
    - .1 Acceptable material: Owens Corning QuietZone or Johns Manville Sound-Shield fiber glass blanket, friction fit. Rockwool Safe'n'Sound is an acceptable substitution.
    - .2 Location: Sound rated partitions and ceilings where indicated.

### **3 Execution**

#### **3.1 INSPECTION**

- .1 Ensure that surfaces to receive insulation are clean and free of obstructions.
- .2 Do not install insulation in framing until roofing is complete and the building is enclosed.

#### **3.2 BATT INSULATION INSTALLATION**

- .1 Install friction-fit batt insulation as indicated on drawings, full width and length of stud/joist spaces between framing members of walls and ceilings. Provide means to prevent sagging in stud and joist cavities.
  - .1 Fill in spaces between and around structural members, piping, bridging, etc. Pay close attention to these locations; ensure the required thickness is fully and consistently achieved.
  - .2 Do not fold batts or compress within studs.
- .2 Install friction fit mineral fiber insulation as indicated on the drawings, full width and length of stud/joist spaces between framing members of fire rated partitions as indicated.
  - .1 Place flexible batt into opening with flexible edge against stud, compress batt and fit batt to stud space, then let batt expand to fit stud space.

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- .2 When cutting batts avoid cutting the marked flexible edge.
  - .3 Use a serrated knife to cut back of batt to half its thickness when fitting over wiring or water pipes.
  - .4 At large drain pipes make two cuts at 45 degrees to form a V groove. Slip insulation into place around pipe.
  - .5 At electrical boxes, measure the location and depth of the electrical box and cut out a corresponding section of insulation. Slide batt behind the box and push into place.
  - .3 Install mineral fibre insulation between exterior wall cladding supports as indicated.
    - .1 Install friction fit mineral fibre insulation as firestop between z-girt framing in exterior wall assemblies as indicated.
    - .2 Mechanically fasten insulation with corrosive resistant fasteners c/w plastic stress plate tight to sheathing.
    - .3 Do not over compress insulation.

### **3.3 ADJUST AND CLEAN UP**

- .1 Make good all defects to installation or defects to other work caused by this installation.
- .2 At completion of the Work remove from the site all excess materials and debris resulting from the work of this Section. Leave site in clean, neat condition.
- .3 Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

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**1 General**

**1.1 RELATED WORK**

- .1 Section 06 10 00: Rough Carpentry
- .2 Section 07 21 16: Blanket Insulation.
- .3 Section 09 21 16: Gypsum Board.

**1.2 WORK INCLUDED**

- .1 The polyethylene vapour retarder forms the air barrier for the walls of this building. The polyethylene membrane has to be applied continuously with sealed laps and must be sealed to all penetrations, such as windows, at intersecting walls/floors and all mechanical and electrical fixtures and appurtenances.

**1.3 REFERENCE STANDARDS**

- .1 All Reference Standards are latest editions, unless noted otherwise.
- .2 CAN/CGSB - 51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

**1.4 MOCK-UPS**

- .1 Construct mock-up of polyethylene sheet vapour retarder installation around a window opening including one (1) lap joint around the jambs head and base of the window returns, and seal to the window frame. Mock-up is to include a full height wall section incorporating a corner, lap joints, method of sealing top and bottom of wall, method of sealing around penetrations through walls and at the underside of roof deck at the top floor level.
- .2 Accepted mock-ups may be part of finished installations.
- .3 Allow 24 hours for review of mock-ups by the Consultant before proceeding with further vapour retarder installations.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Divert unused materials from landfill to recycling facility.

**2 Products**

**2.1 POLYETHYLENE SHEET VAPOUR RETARDER**

- .1 Walls: To CAN/CGSB-51.34, 0.15 mm thick, polyethylene film.

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## **2.2 ACCESSORIES**

- .1 Joint Sealing Tape: Air resistant pressure-sensitive adhesive tape, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
  - .1 Y-8086 Contractor's Sheathing Tape by 3M Canada Inc.
- .2 Sealant: To CGSB 19.21, compatible with vapour retarder materials, recommended by vapour retarder manufacturer. Refer to Section 07 92 00 – Sealants.
- .3 Moulded Vapour Retarder Boxes: Factory-moulded polyethylene shells for use with recessed electric switch and outlet device boxes.

## **3 Execution**

### **3.1 INSTALLATION**

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Use sheets of largest practical size to minimize joints.
- .3 Inspect sheets for continuity. Repair punctures and tears with sealing tape before installations are concealed.
- .4 Wall vapour retarder:
  - .1 Repair and/or Install sheet vapour retarder on warm side of exterior wall around window openings integrally with the gypsum board, to form continuous unbroken vapour retarder and air barrier.
  - .2 Use sheets of largest practical size to minimize joints. Arrange all joints to occur in solid bearing.
  - .3 Inspect sheets for continuity. Repair punctures and tears with sealing tape before installations are concealed.
  - .4 Cut and tailor sheet vapour retarder to form openings and ensure material is lapped and sealed to frames.
  - .5 Seal perimeter of polyethylene film vapour retarder as follows:
    - .1 Apply continuous bead of sealant to substrate at perimeter of sheets on framing.
    - .2 Lap sheet over sealant and press into sealant bead.
    - .3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
  - .6 Seal sheet polyethylene to polyethylene moulded vapour retarder service boxes with sealant and/or tape.
  - .7 Ensure vapour retarder installation is inspected and approved prior to covering with gypsum board.

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**3.2 CLEAN UP**

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**



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**1 General**

**1.1 RELATED WORK**

- .1 Structural drawings: Cast-in-Place Concrete.

**1.2 WORK INCLUDED**

- .1 Polyethylene vapour retarder below concrete slab on grade.

**1.3 REFERENCE STANDARDS**

- .1 All Reference Standards are latest editions, unless noted otherwise.
- .2 ASTM E1745-17, Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Divert unused materials from landfill to recycling facility.

**2 Products**

**2.1 POLYETHYLENE SHEET VAPOUR RETARDER**

- .1 Under Slab: To ASTM E1745, Class A, permeance less than 0.01, minimum 10 mil thickness.
  - .1 Acceptable product, W.R. Meadows Perminator under slab vapour-mat, Stego Wrap Below Grade Vapor Barrier.

**2.2 ACCESSORIES**

- .1 Joint Sealing Tape – Under Slab: Air resistant pressure-sensitive adhesive tape, 100 mm wide for lap joints and perimeter seals.
  - .1 Acceptable product, W.R. Meadows Perminator Tape, Stego Tape.
- .2 Sealant: To CGSB 19.21, compatible with vapour retarder materials, recommended by vapour retarder manufacturer. Refer to Section 07 92 00 – Sealants.

**3 Execution**

**3.1 INSTALLATION**

- .1 Install vapour retarder according to ASTM E1643 and manufacturer's recommendations.
- .2 Ensure services are installed and inspected prior to installation of retarder.

- .3 Use sheets of largest practical size to minimize joints. Unroll vapour barrier with longest dimension parallel with the direction of concrete pour.
- .4 Extend vapour retarder over footings and seal to foundations or grade beam at an elevation consistent with the top of the slab. Terminate at impediments such as water stops or dowels.
- .5 Seal around penetrations such as utilities and columns. Cut vapour retarder around all protrusions. Overlap protrusions with a cut sheet of vapour retarder. Fit to protrusion and seal with tape.
- .6 Over lap ends and side of sheets 300 mm and tape with manufacturer's 100 mm wide seam tape.
- .7 Create a monolithic membrane between the surface of the slab and moisture sources below the slab as well as at the slab perimeter.

### **3.2 PROTECTION**

- .1 Protect vapor retarder from damage during installation of reinforcing steel, utilities and concrete.
- .2 Use reinforcing bar supports with base sections that minimize the potential for puncture of the vapor retarder.
- .3 Inspect and mark all areas of damage and insufficient installation of vapor retarder sufficiently in advance of concrete placement in order for deficiencies to be corrected prior to concrete placement.
- .4 Patch tears or holes in vapour retarder with polyethylene sheets that extend minimum 150 beyond sides of hole or tear. Seal patch to base sheet with tape.

### **3.3 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 SECTION INCLUDES**

- .1 Materials and installation methods supplementing primary air seal materials and assemblies.
- .2 Self-adhesive air/vapour barrier transition membrane flashing to bridge and seal openings and penetrations of window wall frames, window frames, door frames, sheathing and other penetrations of the exterior building envelope.
- .3 Self-adhesive air/vapour barrier transition membrane to all exterior walls at joints in materials and at transitions between materials.
- .4 Self-adhesive high temperature air/vapour barrier transition membrane flashing at all aluminum and sheet metal flashings on exterior walls and roofs.
- .5 Vapour permeable air barrier membrane on exterior walls.

**1.2 RELATED SECTIONS**

- .1 Structural drawings: Cast-In-Place Concrete.
- .2 Section 04 22 00: Concrete Unit Masonry.
- .3 Section 05 50 00: Metal Fabrications.
- .4 Section 06 10 00: Rough Carpentry.
- .5 Section 07 46 23: Wood Siding.
- .6 Section 07 46 46: Fibre Reinforced Cementitious Panels
- .7 Section 07 52 00: Modified Bituminous Roofing.
- .8 Section 07 62 00: Metal Flashing and Trim.
- .9 Section 08 11 00: Metal Doors and Frames.
- .10 Section 08 11 16: Aluminum Doors and Frames.
- .11 Section 08 44 00: Curtain Wall.
- .12 Section 09 25 13: Stucco.
- .13 Mechanical.
- .14 Electrical.

**1.3 REFERENCES**

- .1 CAN/ULC S741-08, Standard for Air Barrier Materials Specification.
- .2 CAN/ULC S742-11, Standard for Air Barrier Assemblies – Specification.

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**1.4 SUBMITTALS**

- .1 Submit shop drawings and product data to requirements of Section 01 33 00: Submittals.
- .2 Shop Drawings: Provide drawings of special joint conditions, including flashing details of all penetration of exterior envelope and all related wall flashings.
- .3 Product Data: Provide data on material characteristics, performance criteria, limitations.
- .4 Manufacturer's Installation Instructions: Indicate preparation, installation requirements and techniques, product storage and handling criteria.

**1.5 QUALITY ASSURANCE**

- .1 Perform Work in accordance with Sealant and Waterproofers Institute - Sealant and Caulking Guide Specification and requirements for materials and installation.

**1.6 QUALIFICATIONS**

- .1 The air barrier contractor is to be an approved contractor by the air barrier materials manufacturer.
- .2 The installer is to have followed the training course offered by the air barrier materials manufacturer.
- .3 Perform air barrier work only by skilled applicators, employed by a company operating all adequate equipment to execute such work.

**1.7 MOCK-UP**

- .1 Construct typical exterior wall panel, 5 m high by 3 m wide, incorporating window frame, head flashing and sill flashing, furring and air barrier transition membranes insulation illustrating materials interface and seals.
- .2 Construct mock-up minimum 3 weeks prior to start of work of this Section.
- .3 Locate where directed by the Consultant.
- .4 Approved mock-up may remain as part of the Work.
- .5 Allow 48 hours for inspection of mock-up by Consultant before proceeding with air barrier work. Schedule mock-up with Consultant site visits.

**1.8 PRE-INSTALLATION CONFERENCE**

- .1 Convene two weeks prior to commencing work of this Section.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- .1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.
- .2 Ensure self-adhesive air barrier material is chemically compatible with adjacent materials in the exterior wall assembly, including glazing materials and sealants. Use materials supplied by one manufacturer.
- .3 Use high-temperature formulation of self-adhesive air barrier material to prevent solar heat activated softening.
- .4 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

- .5 Do not leave air barrier membrane exposed to sunlight for more than 7 days.

#### **1.10 SEQUENCING**

- .1 Sequence work to conform to the Construction Schedule.
- .2 Sequence work to permit installation of materials in conjunction with related materials and seals.

#### **1.11 COORDINATION**

- .1 Coordinate work of this Section with all Sections referencing this Section.

#### **1.12 MATERIAL DELIVERY, STORAGE AND HANDLING**

- .1 Deliver and store all materials in their original packaging, displaying manufacturer's name, quality, weight, standards references.
- .2 Store materials in a dry protected place, properly ventilated and off the ground. Store rolled materials on end.
- .3 Remove from storage only materials that will be used the same day.
- .4 In cold weather maintain a minimum temperature of 10°C in storage area.

#### **1.13 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Construction Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.

### **2 Products**

#### **2.1 SHEET MATERIALS**

- .1 Vapour Permeable Air Barrier: Water Resistive air barrier consisting of an engineered film surface and permeable adhesive technology with split-back poly release film.
  - .1 Thickness: 23 mils (0.58 mm).
  - .2 Minimum adhesion Temperature: -7°C.
  - .3 Water Vapour Permeance: ASTM E96, Method A, 1658 ng/PA.m2S.
  - .4 Tensile Strength: ASTM D882, 182 N MD, 129 N CD.
  - .5 Flame Spread: ASTM E84, Class A, FSI 0.
  - .6 Smoke Developed: ASTM E84, Class a 105.
  - .7 Air Leakage Rate: CAN/ULC S741-08, 0.0147 L/s.m2.
  - .8 Acceptable product Henry VP160 or acceptable substitution.
- .2 Transition Sheet Flashing Self-Adhesive Air/Vapour Barrier Membrane: Self-adhesive air/vapour barrier membrane composed of bitumen modified with thermoplastic polymers and high density polyethylene film, minimum nominal total thickness of 1.1 mm (40 mils). Under surface covered with a silicone release sheet.
  - .1 Membrane conforming to the following:
  - .2 Strain energy: ASTM D 5147 (MD/XD), 21/21 kN/m.
  - .3 Flexibility at cold temperature: ASTM D 1970, -35°C.
  - .4 Static puncture: ASTM E 154, 240 N.

- .5 Tear resistance: ASTM D 624 (MD/XD), 40/40 N.
- .6 Lap adhesion: ASTM D 1876, 2000 N/m.
- .7 Tensile strength at 23°C: ASTM D 5147 (MD/XD), 170/140 N/5 cm.
- .8 Peel resistance: ASTM D 903, 1 200 N/m.
- .9 Air permeability: ASTM E 283 75 Pa pressure, <0.0003 L/sec/m<sup>2</sup>.
- .10 Water vapour permeability: ASTM E96-80, <0.0129 perm.
- .11 Resistance to gust wind load: ASTM E 330 – 3000 Pa pressure for 10 sec., no sign of delamination or variation in air permeability.
- .12 Resistance to sustained wind load: ASTM E 330 – negative 1000 Pa pressure for 1 hour, No significant delamination and no variation in air permeability.
- .13 Acceptable product: Carlisle CCW-705, Soprema Sopraseal Stick 1100, Monsey Bakor Blueskin SA, IKO Aquabarrier AVB, Grace Perm-A-Barrier, W.R. Meadows Air-Shield, Tremco ExoAir 110/110LT or acceptable substitution.
  - .1 Ensure compatibility between air barrier and transition air barrier membrane.
  - .2 Coordinate membrane selection between trades to ensure material compatibility.
- .3 Primer: Recommended by air/vapour barrier membrane manufacturer. Synthetic rubber based primer conforming to CGSB 37-GP-9Ma.
- .4 Mastic sealant from air/vapour barrier membrane manufacturer, modified bitumen based caulking mastic.
- .5 High Temperature Flashing Underlayment: Refer to section 07 62 00.

### **3 Execution**

#### **3.1 EXAMINATION**

- .1 Verify that surfaces and conditions are ready to accept the Work of this Section.

#### **3.2 PREPARATION**

- .1 Remove loose or foreign matter that might impair adhesion of materials.
- .2 Clean and prime substrate surfaces to receive air/vapour barrier membrane in accordance with manufacturer's instructions.
- .3 Perform an adhesion test before installing the membrane.
- .4 Ensure compatibility between self-adhesive sheet and liquid applied materials.

#### **3.3 INSTALLATION SELF-ADHESIVE AIR BARRIER**

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Self-Adhesive Membranes:
  - .1 Examine wall and roof substrate prior to commencing work. Commencement of work signifies acceptance of substrate.
  - .2 Do not begin work until application surfaces are smooth, dry, and free of ice, dirt or foreign material. Do not use calcium or salts to remove ice or snow.
  - .3 Do not install materials in rain or snow.

- .4 Do not install materials on wet surfaces or attempt to dry surface of materials by heating surface with a torch flame. Substrate internal moisture content must be within manufacturers acceptable limits.
- .5 Apply primer to surface at rate of 0.30 litres/m<sup>2</sup>.
- .6 Cover static cracks up to 3 mm in width in the substrate with a 150 mm wide membrane strip centered on the crack prior to installing the covering membrane.
- .7 Install membrane onto primed surface by peeling back the paper backing on the underside and adhering the membrane to the surface. Apply hand pressure to the surface of the membrane to remove any trapped air beneath the membrane. Start at the center of the membrane and work toward the edges. Apply pressure with a roller to ensure perfect adhesion of the membrane to the surface.
- .8 Shingle horizontal laps to drain. Start application at base of wall. Minimum side and end laps 50 mm.
- .9 Repair holes and tears in the membrane with a patch of membrane material. Membrane patch must exceed affected area by 100 mm minimum. Seal around edges of the patch with mastic.
- .10 Seal upper edge of membrane with mastic if rain is anticipated or if work is to be suspended more than one day.
- .11 Install double layers of air seal membrane at outside and inside building corners, minimum 300 mm wide strips.
- .12 At openings in walls apply self-adhesive air/vapour barrier membrane over sloped sill framing and carry up side jamb openings 300 mm. At corners of openings install 300 mm square membrane reinforcing diagonal to the corner, stretch and fit tight to framing. Apply the membrane on the sill first. Apply corner stripping at jambs second. Apply jamb membrane last.
- .13 Coordinate air/vapour barrier installation with curtain wall and window framing. Use transition self-adhesive membrane flashing to cover window frame flanges or seal to recess pocket of curtain wall framing, and seal to wall substrate.
- .14 Lap and seal air/vapour barrier membrane over through-wall flashing at base of wall and at all horizontal wall flashings.
- .15 Lap roof membrane flashing over air/vapour barrier membrane at parapets and seal.
- .16 Seal all through-wall and roof equipment flanges with air/vapour barrier membrane flashing strips; apply mastic to edges.
- .17 Seal all metal fabrication flanges with air/vapour barrier membrane flashing strips; apply mastic to edges.
- .18 Seal all masonry connectors, apply mastic seal.
- .19 Seal all horizontal drip flashings to air/vapour barrier barrier membrane with minimum 150 mm strips of transition membrane flashing applied horizontally, lap and shingle transition membrane into air/vapour barrier membrane; apply mastic to edges of flashing membrane.

- .20 Install the air/vapour membrane to create a continuous seal at construction elements and at junctions of different materials or construction types.

### **3.4 PROTECTION OF FINISHED WORK**

- .1 Protect finished Work until it is covered with insulation and finishes. Install insulation within maximum 7 days of membrane installation.
- .2 Do not permit adjacent work to damage work of this Section.
- .3 Protect air/vapour barrier membrane from excessively high temperatures.

### **3.5 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**



**PART 1        General**

**1.1            RELATED SECTIONS**

- .1        Section 06 10 00: Rough Carpentry.
- .2        Section 07 21 00: Cladding Support System.
- .3        Section 07 21 16: Blanket Insulation.
- .4        Section 07 27 00: Air Barriers.
- .5        Section 07 62 00: Metal Flashing and Trim.
- .6        Section 09 91 00: Painting.

**1.2            REFERENCES**

- .1        Canadian Standards Association (CSA)
  - .1        CSA B111-1974, Wire Nails, Spikes and Staples.
- .2        NLGA Standard Grading Rules for Canadian Lumber.
- .3        ASTM A240, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Purposes.

**1.3            SUBMITTALS**

- .1        Submit samples in accordance with Section 01 33 00 - Submittals.
  - .1        Submit duplicate 600 mm long samples of finished wood siding and fasteners.
- .2        Shop Drawings: Submit shop drawings in accordance with Section 01 33 00 - Submittals.
  - .1        Submit engineered shop drawings for siding support systems. Show installation details, fastening details, and structural supports. Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thickness, exclusive dimensions, openings, requirements of related work and critical installation procedures.
  - .3        Each shop drawing submitted to bear the stamp and signature of a qualified Professional Structural Engineer registered and licensed to practice in the Province of British Columbia.
  - .4        The engineer is to submit the following Schedules:
    - .1        Submit Schedule S-B, 'Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional' with shop drawings.
    - .2        Submit Schedule S-C, 'Assurance of Professional Field Review and Compliance by Supporting Registered Professional' promptly on completion of work.

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**1.4 MOCK UP**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Provide mock-up for each wood siding type and attachment type. Mock-up to illustrate attachments, anchors, and relationship to other exterior envelope wall component materials. WD-2 siding type to include aluminum signage panel in mock-up.
- .3 Locate where directed.
- .4 Allow 72 hours for inspection of mock-up by Consultant before proceeding with work.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work if accepted by Consultant.

**1.5 DELIVERY STORAGE AND HANDLING**

- .1 Protect siding from moisture during delivery and site storage.
- .2 Stack wood siding above ground and under cover. Place a moisture barrier under the siding.
- .3 During hot weather allow siding to acclimatize for 3 to 5 days with well vented storage.
- .4 If siding has become wetted, separate siding and allow to dry thoroughly before installation.
- .5 Handle charred siding carefully to prevent damage to charred surface or damage to adjacent building finishes.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

**PART 2 Products**

**2.1 MATERIALS**

- .1 Cedar Siding: to NLGA Standard Grading Rules for Canadian Lumber, paragraph 201b, WCLIB 106-a.
  - .1 Species: WRCLA Western Red Cedar.
  - .2 Size: 19 mm x 190 mm.
  - .3 Profile: Shiplapped centre match.

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- .4 Grade: Clear, Grade A, S4S.
  - .5 Moisture Content: Kiln dried 12 – 15 %.
  - .2 Fasteners: Stainless steel Type 316, nails, screws, bolts, nuts and washers, sized as required for predrilled holes and furring and siding thickness.
  - .3 Screen Back-up to Spaced Siding: Delta Fassade S, UV resistant water resistive barrier for open joint claddings.
  - .4 Strapping: Pressure preservative treated. Refer to Section 06 10 00.
  - .5 Semi-Rigid Mineral Fibre Insulation: Refer to Section 07 21 16.
  - .6 Air Barrier: Refer to Section 07 27 00.

### **PART 3 Execution**

#### **3.1 INSTALLATION**

- .1 Do not begin installation until substrates have been properly prepared.
- .2 Complete all finishing operations, before beginning installation of siding.

#### **3.2 PREPARATION**

- .1 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.3 INSTALLATION**

- .1 Coordinate wood siding installation with related Sections of exterior building envelope.
- .2 Install screen back-up over framing according to manufacturer's recommendations.
  - .1 Install taut, plumb and level to exterior face with textured side facing substrate.
  - .2 Start installation at building corner leaving 300 mm membrane extended beyond corner.
  - .3 Install horizontally at bottom of wall.
  - .4 Overlap membrane as follows:
    - .1 Exterior corners: 300 mm.
    - .2 Vertical and horizontal seams, joints at protrusions and penetrations: 150 mm.
- .3 Install siding support strapping rails plumb and level on pressure treated wood cladding supports.
- .4 Fasten siding to support rails with orderly fastener pattern. Space boards as indicated.

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- .5 Fasten wood siding in straight, full lengths to support rails using one recessed stainless steel fasteners per board at each fixing location for WD-1. Predrill wood cladding to prevent splitting as required.
  - .6 Intermediate butt joints between support rails are not permitted.
  - .7 Align siding materials and leave open face joint as indicated.
  - .8 Finish cut surfaces to match siding.
  - .9 Mitre cut corners as indicated.
  - .10 Signage: Coordinate installation with wood siding installation.

**3.4 ADJUSTING**

- .1 Verify that products are plumb and rigidly secured to substrate. Make any adjustments required.

**3.5 PROTECTION**

- .1 Protect installed products until Substantial Completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

**3.6 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 07 21 00: Cladding Support System.
- .3 Section 07 21 13: Board Insulation.
- .4 Section 07 27 00: Air Barriers.
- .5 Section 07 62 00: Metal Flashing and Trim.
- .6 Section 08 11 00: Metal Doors and Frames.
- .7 Mechanical.
- .8 Electrical.

**1.2 REFERENCES**

- .1 ASTM International (ASTM):
  - .1 ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
  - .2 ASTM D 635 – Standard Test Method for Small Scale Burning.
  - .3 ASTM D 1929 – Standard Test Method for Ignition Temperature.
  - .4 ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
  - .5 ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
  - .6 ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - .7 ASTM E 119 – Standard Test Method for Fire Rated or Fire Resistive Construction.
  - .8 ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads.
- .2 National Fire Protection Association (NFPA):
  - .1 NFPA 268 – Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
  - .2 NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
- .3 British Columbia Building Code 2012.

**1.4 SYSTEM DESCRIPTION**

- .1 Provide a rain screen system with exposed fasteners based on a flat panel fabrication with continuous open joints. Panel joints consistent, 8 mm wide backed with prefinished metal closure.
- .2 Exposed fasteners and sub-framing at recommended spacing based on panel thickness and size. Fasteners located at recommended locations by manufacturer.

- .3 No visible telegraphing on the panel faces or any other compromise of a neat and flat appearance.
- .4 Fabricate panel system to dimension, size and profile indicated on drawings based on a design temperature of 20°C.
- .5 Fabricate panel system so that no restraints can be placed on the panel that might result in compressive skin stresses. Install with details that enable panels to remain flat regardless of temperature change and at all times remain water tight.
- .6 Provide a removable plastic film on the finish side of the panel during fabrication, shipping and erection to protect the surface from damage.
- .7 Design composite building panel wall to provide for thermal movement of component materials caused by ambient temperature range of 100°C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- .8 Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.
- .9 Design members to withstand dead load, live loads and wind loads as calculated in accordance with British Columbia Building Code and applicable municipal regulations, to maximum allowable deflection of 1/360 of span.
- .10 Provide for positive drainage of condensation occurring within wall construction and/or water entering at joints, to exterior face of wall in accordance with NRC "Rain Screen Principles".
- .11 Design wall system to accommodate specified erection tolerances of structure.
- .12 Design wall system to accommodate seismic movement in panel joints.
- .13 Maintain following installation tolerances:
  - .1 Maximum deviation from vertical and horizontal alignment of erected panels to be 6 mm in 6 m.

#### **1.4 QUALITY ASSURANCE**

- .1 Manufacturer and panel installer/fabricator shall have a minimum of 5 years experience in fabricating and / or installing composite panels. Panel supplier must be an authorized fabricator of the specified composite material and have a certification program acceptable to local code authorities.
- .2 Mock-Up: Provide a mock-up for evaluation of the product and application workmanship.
  - .1 Do not proceed with remaining work until workmanship, color, and sheen are approved by Consultant.
- .3 Pre-installation Meetings: Conduct pre-installation conference to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

#### **1.5 SUBMITTALS**

- .1 Shop Drawings:
  - .1 Submit Shop Drawings in accordance with 01 30 00 - Submittals.

- .2 Indicate dimensions, wall openings, head, jamb, sill and mullion detail, materials and finish, anchor details, compliance with design criteria and requirements of related work.
- .3 Indicate composite panel relationship to adjacent materials in the wall assembly.
- .4 Each Shop Drawing submitted shall bear stamp of qualified professional structural engineer registered in the British Columbia.
- .5 The engineer is also to submit the following Schedules:
  - .1 Submit Schedule S-B, 'Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional' with shop drawings.
  - .2 Submit Schedule S-C, 'Assurance of Professional Field Review and Compliance by Supporting Registered Professional' promptly on completion of work.
- .2 Samples: Submit duplicate colour samples minimum 300 mm length of panel, of colour, finish and thickness selected to Consultant for approval.

#### **1.6 PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Delivery:
  - .1 During transportation, use stable, flat pallets that are at least the same dimension as the sheets.
  - .2 Materials shall be packaged to minimize or eliminate the possibility of damage during shipping.
- .2 Storage:
  - .1 Store products in an enclosed area protected from direct sunlight, moisture and heat. Maintain a consistent temperature and humidity.
  - .2 Store products in manufacturer's unopened packaging until ready for installation.
  - .3 Stack panels using protective dividers to avoid damage to decorative surface.
  - .4 For horizontal storage, store sheets on pallets of equal or greater size as the sheets with a protective layer between the pallet and sheet and on top of the uppermost sheet. Store panels on an even surface.
  - .5 Do not store sheets, or fabricated panels vertically.
- .3 Handling:
  - .1 Remove protective packaging immediately before installation.
  - .2 When moving sheets, lift evenly to avoid dragging panels across each other and scratching the finished surface.
  - .3 Close open pallets after removing panels.
  - .4 Handle panels in upright position. Use protective gloves when handling panels.
  - .5 Follow manufacturers recommendations when cutting and cleaning panels.

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**1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

**2 Products**

**2.1 MATERIALS**

- .1 Fiber-Cement Exterior Siding, Panels and Trim: Composed of Portland cement, ground sand, cellulose fiber, select additives and water, with the following characteristics:
  - .1 Durability: Autoclaved, non-rotting, resistant to permanent damage from water and salt spray.
  - .2 Density: 1.9 g/cm<sup>3</sup>.
  - .3 Non-Combustibility: In accordance with ASTM test method E-136; UBC Class I, NFPA class A.
  - .4 Surface Burning Characteristics: ASTM E 84, Flame spread – 0, Smoke developed – 15.
  - .5 Modulus of Rupture: dry.
    - .1 Crosswise: 28.6 MPa.
    - .2 Lengthwise: 18.2 Mpa.
  - .6 Bending Strength: 25 MPa.
  - .7 Coefficient of Thermal Expansion: ASTM E 228, .0000125 mm/mm °C.
  - .8 Coefficient of Thermal Conductivity, ASTM C 518, 7.5 Btu/h °F ft<sup>2</sup>.
  - .9 Colour: Carat Onyx 7091.
  - .10 Acceptable Panel Material: Swisspearl Carat and Modula as manufactured by Eternit.
    - .1 Texture: Smooth.
    - .2 Thickness: 8 mm.
    - .3 Weight: 15 kg/m<sup>2</sup>.
    - .4 Finish: Factory finished. 'R' coating on panels inclined more than 5 degrees from vertical.



- .5 Colour: Integrally coloured core and panel with delicate vein texture.
- .2 Soffit Panels: HardieSoffit Panels, Vented smooth.
- .3 Accessories:
  - .1 0.8 mm aluminum joint closures and corner profiles as recommended by the manufacturer.
  - .2 Perforated insect screen to manufacturer's standard.
- .4 Screen Back-up to Spaced Siding: Delta Fassade S, UV resistant water resistive barrier for open joint claddings.
- .5 Strapping: Pressure preservative treated. Refer to Section 06 10 00.
- .6 Sealants and gaskets within the panel system to be manufacturer's standard to meet performance requirements.
- .7 Z-Girts: Refer to Section
- .8 Insulation: Refer to Section 07 21 13.
- .9 Sheathing Membrane: Refer to Section 07 27 10.
- .10 Exterior Sheathing: Refer to Section 06 10 00.
- .11 Insect Screens: Delta Bug Screen or acceptable substitution. Non-woven polyester matting, 1.5 m x 38 mm x 12 mm.

### **3 Execution**

#### **3.1 EXAMINATION**

- .1 Examine work of other trades related to the Work of this Section for defects or discrepancies, report defects in writing to the Consultant.
- .2 Examine all details of the Work of other Sections as related to this Section.
- .3 Do not begin installation until substrates have been properly prepared.
- .4 Surfaces to receive panels shall be even, smooth, dry, and free from defects detrimental to installation of the panel system. Notify Contractor in writing of conditions detrimental to proper and timely completion of the work.
- .5 If substrate preparation is the responsibility of another installer, notify Consultant of unsatisfactory preparation before proceeding. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- .1 Clean panel surfaces prior to installation. Remove any cutting or drilling dust from the surface of the panel using a soft micro-cloth.
- .2 Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

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**3.3                    INSTALLATION**

- .1        Install fibre reinforced cementitious wall panels and sub-frame system in accordance with manufacturer's instructions.
- .2        Install screen back-up over pressure treated strapping.
- .3        Install prefinished metal closures to all corner joints.
- .4        Trim factory edges of panels according to manufacturer's instructions.
- .5        Prime all cut edges of panels according to manufacturer's written instructions using manufacturer's proprietary sealer Luko material and special applicator. Apply 2 coats to cut panels edges. Do not apply sealer to panel face, remove immediately.
- .6        Install fibre reinforced cementitious wall panels plumb and level and accurately spaced in accordance with manufacturer's recommendations and approved submittals and drawings.
- .7        Anchor panels and sub-framing securely per engineering recommendations and in accordance with approved Shop Drawings to allow for necessary movement and structural support.
- .8        Ensure continuous air flow behind panels with vent space at top and bottom of wall terminations.
- .9        Do not install panels or component parts that are observed to be defective or damaged including, but not limited to: warped, bowed, abraded, scratched, and broken members.
- .10       Do not cut or trim component parts during installation in a manner that would damage the finish, decrease the strength, or result in visual imperfection or a failure in performance. Return component parts with require alteration to the shop for re-fabrication or replacement.
- .11       Install corner profiles and trim with fasteners appropriate for use with adjoining construction as indicated on the Contract Drawings and as recommended by manufacturer.
- .12       Finished installation to be properly secured, free of rattles, distortions, waviness, protrusions, damaged or chipped components.
- .13       Panel joints to be left open. Do not install sealants in panel joints, as staining of panels will result. Install prefinished metal closures to all joints.
  - .1        Where sealants must be installed in relation to related building components, use a polyurethane or acrylic sealant and test compatibility of sealant primer and sealant prior to use.
- .14       Follow manufacturer's cleaning instructions for final cleaning of installed panels. Do not clean panels in bright sun light.

**3.4                    CLEAN UP AND ADJUSTMENT**

- .1        Remove masking or panel protection as soon as possible after installation. Any masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the General Contractor to remove.
- .2        Adjust final panel installation so that all joints are true and even throughout the installation. Panels out of plane shall be adjusted with the surrounding panels to minimize any

imperfection.

- .3 Repair panels with minor damage. Remove and replace panels damaged beyond repair as a direct result of the panel installation.
- .4 Clean finished surfaces as recommended by panel manufacturer.
- .5 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .6 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED WORK**

- .1 Section 05 50 00: Metal Fabrications.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 07 61 13: Sheet Metal Roofing.
- .4 Section 07 62 00: Metal Flashing and Trim.
- .5 Section 07 90 00: Joint Sealants.
- .6 Section 11 24 23: Safety Fall Restraint.
- .7 Mechanical.
- .8 Electrical.

**1.2 SYSTEM DESCRIPTION**

- .1 Furnish all labour, materials, equipment and services necessary for the complete supply and installation of roofing and sheet metal as indicated on the drawings and as specified.
- .2 The work of this Section is to include, but not necessarily be limited to, the supply and installation of the following:
  - .1 Modified bitumen roof membrane insulated roof system to roof decks including vapour retarder, tapered insulation, insulation, insulation overlay, modified bitumen roof membrane, membrane flashings and other associated materials to provide a complete weather tight and waterproof roofing system.
  - .2 2 ply SBS membrane in gutter, parapet and minimum 300 mm up roof slope of sheet metal roofing.
  - .3 Prefinished metal flashings and scuppers at modified bitumen sheet roofing.
  - .4 Modified bitumen sheet roofing and flashing to mechanical and service curbs.

**1.3 QUALITY ASSURANCE**

- .1 Workmanship Standards: Conform to the latest "RGC Guarantee Standards" of the Roofing Contractors Association of British Columbia Guarantee Corp. (RGC) as published in the "RGC Roofing Practices Manual" for a five year guarantee, unless modified by the Contract Documents to exceed those minimums.
- .2 Contractor Qualification: Roofing contractors and sub-contractors must also be registered with Soprema's PAQ +S program and provide Consultant with a Soprema certificate to this effect before beginning any roofing work.
- .3 Qualification of Workers: Employ skilled applicators approved by membrane manufacturer.
- .4 Inspection costs to be included in the tender price for this Section.

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**1.4 SUBMITTALS**

- .1 Submit manufacturer product data on all roof membrane materials.
- .2 Provide to the Owner the "RGC Roofing Systems Record" upon completion of the work.
- .3 Submit samples of roof insulation, decorative gravel, precast concrete pavers and roofing membrane cap sheet to the Consultant for review prior to ordering materials.

**1.5 STORAGE AND HANDLING**

- .1 Deliver and store materials in original containers with manufacturers labels and seals intact.
- .2 Store materials elevated from contact with ground and moisture and protect from weather.
- .3 Store membrane rolls on end, one pallet high, selvage edge up. Do not store in a leaning position.
- .4 Remove only in quantities required for same day use.
- .5 Avoid prolonged exposure of light and heat sensitive materials to sunlight.
- .6 Store combustible materials away from heat and open flame.
- .7 Do not leave roofing material unsecured at the job site where they may be dislodged by wind.

**1.6 COOPERATION WITH OTHER TRADES**

- .1 Advise all other trades of their responsibility in having pipes, sleeves, wood bases etc., installed on the roof in adequate time to enable the roofing work to proceed. Coordinate with mechanical and electrical trades.
- .2 This Section is to provide base flashing over wood or metal curbs and seal lead flashings for service lines into the roof membrane.

**1.7 GUARANTEE AND INSPECTION**

- .1 Provide the Standard Roofing Contractors Association of British Columbia (RCABC) RGC Guarantee Standards five year guarantee for roofing system included under this Section.
- .2 The Building envelope inspection agency approved by RGC for this project is to provide inspection services as follows:
  - .1 Carry out full and complete inspections while the work is in progress, at completion of roofing installation and just prior to the date of Substantial Performance.
  - .2 Submit: A daily report sheet while work is in progress, showing weather, temperature, condition and progress of job, protection of materials and any other pertinent information including approved deviation from the Contract Documents; all on Roofing Inspection Company's Inspection form to:
    - the Owner
    - the Consultant
    - the Roofing Sub-contractor's Superintendent

- the Contractor's Superintendent
- others as deemed necessary

- .3 This report is to be countersigned by the Roofing Subcontractor's Superintendent acknowledging content.
- .4 Inspect and review materials and workmanship including storage, handling and protection. Advise the Consultant and the Owner of inspections.

## **1.8 WARRANTY**

- .1 The membrane manufacturer shall issue a written document in the Owner's name, valid for a 15 – year period, stating that it will repair any leaks in the roofing membrane to restore the roofing system to a dry and watertight condition, to the extent that membrane manufacturing or installation defects caused water infiltration. The warranty must cover for the entire cost of the repair(s) during the warranty period. The warranty must be transferable, at no extra cost, to subsequent building owners.

## **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 ROOFING MATERIALS**

- .1 Standards: Conform to the RCABC "RGC Guarantee Standards" and the appropriate CSA, CGSB and ASTM Standards for the materials used in the roofing system specified. Materials to be listed on RGC Accepted Materials List; latest edition.
- .2 Use only components supplied or accepted by the roofing membrane manufacturer.
- .3 Asphalt: Oxidized roofing asphalt conforming to CSA A123.4-M1979, Type 3.
- .4 Primer: Conform to CGSB 37-GP-9Ma.
  - .1 Acceptable product, Soprema Elastocol 500 for heat welded.
  - .2 Acceptable product, Soprema Elastocol Stick for self-adhered.
- .5 Vapour Retarder: Self-adhesive membrane composed of SBS modified bitumen and a high-density polyethylene grid. The bottom surface self-adhesive and protected by a silicone release sheet.
  - .1 Reinforcement: High-density polyethylene sheet.
  - .2 Elastomeric bitumen: Mixture of selected bitumen and SBS polymer
  - .3 Properties:

- .1 Breaking strength (Mpa) MD = 75, XD = 98
- .2 Ultimate elongation (%): MD = 52, XD = 24
- .3 Cold bending at -30°C: No cracking
- .4 Water vapour permeance (ng/Pa•s•m<sup>2</sup>): < 0.01
- .5 Static puncture (N): ≥ 400
- .4 Complies with CAN/CGSB-51.33-M89: Type 1.
- .5 Vapour retarder: Soprema Soprapap'R, or acceptable substitution.
- .6 Insulation Overlay: Glass matt faced water resistant treated gypsum core sheathing in conformance with ASTM C1177 standard, 12 mm thick, preprimed. Acceptable product Georgia Pacific DensDeck Prime.
- .7 Wood Blocking and Plywood: Refer to Section 06 10 00.

## **2.2 ROOFING INSULATION**

- .1 Insulation and Tapered Insulation: Polyisocyanurate conforming to CAN/ULC-S704-01 / CAN/CGSB-51.26-M86, faced polyisocyanurate, square edges, high density formulation, thickness indicated in two or more staggered layers, minimum 50 mm thickness per layer, to provide thickness indicated, based on an aged Long Term Thermal Resistance (LTTR) RSI value of 0.973 per 25 mm.

## **2.3 ROOF MEMBRANE**

- .1 Roof membrane system composed of composite reinforced and SBS modified bitumen membranes with a heat welded base sheet and a heat welded cap sheet.
  - .1 Top and underside surface of base sheet covered with a thermofusible plastic film.
  - .2 Top surface of base sheet to have two distinct lines to facilitate roll alignment and fastener positioning. Bottom surface of cap sheet covered with a thermofusible plastic film and the top surface protected by coloured granules.
- .2 Components:
  - .1 Reinforcing: Heavy duty composite reinforcement to ASTM D6162.
  - .2 Elastomeric bitumen: Blend of selected bitumen and SBS polymer.
  - .3 Acceptable products:
    - .1 Base sheet membrane: Soprema Sopraply Base 520 or acceptable substitution.
    - .2 Cap sheet - exposed: Soprema Sopraply Traffic Cap 560 or acceptable substitution.
- .3 Supply sufficient quantity of ceramic granules to spread over joints between sheets for touch-up of asphalt bleed-out.
- .4 Base Membrane Flashing: Soprema Sopraflash Flam Stick, minimum 2.5 mm thick SBS modified bituminous membrane, minimum weight 2.7 kg/square metre reinforcing,

conforming to CGSB 37-GP-56M, Type 2, Class C, Grade 2. Self-adhesive underside with silicone release sheet, top surface suitable for torching. Primer by membrane manufacturer, Soprema Elastocol Stick or similar product by IKO.

- .5 Cap Sheet Membrane Flashing: As specified for cap sheets.
- .6 Liquid Flashing Membrane: PMMA liquid membrane flashing for upstands and complex details. Acceptable product, Soprema Alsan RS 230, Siplast Parapro.
  - .1 Flashing reinforcement, 100g/m<sup>2</sup>, 150 mm wide woven polyester.
- .7 Sealant: Recommended by membrane manufacturer. Colour selected by Consultant.
- .8 Traffic Walkways: SBS-modified membrane composite reinforced and conforming to CANB/CGSB-37.56-M. Top surface covered with contrasting colour granules and free of selvedge. Under surface covered with thermofusible film.
  - .1 Thickness: 4 mm.
  - .2 Roll Width: 1 m.
  - .3 Tear Resistance: 125 N.
  - .4 Static puncture: 540 N.
  - .5 Dimensional stability (%): -1 MD / 0 XD.
  - .6 Plastic flow: 105°C.
  - .7 Breaking strength (kN/m): 15 MD / 13.5 XD.
  - .8 Acceptable product, Soprema Sopraply Traffic Cap 560.

### **3 Execution**

#### **3.1 EXAMINATION**

- .1 Examine roof decks and immediately inform Consultant in writing of any defects.
- .2 Prepare all deck surfaces, joints, cracks, coves, vents, pipes etc. in accordance with RGC Standards.
- .3 Prior to commencement of work ensure:
  - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
  - .2 Curbs have been built for all roof service penetrations.
  - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
  - .4 Plywood and lumber nailer plates have been installed to deck, gutters, walls and parapets as required.
  - .5 Fall restraints complying to WorkSafeBC requirements are in place.

#### **3.2 PROTECTION**

- .1 Cover walls and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage where work must continue over finished roofing membrane with minimum 12 mm thick plywood sheets.



.6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

.7 Clean drainage systems of construction debris or excess tar when work is complete.

### **3.3 INSTALLATION**

.1 All workmanship in accordance with RGC Standards for ten year guarantee.

.2 In areas that are scheduled to have exposed metal deck, install all materials utilizing screws such that the screws only penetrate the top deck flute. Use screws of lengths which ensure that the screws do not penetrate the upper surface of the deck by more than 25 mm. Cut off screws with deck penetration of more than 25 mm.

.3 Leave no work exposed during unsettled weather. Check and repair seams of installed plies and finish membranes at end of each day.

.4 Work to and around all features, voids and edges in best trade manner and to membrane manufacturer's recommendations to produce a watertight and weatherproof installation.

.5 Install curbs at all roof penetrations.

### **3.4 SAFETY REQUIREMENTS**

.1 Prohibit smoking on the roof and in the immediate vicinity of propane tanks, glues and solvents.

.2 Maintain fire extinguishing equipment on hand; minimum five 9 kg multipurpose dry chemical extinguishers in the work area.

.3 Maintain at least one fire extinguisher within 6 m horizontal travel distance of any torch applied roofing equipment.

.4 Ensure workmen are aware of fire hose locations if available and location of outside faucets from domestic water supply.

.5 Maintain telephone service for emergency purposes. Report any fires, even if extinguished, to the fire department.

.6 Provide a 'fire watch' for a minimum of one hour after completion of all hot work. Check roof areas worked on for hot spots and signs of smouldering. Check the inside of the building for signs of fire or smoke.

.7 Take caution when working around roof openings, penetrations or flashing. Do not torch directly to wood. Take extreme care when working around exhaust vents which may have accumulations of lint. Clean such lint accumulations before roofing work is started.

.8 Use torches according to manufacturer's instructions. Use torch stands to direct flame upward when momentarily not in use. Do not use torches where flame impingement cannot be fully viewed. Do not leave open flames unattended. Do not use torches near gas lines, electrical wires or flammable liquids. Inspect equipment regularly and keep in good working order.

.9 Direct torch flame away from wood parapets and blocking and away from joints between wood sheathing or blocking.

### **3.5 VAPOUR RETARDER**

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- .1 Prime substrate to manufacturer's recommendations.
  - .2 Unroll the vapour barrier membrane onto the substrate without adhering for alignment. Overlap each preceding sheet by 75 mm lengthwise following the reference line and by 150 mm at each end. Stagger end laps by at least 300 mm. Begin application at the bottom of the slope.
  - .3 Position each roll at the bottom of the slope and unroll without adhering for alignment. Do not immediately remove the silicone release sheet.
  - .4 Once aligned, peel back a portion of the silicone release sheet and press the membrane onto the substrate for initial adherence. Peel back the release sheet diagonally.
  - .5 Use a 34 kg (75 lb.) roller to press down along each membrane strip, including the laps. Finish by aligning the edge of the roller with the lower end of the side laps and rolling up the membrane. Do not cut the membrane to remove air bubbles trapped under the laps, but rather push the roller to the edge of the joint to squeeze them out.

### **3.6 INSULATION**

- .1 Install tapered insulation where indicated to provide roof slopes.
- .2 Install roof insulation over tapered insulation in moderate contact, stagger end joints, provide a smooth surface to accept roof membrane.
- .3 Install insulation according to RGC Guarantee Standards.
- .4 Mechanically fasten insulation to metal deck according to RGC Standards and as per 3.3.2. Butt insulation to wood blocking.
- .5 Adhere insulation to vapour retarder on concrete and sheet steel roof according to manufacturer's recommendations.
- .6 Install only as much insulation as can be covered with roof membrane on the same day.
- .7 Provide 50% reduced insulation thickness to 1 200 mm x 1 200 mm area centered on roof drains. Provide smooth cant transition to remainder of roof surface.
- .8 Provide minimum 1% sloped insulation to drain in valleys and minimum 2% sloped insulation to drains on non-sloped roof deck areas. Provide 2% sloped insulation crickets to ensure water is not trapped behind vertical parapet or curb projections.
- .9 Install specified insulation overlay over insulation in accordance with RGC Guarantee Standards. Install in two offset layers.
- .10 Install insulation overlay board over insulation on steel deck roof areas with mechanical fastening. Use recommended board size for adhered application.

### **3.7 BASE SHEET**

- .1 Base Sheet:
  - .1 Unroll and relax base sheet a minimum 20 minutes prior to application
  - .2 Start at low point and at right angles to slope.
  - .3 Unroll and align membrane, lap sides and ends and stagger end laps in accordance with manufacturer's directions.

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- .4 Carry base sheet to top of cant strips.
  - .2 Torch Applied:
    - .1 Prime deck according to membrane manufacturer's written recommendations and coverage rate.
    - .2 Cut membrane in 990 mm wide roll width by the length required to suit detail.
    - .3 Stagger side laps and end laps in accordance with membrane manufacturer's directions. At end laps, angle cut the corners that will be covered with the following roll.
    - .4 Direct propane torch along underside of roll, melting the surface modified bitumen; preheat seam of previous roll concurrently.
    - .5 Unroll membrane as modified bitumen melts.
    - .6 Push first roll back after starting to check for full bonding of the membrane; adjust torching and speed accordingly, avoid stopping and starting that may cause voids or insufficient bonding.
    - .7 Bevel 'T' joints at roll ends and repair 'fishmouths' using a torch-heated trowel.
    - .8 Reroll opposite end and repeat process.
    - .9 Use aluminum applicator to ensure a perfect transition between upstands and field surface.
    - .10 Smooth entire membrane surface with a roller.
    - .11 Mechanically fasten membrane to conform to wind uplift requirements.
    - .12 Allow base membrane to cure prior to installation of cap sheet.

### **3.8 CAP SHEET**

- .1 Unroll and relax cap sheet a minimum 20 minutes prior to application
- .2 Start at low point in same direction as base sheet.
- .3 Unroll and align membrane; stagger side laps and end laps in accordance with membrane manufacturer's directions.
- .4 Carry cap sheet to top of cant. Carry cap sheet up and over parapet at parapet and curbs where detailed.
- .5 Reroll approximately half the membrane into a firm roll.
- .6 Direct propane torch along underside of roll, melting the surface modified bitumen; preheat seam of previous roll concurrently.
- .7 Unroll membrane as modified bitumen melts.
- .8 Push first roll back after starting to check for full bonding of the membrane; adjust torching and speed accordingly, avoid stopping and starting that may cause voids or insufficient bonding.
- .9 Bevel 'T' joints at roll ends and repair 'fishmouths' using a torch-heated trowel.

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- .10 Reroll opposite end and repeat process.
  - .11 Provide compatible asphalt roofing mastic cover to granular surface at top of membrane in gutters where air/vapour barrier membrane of metal roof will lap cap sheet.
  - .12 Install traffic walkways to manufacturer's recommendations. Install walkway pads at roof access to roof top equipment and around all mechanical and other roof top equipment requiring maintenance and where indicated. Install apart at approximately 50 mm spacing in a regular and uniform pattern.

### **3.9 BASE AND CAP FLASHING**

- .1 Install base membrane flashing in accordance with membrane manufacturer's directions and to RCABC Standards.
- .2 Cut membrane in 990 mm wide roll width by the length required to suit detail.
- .3 Extend membrane cap flashing onto roof from toe of cant to minimum distance as required by membrane manufacturer's directions and above completed roof assembly to minimum of 300 mm, or over top of parapets as detailed.
- .4 Stagger side laps and end laps in accordance with membrane manufacturer's directions.
- .5 Install membrane cap flashing torch adhered and mechanically fasten according to manufacturer's details.
- .6 At locations where self-adhesive membrane flashing is detailed to lap over cap flashing install a compatible asphalt roofing mastic to cover granular surface and allow self-adhesive membrane to bond to coated cap flashing.
- .7 Install flashing membranes to manufacturer's installation specifications. Detail penetrations and difficult areas with PMMA liquid membrane.
- .8 Install base metal flashing on all vertical surfaces, walls, curbs etc where asphalt is used to adhere flashing membranes.

### **3.10 ROOF DRAINS**

- .1 Fit roof membrane into drains with positive mechanical fixings in accordance with RGC Standards.
- .2 Install precast concrete splash pads over drainage composite at rain water leaders.

### **3.11 SEALANT**

- .1 Seal all joints in metal flashings, including joints in parapet and coping flashings as required to provide fully watertight installation in accordance with RGC Standards.
- .2 Where required, behind sealant provide non-staining type joint backing of expanded polyurethane cell foam compressed 25% in joint.

### **3.12 ADJUST AND CLEAN**

- .1 Immediately repair, remove and clean all drips or smears of asphalt on exposed finished surfaces or surfaces to be subsequently finished.
- .2 Remove any surplus supplies and debris resulting from the work of this Section promptly upon completion of the work.

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**3.13 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 07 27 00: Air Barriers.
- .3 Section 07 52 00: Modified Bituminous Roofing.
- .4 Section 07 62 00: Metal Flashing and Trim.
- .5 Section 07 92 00: Joint Sealants.
- .6 Section 11 24 23: Safety Fall Restraint.

**1.2 REFERENCES AND DESIGN CRITERIA**

- .1 Design roof system in accordance with:
  - .1 CAN/CSA S136 for the Design of Cold Formed Steel Structural Members.
  - .2 Canadian Sheet Steel Building Institute Standards 10M and 20M.
  - .3 ANSI B18.6.4-1981 Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
  - .4 ASTM A792/A792M-09, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - .5 ASTM E 108, Standard Test Methods for Fire Tests of Roof Coverings.
  - .6 UL 790, Test Methods for fire Tests of Roof Coverings.
  - .7 National Research Council (NRC-CNRC) Report No. B1040 Wind Uplift Resistance of Metal Roofing.
  - .8 British Columbia Building Code 2012.
- .2 Deflection of the roof system maximum 1/240 th of the span for the specified live loading.
- .3 Design roof system to accommodate thermal movement of the roof sheet caused by ambient temperature range of minus 20 to plus 65 degrees C without causing deterioration of the roof system.
- .4 Design roof system to withstand dead loads, snow loads, snow build-up and rain load. Design fastener systems to withstand wind uplift on the roof and sliding forces induced by environmental loads.
- .5 Allow for movement in roofing caused by deflection in structure.
- .6 Design assembly to be weatherproof and prevent infiltration of water into the roof assembly.
- .7 Fasten panel assembly to the building structure in a manner that transmits all loads to the main structure without exceeding the capacity of any fastener.
- .8 Panel assembly to be non-combustible.

- .9 Roof panel assembly to exhibit no permanent deformation when subjected to design criteria.

### **1.3 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- .2 Indicate arrangements of sheets and joints, types and locations of fasteners, flashing, gutters, mitres and all metal components related to the roof and soffit installation.
- .3 Detail relationships to adjacent materials at roof and soffit.
- .4 Indicate all load bearing steel stud assemblies, all details, reinforcement, welding and method of assembly. Show fabrication and installation details, fastening details, field jointing and splicing anchor reinforcing, and structural supports. Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thickness, exclusive dimensions, openings, requirements of related work and critical installation procedures.
- .5 If requested, submit three copies of engineering calculations and manufacturer's product data verifying the capacity of the members and the ability of the assemblies to meet the design requirements.
- .6 Submit two samples of panel to Consultant for approval, minimum 450 mm x panel width of colour and profiles of material used prior to fabrication.

### **1.4 HANDLING AND PROTECTION**

- .1 Protect prefinished steel during fabrication, transportation, site storage and installation in accordance with CSSBI Standards.
- .2 Store roofing products in accordance with manufacturer's recommendations.
  - .1 Protect from elements.
  - .2 Do not store on the ground.
  - .3 Block materials to prevent sagging.
  - .4 Slope to shed water.
  - .5 Ventilate covered materials.
  - .6 Separate sheets which become wet and air dry.
  - .7 Store away from chemically aggressive substances and traffic.

### **1.5 GUARANTEE AND INSPECTION**

- .1 Provide the Standard Roofing Contractors Association of British Columbia (RCABC) RGC Guarantee Standards five year guarantee for roofing system included under this Section.
- .2 The Building envelope inspection agency approved by RGC for this project is to provide inspection services as follows:
  - .1 Carry out full and complete inspections while the work is in progress, at completion of roofing installation and just prior to the date of Substantial Performance.
  - .2 Submit: A daily report sheet while work is in progress, showing weather, temperature, condition and progress of job, protection of materials and any other

pertinent information including approved deviation from the Contract Documents; all on Roofing Inspection Company's Inspection form to:

- the Owner
- the Consultant
- the Roofing Sub-contractor's Superintendent
- the Contractor's Superintendent
- others as deemed necessary

- .3 This report is to be countersigned by the Roofing Subcontractor's Superintendent acknowledging content.
- .4 Inspect and review materials and workmanship including storage, handling and protection. Advise the Consultant and the Owner of inspections.

## **1.6 WARRANTY**

- .1 The metal roofing installer shall issue a written document in the Owner's name, valid for a 5 – year period, stating that it will repair any leaks in the roofing membrane to restore the roofing system to a dry and watertight condition, to the extent that membrane manufacturing or installation defects caused water infiltration. The warranty must cover for the entire cost of the repair(s) during the warranty period. The warranty must be transferable, at no extra cost, to subsequent building owners.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with 01 74 19.
- .2 Do not dispose of unused sealant materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 PREFINISHED METAL ROOFING**

- .1 Metal Roof Panels: Fabricated from 0.61 mm (24 gauge) aluminum-zinc alloy coated steel sheet, conforming to ASTM A792/A792M-06 CS Type B, AZM150 coating. Thickness tolerance as per ASTM A924/A924M-06, +/- 0.08 mm for sheet widths not exceeding 1500 mm.
  - .1 Panel width approximately 406 mm x full length of slope.
  - .2 Two stiffening profiles in panel width.
  - .3 Neoprene closures.
  - .4 Roof Profile:
    - .1 Double-lock standing seam panel system with spacing maximum 406 mm on centre.
    - .1 25 mm finished standing seam height.



- .5 Finish: Coil coated, minimum 2 coat, based Kynar 500/Hylar 5000 Fluorocarbon coating, with top side film thickness of 0.70 to 0.90 mil over 0.25 to 0.35 mil prime coat for a total dry film thickness of 0.95 to 1.25 mil. Bottom side coated with 0.25 mil primer. Strippable coating factory applied for protection.
  - .1 Colour: to match existing building.
- .2 Sealant Tape: Low-density neoprene foam tape, 6 mm thickness x 12 mm width one or two side adhesive.
- .3 Sealants: In accordance with manufacturer's recommendation.
  - .1 Single component urethane caulk.
  - .2 Butyl tape sealant.
- .4 Fasteners Manufacturer's standard corrosion-resistant, self-drilling, concealed type to suit application. Size and spacing to withstand full design load. Neoprene washers.
- .5 Accessories: Flashings, internal corner closures, transition pieces, copings and closures for jamb, sill corners brake formed of same material and finish as roof sheet.

## **2.2 COMPOSITE ROOF COMPONENTS**

- .1 Framing and Sheathing: Refer to Section 06 10 00 and Structural.
- .2 Membrane: Self-adhesive, rubberized asphalt sheet material. Self-adhering high temperature membrane complete with compatible primer and sealant. Acceptable product, Soprema Lastobond Shield HT, Bakor Blueskin PE 200HT or acceptable substitution.
  - .1 Primer recommended by membrane manufacturer.
- .3 Z-Girts: Supporting Z-Girt profiles as required for wind loading and support of metal roof panels. Weep holes at maximum 600 mm centres at base of Z.
  - .1 Roll formed hot-dipped galvanized Z275 coated, minimum base thickness 1.52 mm for Z-girts, or as required for applied loading, face width 32 mm, depths as indicated.
  - .2 Steel thickness and profile conforming to CAN/CGSB-7.1-98. Grade of steel conforming to ASTM A 527 or A 446. Coating to ASTM A 653.
- .4 Insulation: Polyisocyanurate conforming to CAN/ULC-S704-01 / CAN/CGSB-51.26-M86, faced polyisocyanurate, square edges, high density formulation, thickness indicated in two or equal layers, based on an aged Long Term Thermal Resistance (LTTR) RSI value of 0.973 per 25 mm.
- .5 Slip sheet: Reinforced sisal paper or a heavy felt kraft paper.

## **2.3 FABRICATION**

- .1 Fabricate panels in continuous one-piece lengths. Fabricate flashings and accessories in longest practical lengths. Factory fabricate all components ready for field installation.
- .2 Manufacture flashings and trims to required profile.
- .3 Hem exposed edges on underside 12 mm, miter and seal.

- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

### **3 Execution**

#### **3.1 INSPECTION EXISTING CONDITIONS**

- .1 Verify field measurements prior to fabrication.
- .2 Verify that deck and soffit framing is complete, secure, in true plane and acceptable for the work of this Section.
- .3 Report any discrepancies to the Consultant in writing. Commencement of work acknowledges acceptable conditions.

#### **3.2 PROTECTION**

- .1 Protect work of other Sections against damage from the work of this Section.
- .2 Treat any contacting surfaces of dissimilar materials to prevent corrosion.
- .3 Require workmen who will be walking on roof panels to wear clean, soft soled shoes that will not pick up abrasive materials.

#### **3.3 INSTALLATION**

- .1 Install all work in accordance with manufacturer's written instructions and reviewed shop drawings.
- .2 Build-in and provide supplementary reinforcing, bracing or framing required for wind load and deflections and cladding support.
- .3 Conceal all anchors and fastenings on roof. All visible joints to be lapped flush hairline butt joints.
- .4 Use anchors that permit sufficient adjustments for accurate alignment. Make allowance for building structure deflection and thermal movement.
- .5 Coordinate installation with related trades to ensure proper weatherproof and water-resistant jointing.
- .6 Locate and install flashings, deflectors and weep holes to allow proper drainage of any moisture entering the roof assembly. Interlock and seal flashings to prevent entry of water.
- .7 Completed installation to be free of rattles or noise due to thermal movement or wind whistle.
- .8 Install eave protection according to manufacturer's recommendations. Overlap membrane by minimum 200 mm, installed in shingle fashion.
- .9 Membrane:
  - .1 Ensure sheathing is clean of dust, oil and other contaminants.
  - .2 Apply primer to manufacturer's recommendations. Allow sufficient time for curing.

- .3 Cut membrane into manageable strips. Starting at low edge of roof align edges and apply over primed surface taking care to avoid ridges and fish mouths.
- .4 Lap edges minimum 75 mm.
- .5 Use a rubber roller to apply pressure and roll membrane to assure adhesion.
- .6 Overlap air barrier membrane on gutter as detailed.
- .7 Seal air barrier membrane to metal roof deck at line of wall membrane below roof.
- .10 Z-Girts: Install Z-girts on roof slope in alternating directions, parallel and perpendicular to roof slope. Apply sealant over mechanical fasteners.
- .11 Insulation: Install insulation friction fit between z-girts in two offset layers.
- .12 Install slip sheet over insulation.
- .13 Roof Panels:
  - .1 Follow manufacturer's directions.
  - .2 Install standing seams vertically with slope of roof.
  - .3 Fasten panel clips to Z girts with approved fasteners. Panel clip spacing to be designed to maintain deflections within tolerance of L/240.
  - .4 Apply sealant tape on underside of female ribs prior to installing panel.
  - .5 Secure panels without warp or deflection. Fully engage interlocking corrugations.
  - .6 Extend panels to overlap end slopes 50 mm.
  - .7 Form seams in direction of water-flow and make watertight.
  - .8 Maximum alignment variation: 5 mm in 12 metres.
  - .9 Remove cuttings from exposed prefinished surfaces. Hand trim edges cut with an abrasive blade.
- .14 Flashing:
  - .1 Follow manufacturer's directions.
  - .2 Install flashing to manufacturer's details using approved fasteners and sealant.
  - .3 Overlap panels minimum 150 mm.
  - .4 Install closure into space between rcorrugations at flashing perpendicular to corrugations.
- .15 Coordinate metal work with work of related Sections.

### **3.4 TOUCH-UP, CLEANING AND REPAIRING**

- .1 Touch-up any minor scratches with same paint as coating.
- .2 Replace any damaged panels.

- .3 At completion of work each day and at completion sweep panels, flashing and gutters clean. Do not allow fasteners, cuttings, fillings or scraps to accumulate on finished surfaces.
- .4 Do not expose any cut edges. Paint and protect all cut edges of metal from corrosion.
- .5 Repair any damage caused to the work of other Sections.
- .6 Remove debris and left over material from the site at completion.

**3.5 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED WORK**

- .1 Section 04 22 00: Concrete Unit Masonry.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 07 27 00: Air Barriers.
- .4 Section 07 46 23: Wood Siding.
- .5 Section 07 46 46: Fibre Reinforced Cementitious Panels.
- .6 Section 07 52 00: Modified Bituminous Roofing.
- .7 Section 07 61 13: Sheet Metal Roofing.
- .8 Section 08 11 00: Metal Doors and Frames.
- .9 Section 08 11 16: Aluminum Doors and Frames.
- .10 Section 08 44 00: Curtain Wall.
- .11 Section 09 25 13: Stucco.
- .12 Section 11 24 23: Safety Fall Restraint.
- .13 Mechanical.
- .14 Electrical.

**1.2 REFERENCES**

- .1 Aluminum Association Designation System for Aluminum Finishes.
- .2 ASTM A792/A792M-10(2015), Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 CAN/CGSB-37.5-M89 Cutback Asphalt Plastic Cement.
- .4 Canadian Roofing Contractors Association (CRCA).
- .5 Sheet Metal and Air Conditioning Contractors National Association Inc., Architectural Sheet Metal Manual (SMACNA).

**1.2 SUBMITTALS**

- .1 Submit Shop Drawings in accordance with Section 01 33 00 – Submittals.
- .2 Submit duplicate 100 x 100 mm samples of each type of sheet metal material, colour and finish.

## **1.4 MOCK-UPS**

- .1 Provide mock ups of parapet types for Consultant approval prior to fabrication of metal flashings. Install one 3 m length of flashing profiles indicated with a joint seam at mid length.
- .2 Coordinate mock up with related trades.

## **1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused metal materials from landfill to metal recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 SHEET METAL MATERIALS**

- .1 Pre-finished Steel Sheet: Aluminum-Zinc Alloy Coated: 0.61 mm (24 gauge) aluminum-zinc alloy coated steel sheet, conforming to ASTM A792/A792M-06 CS Type B, AZM150 coating. Thickness tolerance as per ASTM A924/A924M-06, +/- 0.08 mm for sheet widths not exceeding 1500 mm.
  - .1 Finish: Polyvinylidene Fluoride (PVDF) comprised of 70% Kynar or Hylar 5000 fluoropolymer resin systems, ceramic pigments and other select inorganic pigments.
  - .2 Colours to be selected by Consultant. Colours to match adjacent materials.
- .2 Rain Screen Vents: Perforated, 3 mm round holes, 22 gauge aluminum insect vent break formed to sizes and profiles required and/or indicated. Acceptable manufacturer, Menzies Metal Products or acceptable substitution.
  - .1 Finish to match adjacent cladding material.
- .3 Membrane Underlayment: Self-adhering membrane complete with compatible primer and sealant. Acceptable product, Soprema Lastobond Shield HT, Bakor Blueskin PE 200HT, Protecto Wrap Jiffyseal 140/60 or acceptable substitution.

### **2.2 ACCESSORIES**

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CGSB 37-GP-5Ma.
- .3 Sealants: UV resistant one part polysulfide to 19-GP-13, colour to match adjacent surface.
- .4 Clips or Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness 2 ga. Heavier than metal being secured. Use clips on all copings and base

flashings. Install at 600 mm centres. Carry clips down a minimum of 12 mm past the bottom edge of all flashing and turn back over into the face. Back paint clips of flashings on exposed walls.

- .5 Membrane Underlayment: Self-adhering membrane, high temperature formulation, complete with compatible primer and sealant. Acceptable product, Soprema Lastobond Shield HT, Bakor Blueskin PE 200HT, Protecto Wrap Jiffyseal 140/60 or acceptable substitution.
- .6 Fasteners: Screws. Solder over all screws and other fasteners.
- .7 Washers: of same material as metal, 1 mm thick with rubber packings.
- .8 Plumbing Vent Flashings: Aluminum vents to CSA-879, with vandal proof aluminum caps.
- .9 Vent and Insect Screen: Perforated galvanized 22 gauge metal, 3 mm x 5.55 mm staggered holes.

## **2.3 FABRICATION**

- .1 Fabricate flashings and other sheet metal work to applicable SMACNA and RCABC specifications.
- .2 Form pieces in 2 400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 19 mm. Miter and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Fabricate curved or radius sections of flashing and trim to suit radius and or curve indicated. Segmented sections of straight metal are unacceptable.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

## **2.4 METAL FLASHINGS**

- .1 Form flashings, copings and trims to profiles indicated of 24 gauge thick prefinished aluminum-zinc alloy coated sheet steel.
- .2 Form sealed 50 mm high end dams to all horizontal flashings at openings or where flashings butt to walls.
- .3 Form joints of all horizontal and sloping cap flashings with standing seam joints.

## **2.6 REGLETS, SCUPPERS, RWL AND FLASHINGS**

- .1 Form recessed reglets, scuppers, rain water leaders and metal cap flashing of 24 gauge thick prefinished galvanized sheet steel as detailed. Provide slotted fixing holes and steel/plastic washer fasteners.
- .2 Use standing seam joints for all corner seams. Use S-lock seams for all flat work. Insert sealant in seam prior to fixing adjacent section of flashing.

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**3 Execution**

**3.1 INSTALLATION**

- .1 Install sheet metal work as detailed to RCABC Standards.
- .2 Use concealed fastenings except where approved before installation.
- .3 Install flashings over high temperature self-adhesive underlayment.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock seams forming tight fit over hook strips.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing into reglets and under cap flashing to form weathertight junction.
- .8 Caulk flashing at reglets and cap flashing with sealant.
- .9 Install curbs and flashings, around items projecting through roof membrane.
- .10 Install base metal flashing on all vertical surfaces, walls, curbs etc where hot asphalt is used to adhere flashing membranes.
- .11 Make all roof areas watertight. Flash openings and other items projecting through roofing. Bend up flashing as required, fold and clip neatly and secure in straight lines free from wrinkles and undulations.
- .12 Ensure wide girth flashings are adequately sloped to the inside of roof areas and do not pond water. Backsloped flashings will be rejected by the Consultant. Fastenings to be concealed and watertight. Carefully place, form and trim breaks. Bond and neutralize soldering.
- .13 Turn back edges of all exposed flashing to form 6 mm stiffeners.
- .14 Keep all metal flashings a minimum of 38 mm above all roof surfaces.
- .15 Install flashing in maximum 3000 mm lengths, to profiles indicated.
- .16 Construct internal and external mitres with properly shaped capping pieces.
- .17 Form all flashing on a bending brake. Execute all hand trimming, shaping and soldering with appropriate tools. Install with hold down clips.
- .18 Allow for expansion and contraction to finished work without deformation.
- .19 Install scuppers in accordance with RCABC Standards, set scupper flanges in a full trowelling of mastic.
- .20 Neutralize all acid flux before painting.
- .21 Slope all horizontal wall flashings 20 degrees to exterior.
- .22 Form end dams for all wall flashings.



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**3.2 CLEAN UP**

- .1 As work proceeds and at completion remove all excess and waste materials.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED WORK**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 05 50 00: Metal Fabrications.
- .3 Section 07 52 00: Modified Bituminous Roofing.
- .4 Section 09 91 00: Painting.

**1.2 REFERENCES**

- .1 ASTM A526M, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

**1.3 DESIGN CRITERIA**

- .1 Design roof hatch to withstand snow load, wind uplift and temperature range in accordance with British Columbia Building Code for designated area, based on 30 year probability, without damage to unit or permanent deformation of weather seals.
- .2 Design roof hatches to limit air exfiltration in closed position to a maximum of 0.03 m<sup>3</sup> per minute with a differential pressure of 127 mm of water.
- .3 Design hatches with no through metal contact and with insulation thickness to meet design requirements.

**1.4 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 Submittals.
  - .1 Indicate size and description of components, materials, attachment devices, description of frame and finish, and construction details.
- .2 Provide maintenance data for hardware complete with pertinent details, spare parts lists for incorporation into the maintenance manual.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Construction Waste Management Plan.

**2 Products**

- .1 Steel sheet: regular quality alloy steel to ASTM A506.
- .2 Galvanized steel sheet: commercial quality to ASTM A526M, with ASTM A525, Z275 designation zinc coating.
- .3 Gaskets: extruded resilient neoprene, with full recovery after 50% compression.
- .4 Fasteners: screws galvanized steel.
- .5 Prime paint for steel: to CAN/CGSB-1.105.

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- .6 Isolation coating: alkali resistant bituminous paint.

## **2.2 HATCH COVER AND CURB**

- .1 Metal Cover: Preformed, 14 gauge G-90 paint bond galvanized steel with 76 mm beaded flange and formed reinforcing members welded to support minimum live load of 195 kg/m<sup>2</sup>, 25 mm rigid insulation with 22 gauge metal liner.
- .2 Preformed metal curb: 14 gauge x 305 mm high insulated with 25 mm rigid insulation, with 89 mm deck flange for attachment. Integral metal cap flashing fully welded at corners. Opening size 762 mm x 1370 mm.
- .3 Assembled with heavy pintel hinges with 9.5 mm type 316 stainless steel hinge pins, positive snap latch with turn handle and padlock hasp inside.
- .1 Compression spring operator enclosed in telescopic tubes.
- .2 Automatic hold-open arm complete with vinyl grip handle.
- .3 Inside and outside latch handles.
- .4 Inside integral padlock hasp.
- .4 Extruded EPDM rubber gasket permanently adhered to cover.
- .5 Finish: Prime coated for exterior Alkyd paint finish by Section 09 91 00.
- .6 Size: 914 mm x 914 mm.
- .7 Approved manufacturers: Bilco, Bolar, Maxam, Milcor, Williams Brothers Corp, Acudor Roof Hatch.

## **2.3 ACCESSORIES**

- .1 Ladder Safety Post: Install on fixed ladder below hatch cover. Tubular telescoping section that locks automatically when fully extended. Upward and downward movement controlled by stainless steel spring balancing mechanism. Unit completely assembled for securing in accordance with manufacturer's instructions.
- .2 Approved Product: Bilco LadderUP Safety Post Model LU-1, Bolar Model SLP-1 Spring Balanced Post, Maxam SLP-1 powder coated steel safety post.

## **2.4 FABRICATION**

- .1 Fabricate components free of twists, bends, or visual distortion and insulated. Weld corners and joints.
- .2 Assemble roof hatch components as indicated.
- .3 Ensure continuity of weather-tight seal.
- .4 Design flashings to collect and lead off condensation accumulated.
- .5 Zinc plate hardware and attachments and shop prime ready for field painting.

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**3 Execution**

**3.1 INSTALLATION**

- .1 Erect components plumb, level and in proper alignment.
- .2 Ensure continuity of building envelope air barrier and vapour retarder systems.
- .3 Adjust and seal assembly with provision for expansion and contraction of components.
- .4 Secure brake formed metal curb to structure.
- .5 Secure safety railing to opening frame. Provide brackets as required to accommodate installation.
- .6 Instruct Owner's personnel in proper operating and maintenance procedures.
- .7 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED WORK**

- .1 Section 04 22 00: Concrete Unit Masonry.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 09 21 16: Gypsum Board.
- .4 Mechanical.
- .5 Electrical.

**1.2 DESCRIPTION OF WORK**

- .1 Provide all labour, materials, services and equipment necessary for the supply and installation of firestopping and smoke seals where indicated on the drawings, as specified and scheduled.
- .2 Provide tested firestop systems used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, water and hot gases through penetrations in fire rated wall and floor assemblies, including:
  - .1 Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated walls and partitions, horizontal floor/ceiling assemblies and vertical service shaft walls and partitions.
  - .2 Openings between structurally separate sections of walls.
  - .3 Gaps between the top of walls and ceilings or roof assemblies.
  - .4 Expansion joints in walls.
  - .5 Openings and penetrations in fire-rated partitions or walls containing fire doors.
  - .6 Openings around structural members that penetrate walls.
- .3 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturing'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. Engineering judgement drawings must follow requirements set forth by the International Firestop Council.

**1.3 QUALITY ASSURANCE**

- .1 Engage an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer, as having the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or installer engaged by the Contractor does not in itself confer qualification on the purchaser.
- .2 The work is to be installed by a Contractor with at least one of the following qualifications:
  - .1 FM 4991 Approved Contractor.

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.2 ULC Approved Contractor.

.3 Hilti Accredited Fire Stop Specialty Contractor.

- .3 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas. Keep areas of work accessible until inspection by applicable code authorities.
- .4 Engage qualified independent testing agency or Fire Protection Engineering Firm to perform the inspections and tests and prepare reports for each firestop system and identify each meeting the requirements of CAN4-S115-M, ULC S-115-M or UL 2079 tested assemblies providing a fire rating equivalent to the required supporting construction assembly.
- .5 Manufacturer's direct representative to be on site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures.

#### **1.4 REFERENCES**

- .1 British Columbia Building Code 2012.
- .2 British Columbia Fire Code.
- .3 CAN/ULC - S102-10, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
- .4 CAN 4-S115-M or ULC-S115-11, 'Standard Method of Fire Tests of Firestop Systems'.
- .5 UL 2079, 'Tests for Resistance of Building Joint Systems'.
- .6 NFPA 101, 'Life Safety Code'.
- .7 Canadian Electric Code.

#### **1.5 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00. Submit to Consultant for review prior to installation.
- .2 Submit three copies of manufacturer's specifications and installation instructions for each type of material required. Include data substantiating that materials and/or systems comply with specific test standards documented by ULC or cUL.
- .3 Accompany manufacturer's specifications by duplicate, tagged samples of materials and components of the firestopping system.
- .4 Submit material safety data sheets with products delivered to site.
- .5 Submit inspection reports from the manufacturer's representative following each inspection.

#### **1.6 DELIVERY, HANDLING AND STORAGE**

- .1 Deliver materials and store on the Work site in manufacturer's original unopened containers, clearly labeled, identified with brand, type and ULC or cUL label as applicable.

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- .2 Coordinate delivery of materials with scheduled installation date to allow minimum storage time on site.
  - .3 Store materials in accordance with manufacturer's requirements, in enclosed dry areas, above ground and protected from the elements and damage.
  - .4 Replace at no additional cost, expired materials, materials damaged during delivery, storage or through improper handling.
  - .5 Comply with recommended procedures, precautions or remedies described in material safety data sheets.

## **1.7 PROJECT CONDITIONS**

- .1 Do not use materials that contain flammable solvents.
- .2 Schedule installation of firestopping after completion of penetrating item installation but before covering or concealing openings.
- .3 Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- .4 Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation.
- .5 Provide masking and drop cloths during installation to prevent firestopping materials from contaminating any adjacent surfaces.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused metal and wiring materials from landfill to metal recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 FIRESTOPPING - GENERAL**

- .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN 4-S115-M and not exceeding intended opening sizes.
- .2 Firestopping components compatible with each other, substrates forming openings and items penetrating the firestopping under conditions of service and application.
- .3 Where 'cast-in-place' firestopping materials are used, provide firestopping devices prior to concrete placement.
- .4 Firestop System Rating:

.1 For penetrations through a fire wall or horizontal fire separation provide a firestop system with a 'FT' rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

.2 For combustible pipes, tubing, ducts, chimneys, optical fibre cables, electrical wires and cables, totally enclosed non-combustible raceways, electrical outlet boxes and similar building services that penetrate through a fire separation provide a firestop system with a 'F' Rating as determined by ULC or cUL as indicated below:

Separation Fire Resistance Rating	Firestopping Required ULC or cUL 'F' Rating
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hour

For DWV combustible pipe penetrations through a fire separation provide a firestop system with a 'F' Rating as determined by ULC or cUL (when tested with a pressure differential of 50 Pa between exposed and unexposed sides) which is equal to the fire resistance rating of the construction being penetrated.

.3 For joints provide a firestop system with an Assembly Rating as determined by CAN4-S115-M, ULC-S115-M or UL 2079 which is equal to the fire resistance rating of the construction being penetrated.

.5 Mold Resistance: All firestopping materials are to conform to ASTM G21 with a rating of 0.

## **2.2 MANUFACTURERS**

.1 Subject to compliance with through penetration firestop systems and joint systems listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory, provide products of the following acceptable manufacturers:

- .1 A/D Firebarrier
- .2 3M Fire Protection Products.
- .3 Hilti (Canada) Limited.
- .4 Tremco Sealants & Coatings.
- .5 JV-Industries Sleeves and Firestop Devices c/w Tremco Firestop materials.
- .6 Emseal Emshield WFR2.
- .6 Other manufacturers listed in the above noted reference Standards.

## **2.3 ACCESSORIES**

- .1 Fibre Insulation: Alumina-silica refractory fibre insulation in blanket or bulk form with service temperature limit of 1315 degrees C, melting point of more than 1760 degrees C, specific gravity 2.56, thickness to suit application.
- .2 Primers: to manufacturer's recommendation for specific material, substrate, and end use.



- .3 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .4 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .5 Sealants for vertical joints: non-sagging.

### **3 Execution**

#### **3.1 PREPARATION**

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

#### **3.2 COORDINATION**

- .1 Installation is not to proceed until shop drawings have been approved.
- .2 Coordinate location and proper selection of cast-in-place firestop devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- .3 Provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interference.
- .4 Firestopping of floor and roof slab penetrations must precede steel stud track installation.
- .5 Firestopping must precede fireproofing installation.
- .6 Firestopping at slab edge detail to exterior wall panels and at window panels must be done with wall panel installations.
- .7 Firestopping must precede mechanical pipe insulation. Vapour barriers must be continued along with FPI – ASJ jacketing.

#### **3.3 INSTALLATION**

- .1 Install fire stopping and smoke seal material and components in accordance with ULC or cUL Certification and manufacturer's instructions.

- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained by providing an air and water resistant seal.
- .3 Consult with related trades before installation of ULC or cUL firestop systems that might hamper the performance of fire dampers in duct work.
- .4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .5 Tool or trowel exposed surfaces to a neat finish.
- .6 Remove excess compound promptly as work progresses and upon completion.
- .7 Protect materials from damage on surfaces subjected to traffic.

### **3.4 FIELD QUALITY CONTROL**

- .1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.
- .2 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- .3 Perform patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- .4 Install a warning card visible adjacent to all large and medium openings that may be re-penetrated. Provide the following information on the card:
  - .1 Warning that the opening has been fire stop protected.
  - .2 Indicate the fire stop system used, ULC or cUL.
  - .3 F or FT rating.
  - .4 Fire stop products used.
  - .5 Person to contact and phone number in case of modification or new penetration of fire stop system.
  - .6 Through-penetration firestop system manufacturer name.

### **3.5 FIRESTOPPING SCHEDULE**

- .1 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT):
  - .1 3M Fire Stop Sealant 2000.
  - .2 3M Fire Barrier CP25 WB.
  - .3 Hilti CP 606 Flexible Firestop Sealant.
  - .4 Hilti CP 601s Elastomeric Firestop Sealant.
  - .5 Hilti FS-One Intumescent Firestop Sealant.
  - .6 Hilti FS 604 Self Levelling Firestop Sealant.

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- .7 Tremco Tremstop Fyre-Sil Sealant.
  - .8 Tremco Fyre-Sil SL.
  - .9 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .2 Sealants or caulking materials for use with sheet metal ducts:
    - .1 Hilti CP 601s Elastomeric Firestop Sealant.
    - .2 Hilti CP 606 Flexible Firestop Sealant.
    - .3 Hilti FS-One Intumescent Firestop Sealant.
    - .4 Hilti FS 604 Self Leveling Firestop Sealant.
    - .5 Tremco Fyre-Sil SL Sealant.
    - .6 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .3 Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps:
    - .1 3M Firestop Sealant 2000.
    - .2 Hilti CFS-SP WB Firestop Joint Spray.
    - .3 Hilti CP 601s Elastomeric Firestop Sealant.
    - .4 Hilti CP 606 Flexible Firestop Sealant.
    - .5 Hilti FS 604 Self Leveling Firestop Sealant.
    - .6 Tremco TREMstop Acrylic.
    - .7 Tremco Dymonic FC.
    - .8 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .4 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed flexible cable or cable bundles and plastic pipe:
    - .1 3M Fire Barrier CP25 WB.
    - .2 Hilti Fs-One Intumescent Firestop Sealant.
    - .3 Tremco TREMstop IA.
    - .4 Tremco TREMstop WS.
    - .5 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .5 Intumescent sealants, caulking or putty materials for use with low voltage cabling, communication cabling and IT cabling:
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- .1 Hilti CP 653 Speed Sleeve.
  - .2 Hilti CP 680 Cast-in-Place Firestop Device.
  - .3 Hilti FS 657 Fire Block.
  - .4 Tremco TREMstop IA.
  - .5 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .6 Wall opening protective materials for use with cUL/ULC listed metallic and specified non-metallic outlet boxes:
    - .1 Hilti CP 617 Firestop Putty Pad.
    - .2 Tremco TREMstop MP.
    - .3 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .7 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems) tested to 50 Pa differential:
    - .1 3M Fire Barrier PPD Plastic Pipe Device.
    - .2 Hilti CP 648E/CP 648S Wrap Straps or CP 643 Firestop Collar.
    - .3 Tremco TREMstop WS.
    - .4 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .8 Materials for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways:
    - .1 3M Firestop Foam 2001.
    - .2 3M Fire Barrier CS-195 Composite Sheet.
    - .3 Hilti CP 675T Fire Boards.
    - .4 Hilti FS 657 Fire Block.
    - .5 Tremco TREMstop PS.
    - .6 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
  - .9 Non-curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways:
    - .1 Hilti FS 657 Fire Block.
    - .2 Tremco TREMstop PS.
    - .3 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.

- .10 Sealants or caulking materials used for openings between structurally separate sections of walls and floors:
  - .1 3M Fire Barrier CP 25 WB.
  - .2 Hilti CFS-SP WB Firestop Joint Spray.
  - .3 Hilti CP 601s Elastomeric Firestop Sealant.
  - .4 Hilti CP 606 Flexible Firestop Sealant.
  - .5 Hilti FS 604 Self Leveling Firestop Sealant.
  - .6 Tremco TREMstop Fyre-Sil.
  - .7 Tremco Dymonic FC.
  - .8 Emseal Emshield WRF2.
  - .9 Acceptable substitution product listed in the ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.
- .11 Materials for locations of high re-penetration of low voltage wiring:
  - .1 Hilti CP635 Speed Sleeve.
- .12 Smoke seals: Sealant materials specified for firestopping or as follows:
  - .1 Hilti Smoke and Acoustic sealant CP560.
  - .2 Tremco TREMstop Smoke and Sound Sealant.
  - .3 Acceptable substitution.

### **3.6 CLEAN UP**

- .1 Remove temporary dams after initial set of fire stopping and smoke seal materials.
- .2 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .3 Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

**1 General**

**1.1 SUMMARY**

- .1 This Section specifies caulking and sealants not specified in other Sections.
- .2 Refer to other sections for other caulking and sealants.
- .3 Supply all labour, materials and equipment necessary to complete all caulking and sealing of exterior and interior joints where shown on the drawings and as specified herein.

**1.2 SITE CONDITIONS**

- .1 Sealant and substrate materials to be minimum five degrees C.

**1.3 QUALIFICATIONS OF APPLICATOR**

- .1 Caulking installation to be performed by workmen thoroughly skilled and specially trained in the techniques of caulking and who are completely familiar with the published recommendations of the manufacturer of the caulking material to be used.
- .2 Indication of lack of skill on the part of caulking applicators will be sufficient grounds for the Consultant to reject installed caulking and to require its immediate removal and complete recaulking at no extra cost to the Contract Price.

**1.4 WARRANTY**

- .1 Provide a written warranty, signed and issued in the name of the Owner, stating that caulking work of this Section is guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion, staining adjacent surfaces, or other failure, for a period of ten years from the date of Certificate of Substantial Performance.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels intact.
- .2 Protect materials from freezing, moisture and water.

**1.6 ENVIRONMENTAL AND SAFETY REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and regarding labeling and provision of material safety data sheets acceptable to Human Resources Development Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants, including special conditions governing use.
- .3 Ventilate work area using approved portable supply and exhaust fans.

**1.7 PROTECTION**

- .1 Protect the work of this Section from damage by others and protect the work of others from the work of this Section.

- .2 Use masking tape on finished aluminum or metal surfaces when caulking joints adjacent to them to prevent smearing and staining.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 SEALANT MATERIALS**

- .1 Sealants, primers and caulking compounds must:
  - .1 meet or exceed all applicable governmental and industrial safety and performance standards; and
  - .2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising there from, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the fisheries Act and the Canadian Environmental Protection Act (CEPA).
- .2 Sealant, primer and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.
- .3 Sealant and caulking compounds must meet VOC limits of SCAQMD Rule 1168.
- .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in air handling units.
- .6 When low toxicity caulks are not possible, confine usage to areas which offgas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .7 The manufacturing process must adhere to Lifecycle Assessment Standards as per CSA Z760 LCA Standards.
- .8 Sealants acceptable for use on this Project except CAN/CGSB-19.1 and CAN/CGSB-19.18 must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.
- .9 Use sealant(s) specified below:
  - .1 Type 1: single component, polyurethane sealant. To meet specified requirements of CGSB specification CAN/CGSB-19.13-M90, ASTM C920 Type

- S, Grade NS, Class 50. Acceptable product, Dymonic 100, Dymonic FC by Tremco Ltd., Masterseal NPI, Bakor/Henry 925 BES. Use at all exterior locations, except where another type is specified. Use Dow 758 for S.A. air barrier membranes.
- .2 Type 2: Medium modulus, moisture curing, one part silicone sealant. Meeting the specified requirements of specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-L. Use in glass to glass, glass to metal and metal to metal window wall joints and sheet metal roofing. Acceptable material, Dow 795, Spectrem 2 by Tremco Ltd. Dow 790 for porous substrates.
- .3 Type 3: Mildew resistant, one component neutral cure silicone sealant. Meeting the specified requirements of specification CGSB-19GP22M. Use on fixtures, bathtubs and vanity tops, clear elsewhere.
- .4 Type 4: One component, non-skinning, non-hardening acoustical sealant. Meeting the specified requirements of specification CAN/CGSB-19.21-M87. Use at all vapour barrier joints and openings in drywall systems as shown on the drawings or specified.
- .5 Type 5: One component, paintable acrylic latex sealant. Meeting the specified requirements of specification CGSB-19-GP-17M. Use in interior non-moving joints that may be painted.
- .10 Colours of sealant to be selected by the Consultant from the range of manufacturer's standard colours.
- .11 Joint Cleaner: Xylol, methylethyleketon or non-staining and non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.
- .12 Primers: Type recommended by sealant manufacturer.
- .13 Joint Fillers:
- .1 .1 General: Compatible with primers and sealants, oversized 30 to 50%.
- .2 Polyethylene, Urethane, Neoprene or Vinyl: Extruded closed cell foam Shore A , hardness 70, tensil strength 138 to 207 kPa. (20 to 30 psi).
- .3 Joint backing material vertical surfaces - Sof Rod an extruded polyolefin foam by Tremco Ltd.
- .4 Joint backing horizontal surfaces - Standard Backer Rod a closed cell polyethylene foam by Tremco Ltd.
- .14 Bond breaker, where joint configuration does not allow for proper depth/width ratio place a pressure sensitive plastic tape at the back of the joint that will not bond to the sealant such as 3M #226 or #481 or Valley Industries #40.



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**3 Execution**

**3.1 PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants. Maintain depth of sealant at middle of joint width as follows:

Joint Width	Sealant Depth	Joint Depth
6 mm	6 mm	10 mm
20 mm	10 mm	15 mm

Minimum adhesion surface to be 1.5 times depth.

- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil, grease and other matter which may impair work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

**3.2 PRIMING**

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

**3.3 BACKUP MATERIAL**

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

**3.4 MIXING**

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

**3.5 APPLICATION**

- .1 Applicators:
- .1 Application only by specially trained applicators.
- .2 Sealant.
- .1 Apply sealant in accordance with manufacturer's written instructions after surfaces have been cleaned, primed and rodded.
- .2 Apply sealant only after tests have been carried out to ensure there will be no staining of adjacent materials.
- .3 Tool all joints and tape and tool exposed joints.
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- .4 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .5 Prime all joints to ensure full bond capabilities of sealant.
- .6 Apply sealant in continuous beads.
- .7 Apply sealant using gun with proper size nozzle.
- .8 Use sufficient pressure to fill voids and joints solid.
- .9 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .10 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .11 Remove excess compound and tapes promptly as work progresses and upon completion.
- .3 Locations:
  - .1 Caulk all joints where indicated on the drawings and at all locations where required to provide a complete weathertight building.
  - .2 Install sealants in all locations shown on drawings.
  - .3 Install sealant at the perimeter of all exterior openings where doors, windows, grilles and other items abut or penetrate the exterior wall materials.
  - .4 Install sealant at all door saddles, spread a bead of sealant compound over entire seat of saddles at least 3 mm thick before installing saddle.
  - .5 Seal the junctions of differing exterior wall materials.
  - .6 Provide a minimum of two continuous beads of sealant under all prefinished galvanized steel wall flashings.
- .4 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
- .5 Cleanup.
  - .1 Clean adjacent surfaces immediately and leave work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

### **3.6 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 04 22 00: Concrete Unit Masonry.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 06 20 00: Finish Carpentry.
- .4 Section 07 62 00: Metal Flashing and Trim.
- .5 Section 07 90 00: Joint Sealants.
- .6 Section 08 71 00: Door Hardware.
- .7 Section 08 80 00: Glazing.
- .8 Section 09 21 16: Gypsum Board.
- .9 Section 09 91 00: Painting.
- .10 Mechanical.
- .11 Electrical.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International)
  - .1 ASTM A653/A653M-15e1, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
  - .1 G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59-13, Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
  - .1 CSDMA, Specifications for Commercial Steel Doors and Frames, 1990.
  - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.
- .5 National Fire Protection Association (NFPA)
  - .1 NFPA 80-10, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252-17, Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN4-S104-15, Fire Tests of Door Assemblies.
  - .2 CAN4-S105-16, Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .7 CAN/ULC-S704-11, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

## **1.2 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00: Submittals.
- .2 Submit shop drawings within 14 days of Contract signing.
- .3 Indicate each type of door, material, steel core thickness, mortises, reinforcements, location of exposed fasteners, openings, arrangement of hardware and fire rating.
- .4 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings, reinforcing and fire rating.
- .5 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

## **1.4 REQUIREMENTS OF REGULATORY AGENCIES**

- .1 Steel fire rated doors and frames: labeled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M NFPA 252 for ratings specified or indicated.

## **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Hot dipped galvanized steel sheet: to ASTM A653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653M, ZF75.
- .3 Doors and frames: interior doors and frames use wipe ZF75 galvanizing; exterior doors and frames use hot dip galvanizing to Z275.
- .4 Fire rated 3/4 hour doors where shown on the Door Schedule, 44.5 mm thick fabricated from 1.2 mm (18 gauge) sheet steel metal, steel stiffened, flush doors manufactured in accordance with the standards of the National Fire Protection Association.
  - .1 Label each fire rated door with a label of the Underwriters Laboratories of Canada indicating the number and rating. Affix label to hinge side of the door at eye level.
  - .2 Reinforce door for hardware.

- .5 Typical Doors: Hollow metal flush doors without label, 44.5 mm thick, fabricated from sheet steel with stitch welded rolled lock edge seams on hinge and lock edges, top and bottom of doors with 1.6 mm cold rolled steel channels spot welded within the door.
  - .1 Base metal thickness of steel sheet on exterior door faces 1.2 mm. Base metal thickness of steel sheet on interior door faces 1.2 mm.
  - .2 Mortise door and adequately reinforced for hardware, including 2.7 mm internal reinforcing strip for door closers.
  - .3 Where indicated on the Door Schedule make provisions for glazing or door grilles or door undercutting.
- .6 Stiffened Doors: Hollow metal flush doors without label, steel stiffened, 44.5 mm thick, fabricated from sheet steel with stitch welded rolled lock edge seams on hinge and lock edges, top and bottom of doors with 1.6 mm cold rolled steel channels spot welded within the door.
  - .1 Base metal thickness of steel sheet on exterior door faces 1.2 mm. Base metal thickness of steel sheet on interior door faces 1.2 mm.
  - .2 Vertical 1.2 mm ribs at 150 mm centres spot welded to outside door skin with rib clip spotwelded to inside door skin.
  - .3 Adequately reinforced for hardware, including 2.7 mm internal reinforcing box for door closers.
  - .4 Where indicated on the Door Schedule make provisions for glazing, door grilles or undercutting.
- .7 Exterior Thermally Broken Doors and Frames:
  - .1 Doors constructed from 16 gauge galvanized skins with internal steel stiffeners separated by structural isolators and insulated with foamed in place urethane insulation chemically bonded to interior surfaces.
  - .2 Frames constructed from 16 gauge galvanized steel with structural isolator.
  - .3 Adequately reinforced for hardware, including 12 gauge internal reinforcing box for door closers.
  - .4 Where indicated on the door schedule make provisions for glazing, door grilles or undercutting.
  - .5 Acceptable product, Kreiger thermally broken frame and door, Fleming Trio Series exterior frame and door or acceptable substitution.
- .8 Door Insulation: Cores filled with rigid foam high density polystyrene, fiberglass or polyurethane insulation.
  - .1 Fiberglass loose batt type density minimum 24 kg/m<sup>3</sup> conforming to CAN/ULC-S702-97, Type 1.
  - .2 Polystyrene board conforming to CAN/ULC-S701-97.

## **2.2 PRIMERS**

- .1 Touch-up prime CAN/CGSB-1.181. Interior paints and coatings VOC content to comply with content limits of South Coast Air Quality Management District (SCAQMD) Rule

#1113. VOC emissions from anti-corrosive coatings to comply with limits of Green Seal Standard GS-03.

## **2.3 ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type, 3 per jamb, 1 per single head.
- .2 Exterior top caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Metallic paste filler: to manufacturer's standard.
- .5 Fire labels: Metal riveted.
- .6 Glazing: As scheduled.
- .7 Make provisions for glazing as indicated and provide necessary glazing stops.
- .8 Astragals welded to doors where scheduled in Section 08 71 00 and on all exterior doors, minimum thickness 4.69 mm.

## **2.4 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDFMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated. Four sided frames to roof areas. Typical face profile for frames 50 mm.
- .3 Exterior and Interior frames: 1.6 mm (16 gauge) welded type construction. Corners mitred, welded, filled and sanded to a smooth finish.
- .4 Blank, reinforce, drill and tap frames for mortised, templated hardware, using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware. Provide minimum 3.5 mm plate steel hinge, strike and closer reinforcing; other reinforcing as required.
- .5 Protect mortised cutouts with steel guard boxes.
- .6 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .7 Manufacturer's nameplates on frames and screens are not permitted.
- .8 Conceal fastenings except where exposed fastenings are indicated.
- .9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .10 Insulate exterior frame components with polyurethane insulation.

## **2.5 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction and ULC requirements.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 600 mm o.c. maximum.
- .5 Grout in place frames located in concrete and concrete unit masonry walls.

## **2.6 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary 1.8 mm thick steel channel jamb spreaders per frame to maintain proper alignment during shipment and installation.

## **2.7 DOOR FABRICATION GENERAL**

- .1 Doors: Swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior and Interior Doors: Insulated construction.
- .3 Fabricate doors with longitudinal edges welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Blank, reinforce, drill doors and tap for templated hardware.
- .5 Factory prepare holes 12 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top caps to exterior doors conforming to CGSB 41-GP-19Ma. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labeled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104, ASTM E 152 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
  - .1 Form each face sheet for temperature rise rated doors from 1.2 mm face sheets with temperature rise rated core. Core to be tested as part of a complete door assembly in accordance with CAN 4-S104 covering the Standard Method of Tests of Door Assemblies.
- .9 Manufacturer's nameplates on doors are not permitted.

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**2.8 DOORS: CORE CONSTRUCTION**

- .1 Form each face sheet for doors from 1.2 mm sheet steel with polystyrene or fiberglass core laminated under pressure to face sheets.

**2.9 THERMALLY BROKEN DOORS AND FRAMES**

- .1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.
- .2 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .3 Thermal Break: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

**2.10 ELECTRIFIED HARDWARE COORDINATION**

- .1 Prepare doors and frames to receive finish hardware and electrified hardware supplied and installed by Section 08 71 00.
- .2 Frame preparation for electrified hardware to include the application of shallow back boxes suitable for conduit termination welded to frame assemblies at all device locations.
- .3 Back boxes to be of sufficient size to include the device and all wire and connectors.
- .4 Back boxes to be drilled on site by Electrical for conduit fittings where required prior to frame installation.
- .5 Where two similar devices are located in close proximity, install one larger box to allow the devices to be wired together.
- .6 Door preparation to include the installation of flexible conduit or wire raceway within door assemblies where required.
- .7 Install pull strings in all door raceways.
- .8 Coordinate with all affected trades.

**2.11 DOOR GLAZING**

- .1 Exterior: Sealed units with warm edge, argon filled space in thermally broken frames.
- .2 Interior:
  - .1 Tempered glass.
- .3 Refer to Section 08 80 00 for glazing.

**3 Execution**

**3.1 INSTALLATION GENERAL**

- .1 Install labeled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDFMA Installation Guide.
- .3 Do not paint over ULC labels.
- .4 Maximum permissible warp, 1.5 mm measured diagonally across door.



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**3.2 FRAME INSTALLATION**

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchors and connections to adjacent construction. Install fire rated frames in accordance with NFPA 80.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1 200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier and vapour retarder.
- .7 Fill all door frames marked 'Insulated' on Door & Frame Schedule with polyurethane foam insulation.

**3.3 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latchside and head: 1.5 mm.
  - .3 Finished floor: 13 mm , Thresholds: 6 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres.
- .5 Install door panels in transoms as detailed.

**3.4 FINISH REPAIRS**

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

**3.5 GLAZING**

- .1 Install glazing for doors and frames in accordance with Section 08 80 00 - Glazing.

**3.6 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**PART 1        GENERAL**

**1.1            RELATED SECTIONS**

- .1        Section 06 10 00: Rough Carpentry.
- .2        Section 07 27 00: Air Barriers.
- .3        Section 07 92 00: Joint Sealers.
- .4        Section 08 44 00: Curtain Wall.
- .5        Section 08 71 00: Finish Hardware.
- .6        Section 08 80 00: Glazing.
- .7        Section 08 84 00: Plastic glazing.
- .8        Electrical.

**1.2            REFERENCES**

- .1        Aluminum Association Designation System For Aluminum Finishes (AA).
  - .1        DAF 45, Designation System For Aluminum Finishes.
- .2        Architectural Aluminum Manufacturers Association (AAMA)
  - .1        AAMA CW-DG-1-96, Aluminum Curtain Wall Design Guide Manual.
  - .2        AAMA CW-10-97, Curtain Wall Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.
  - .3        AAMA CW-11-85, Curtain Wall Manual - Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.
  - .4        AAMA T1R-A1-75, Sound Control for Aluminum Curtain Walls and Windows.
  - .5        AAMA 501.1-17, Methods of Test for Exterior Windows, Curtain Walls, and Sloped Glazing Systems for Water Leakage.
  - .6        AAMA 503, Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
  - .7        AAMA 607.1, Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
  - .8        AAMA 609/610, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
- .3        American Society for Testing and Materials (ASTM)
  - .1        ASTM A 36/A 36M-14, Specification for Structural Steel.
  - .2        ASTM A 123M-15, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .3        ASTM A 167-99(2009), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .4        ASTM B 209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - .5        ASTM B 221M, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

- .6 ASTM E 283-00, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .7 ASTM E 330-14, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- .8 ASTM E 331-00(2016), Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- .9 ASTM E 1105-15, Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint.
  - .2 CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer.
  - .3 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
  - .4 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .5 Canadian Standards Association (CSA)
  - .1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
  - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S136-12, Cold Formed Steel Structural Members.
  - .4 CAN/CSA-S157/S157.1-05(2010), Strength Design in Aluminum.
  - .5 CSA W59.2-M1991(R2008), Welded Aluminum Construction.
- .6 AAMA/WDMA/CSA101/I.S.2/A440-08, Standard Specification for Windows, Doors and Unit Skylights.
- .7 British Columbia Building Code 2012.

### **1.3 SYSTEM DESCRIPTION**

- .1 Thermally broken aluminum entrance framing and thermally broken aluminum entrances.
- .2 Non-thermally broken interior aluminum entrances and framing.
- .3 Assembled system to permit re-glazing of individual glass (and infill panel) units without requiring removal of structural mullion sections.

### **1.4 PERFORMANCE REQUIREMENTS**

- .1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, snow and hail for sloped glazing, acting normal to plane of system as calculated in accordance with British Columbia Building Code.
- .2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with British Columbia Building Code.
- .3 Limit mullion deflection to L/175, with full recovery of glazing materials.
- .4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

- .5 Provide system to accommodate, without damage to components or deterioration of seals:
  - .1 Movement within system.
  - .2 Movement between system and perimeter framing components.
  - .3 Dynamic loading and release of loads.
  - .4 Deflection of structural support framing.
  - .5 A mid-span slab edge deflection of L/360 of span.
- .6 Design frames and doors in exterior walls to:
  - .6 Accommodate expansion and contraction within service temperature range of -35 to 35 degrees C.
  - .7 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330 under wind load of 1.2 kPa (submit certificate of tests performed).
  - .8 Movement within system.
  - .9 Movement between system and perimeter framing components or substrate.
- .7 Size glass thickness and glass unit dimensions to limits in accordance with CAN/CGSB-12.20.
- .8 Design door system to provide average thermal resistance of: U value 0.45 overall effective.
- .9 Include continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

## **1.5 PRODUCT DATA**

- .1 Submit Product data in accordance with Section 01 33 00 - Submittals.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for doors and frames and include product characteristics, performance criteria, physical size, finish and limitations.

## **1.6 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- .2 Indicate materials and profiles and provide full-size, scaled details of components for each type of door and frame. Indicate:
  - .1 Interior trim and exterior junctions with adjacent construction.
  - .2 Junctions between combination units.
  - .3 Elevations of units.
  - .4 Core thicknesses of components.
  - .5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.
  - .6 Location of caulking.
  - .7 Each type of door system including location.
  - .8 Arrangement of reinforcing for hardware and joints.
  - .9 Arrangement of hardware and required clearances.
- .3 Schedule glass types and sealed unit makeup. Identify finishes, sealants, location of isolation coatings and any other information required to indicate compliance with Contract Documents.
- .4 List all performance criteria and standards.

- .5 Submit Shop Drawings under seal of registered professional structural engineer licensed to practice in British Columbia.
- .6 The engineer is also to submit the following Schedules:
  - .1 Submit Schedule B-1, 'Assurance of Professional Design and Commitment for Field Review' and Schedule B-2, 'Summary of Design and Field Review Requirements' with shop drawings.
  - .2 Submit Schedule C-B, 'Assurance of Professional Field Review and Compliance' promptly on completion of work.
- .7 Maintenance Data:
  - .1 Submit maintenance data for incorporation into Project maintenance manual.
    - .1 Data for maintenance and cleaning of aluminum finishes.
    - .2 Data for maintenance of door and window operating hardware.
    - .3 Data for cleaning of glass.

## **1.7 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittals.
- .2 Submit two samples 300 x 300 mm in size illustrating prefinished aluminum surface, specified glass units, insulated infill panels, glazing materials illustrating edge and corner.

## **1.8 TEST REPORTS**

- .1 Submit test reports in accordance with Section 01 33 00 - Submittals.
- .2 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.

## **1.9 PRE-INSTALLATION MEETING**

- .1 Convene one week before starting work of this Section.

## **1.10 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 60 00 – Materials and Equipment.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
  - .1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Use coatings that are easy to remove and residue free.
  - .2 Leave protective covering in place until final cleaning of building.
  - .3 Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Store and protect aluminum doors and frames from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

#### **1.11 ENVIRONMENTAL REQUIREMENTS**

- .1 Do not install sealants when ambient and surface temperature is less than 10°C.
- .2 Maintain this minimum temperature during and after installation of sealants.

#### **1.12 SEQUENCING**

- .1 Coordinate work of this Section with installation of air barrier placement, and adjacent exterior wall envelope components or materials.

#### **1.13 WARRANTY**

- .1 For the work of this Section 08 11 16 Aluminum Doors and Frames the 12 months warranty period prescribed in subsection GC of General Conditions "C" is extended to 60 months.
- .2 Contractor hereby warrants that aluminum work will function and remain leakproof including coverage for complete system failure in accordance with GC 24, but for 60 months.

#### **1.14 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused metal materials from landfill to metal recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

### **PART 2 Products**

#### **2.1 MATERIALS**

- .1 Aluminum extrusions: to Aluminum Association alloy AA6063-T5 or T6 anodizing quality.
- .2 Sheet aluminum: to Aluminum Association alloy AA1100-H14 or AA5005-H32 or H34 anodizing quality.
- .3 Steel sections: CAN/CSA-G40.21M; grade 300W, shaped to suit mullion sections.
- .4 Fasteners: stainless steel.
- .5 Door bumpers: black neoprene.
- .6 Door bottom seal: adjustable door seal of anodized extruded aluminum frame and vinyl weather seal, recessed in door bottom closed ends.

- .7 Isolation coating: Bituminous paint: CAN/CGSB1.108, without thinner.
- .8 Glass units: refer to drawings and Section 08 80 00 for glazing types schedule.
- .9 Aluminum Glazing Angle: clear anodized aluminum, finish to match curtain wall framing.
  - .1 Angle size: 25 mm x 25 mm.

## **2.2 ALUMINUM DOORS AND FRAMES**

- .1 Exterior Aluminum Doors: Kawneer Insulclad 360, Alumicor Insuldoor System or acceptable substitution.
  - .1 Extrusions of 6063 T54 alloy and temper conforming to CAN3-S157.
  - .2 PVC separators interlocked to aluminum cladding at edges and mechanically fastened.
  - .3 Square glass stop for 25 mm clear tempered insulating glass units, refer to Section 08 80 00 for glass.
  - .4 EPDM glazing gaskets reinforced with non-stretchable cord.
  - .5 Fasteners: 300 series stainless steel, sized to suit intended function.
  - .6 Weatherstrip:
    - .1 Elastomeric tubular shape with semi-rigid polymeric backing.
    - .2 Door bottom rail weathering, extruded elastomeric blade sweep strip applied with concealed fasteners.
    - .3 Meeting stiles, adjustable astragal with wool pile and polymeric fin.
  - .7 Corner Construction: Mechanical clip fastening plus SIGMA deep penetrating plug and fillet welds.
  - .8 Offset pivot hinges.
  - .9 152 mm horizontal cross rails, 254 mm bottom rails.
  - .10 Door Hardware: Supplied by Section 08 71 00, preparation and installed by this Section.
- .2 Non-Thermally Broken Curtain Wall Framing for Plastic Glazing: 50 mm wide mullions.
  - .1 Extrusions of 6063 T54 alloy and temper conforming to CAN3-S157.
  - .2 Acceptable product, Kawneer 1602 or acceptable substitution.

## **2.3 FABRICATION**

- .1 Doors and framing to be by same manufacturer.
- .2 Fabricate doors and frames to profiles and maximum face sizes as indicated. Provide minimum 22 mm bite for insulating glazed units.
- .3 Provide structural steel reinforcement as required.
- .4 Fit joints tightly and secure mechanically.

- .5 Conceal fastenings.
- .6 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under Section 08 71 00 - Door Hardware.
- .7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

## **2.4 FINISHES**

- .1 Finish coatings: Refer to drawings for locations.
  - .1 Conform to AA-M12C22A31, AAMA 611, Architectural Class II Clear Anodic Coating for all exposed exterior and interior finishes.
- .2 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc rich.
- .3 Concealed steel items: galvanized in accordance with CSA G164 to 600 gm/m2.
- .4 Apply two coats of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

## **2.5 SOURCE QUALITY CONTROL**

- .1 Perform work in accordance with GCABC Glazing Systems Specifications Manual, maintain one copy on site.
- .2 Manufacturer qualifications: company specializing in manufacturing the Products specified in this Section with minimum five years documented experience.
- .3 Installer qualifications: company specializing in performing the work of this Section with minimum five years documented experience, approved by manufacturer and a member in good standing of the Glazing Contractors Association of B.C.
- .4 Design structural support framing components to CAN/CSA-S157 under direct supervision of a professional structural engineer experienced in design of this work and licensed in the Province of British Columbia.
- .5 Perform welding Work in accordance with CSA W59.2.

## **2.6 ELECTRIFIED HARDWARE COORDINATION**

- .1 Prepare doors and frames to receive finish hardware and electrified hardware supplied and installed by Section 08 71 00.
- .2 Frame preparation for electrified hardware shall include preparing frames with holes and plastic knock-out grommets for cable pathway where required, and the installation of cabling within frame assemblies during installation where required.
- .3 Headers for overhead concealed automatic operators shall be finished and installed by this Section as part of the glazing system.
- .4 Mounting tabs shall be provided for all flush mounted mortised hardware
- .5 Install pull strings in all door raceways.
- .6 Provide mounting tabs for all flush mounted mortised hardware.



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- .7 Coordinate with all affected trades.

**PART 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for aluminum doors and frames installation in accordance with manufacturer's written instructions.
- .2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this Section.

**3.2 INSTALLATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Set frames plumb, square, level at correct elevation in alignment with adjacent work.
- .3 Anchor securely.
- .4 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.
- .5 Adjust door components to ensure smooth operation.
- .6 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.
- .7 Glaze aluminum doors and frames in accordance with Section 08 80 00 - Glazing.
- .8 Seal joints to provide weathertight seal at outside and air, vapour seal at inside.
- .9 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within the aluminum work except where exposed use is permitted by Consultant.

**3.3 SITE TOLERANCES**

- .1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.
- .2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.
- .3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

**3.4 FIELD QUALITY CONTROL**

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's Field Services: provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits:
- .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.

- .2 Twice during progress of Work at 25% and 60% complete.
- .3 Upon completion of Work, after cleaning is carried out.
- .4 Obtain reports within 3 days of review and submit to Consultant.

### **3.5 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
  - .2 Perform cleaning of aluminum components in accordance with AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.
  - .3 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
  - .4 Clean aluminum with damp rag and approved non-abrasive cleaner.
  - .5 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.
  - .6 Clean glass and glazing materials with approved non-abrasive cleaner.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

### **3.6 PROTECTION**

- .1 Protect finished Work from damage.

### **3.7 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 20 00: Finish Carpentry.
- .2 Section 08 11 00: Metal Doors and Frames.
- .3 Section 08 71 00: Finish Hardware.
- .4 Section 08 80 00: Glazing.
- .5 Section 09 91 00: Painting.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA).
  - .1 CAN/CSA O132.2 Series-90, Wood Flush Doors.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
  - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .3 National Fire Protection Association (NFPA).
  - .1 NFPA 80-2010, Fire Doors and Fire Windows.
  - .2 NFPA 252-17, Door Assemblies, Fire Tests of.
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
  - .1 Architectural Woodwork Standards, edition 2.
- .5 Underwriters' Laboratories of Canada (ULC).
  - .1 CAN4 S104-15, Fire Tests of Door Assemblies.
  - .2 CAN4 S105-16, Fire Door Frames Meeting the Performance Required by CAN 4-S104.
- .6 ANSI/WDMA I.S. 1A-04.
- .7 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

**1.3 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00: Submittals.
- .2 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.
- .3 Provide wood door finish samples, minimum 200 x 200 mm, to Consultant for approval.

**1.4 REGULATORY REQUIREMENTS**

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

**1.5 STORAGE AND PROTECTION**

- .1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.

- .2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.
- .3 Protect stored doors from spacers that may cause flat spots on veneer.
- .4 Protect doors from scratches, handling marks and other damage.

## **1.6 WARRANTY**

- .1 Provide manufacturer's warranty certificate, signed and issued in the Owner's name, stating that doors are guaranteed against defects in materials and workmanship for a period of three years from the date of Substantial Completion.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 FLUSH WOOD DOORS**

- .1 Solid core: to ANSI/WDMA I.S. 1A-04.
  - .1 Construction: Performance Level Extra Heavy Duty.
    - .1 Solid Core: 44 mm thick, solid core of 5-ply bonded particle board core. Styles and rails hardwood to AWMAC institutional custom grade, edge detail #3, styles minimum 38 mm wide, rails minimum 63 mm wide.
    - .2 Face Panels: Painted - Face Panels tempered hardboard.
    - .3 Hardware preparations factory machined in accordance with NFPA 80 requirements. Field preparation and fitting not allowed.

### **2.2 FABRICATION**

- .1 Fabricate doors to AWMAC Architectural Woodwork Standards, residential grade and reviewed shop drawings.
- .2 Make cut-outs and provide necessary stops and stickings. Cut-outs not permitted within 125 mm of sides and top of door or 200 mm from bottom of door. Lip stops unless otherwise detailed.

## **3 Execution**

### **3.1 INSTALLATION**

- .1 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.
- .2 Install doors and hardware in accordance with manufacturer's printed instructions and CAN/CSA-O132.2 Series, Appendix A. Maximum warp of 1.5 mm measured diagonally across door.

- .3 Install wood doors in accordance with Section 9 of the AWMAC Architectural Woodwork Standards.
- .4 Install labeled fire rated doors to NFPA 80.
- .5 Seal wood doors after sizing and machining for fit in the field.
- .6 Install finish hardware to doors in accordance with Section 08 71 00 and 06 20 00.
- .7 Adjust hardware for correct function.
- .8 Install glazing in accordance with Section 08 80 00 - Glazing.
- .9 Install louvres and stops.

**3.2 ADJUSTMENT**

- .1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

**3.3 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 05 50 00: Metal Fabrications.
- .3 Section 08 71 00: Door Hardware.
- .4 Electrical.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA)
  - .1 CSA G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.105-M91 Quick-Drying Primer.
  - .2 CGSB 1-GP-121M-77 Coating, Vinyl, Pretreatment, for Metals (Vinyl Wash Primer).
  - .3 CGSB 1-GP-181M-77 Coating, Zinc-Rich, Organic, Ready Mixed.
- .3 American Society for Testing and Materials (ASTM)
  - .1 ASTM A 366M-85 Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
  - .2 ASTM A 526M-90 Specification for Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

**1.3 DESIGN REQUIREMENTS**

- .1 Design coiling grille assembly to withstand earthquake forces in accordance with the requirements of the British Columbia Building Code.

**1.4 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 30 00 – Submittals Procedures.
  - .1 Indicate sizes, service rating, types, materials, operating mechanisms, hardware, accessories, required clearances and electrical wiring, conduit, controls and disconnect switches.

**1.5 CLOSEOUT SUBMITTALS**

- .1 Provide operation and maintenance data for overhead coiling grille for incorporation into Maintenance Manual.
- .2 Submit manufacturer's product data, rough-in diagrams and installation instructions for overhead coiling grille.

**1.6 WARRANTY**

- .1 Provide manufacturer's warranty certificate, signed and issued in the Owner's name as follows:
  - .1 Manufacturer warrants sectional overhead door assembly and it's counter-balance tension spring system for a period of five (5) years commencing from date of Substantial Performance of the Project.

- 
- .2 Manufacturer warrants mechanical and electrical components against defects in material and workmanship for one (1) year commencing from the date of Substantial Performance of the Project.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused metal and wiring materials from landfill to metal recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 COILING GRILLE**

- .1 Grille:
- .1 Constructed of 2.54 mm thick x 16 mm wide x 95 mm offset aluminum vertical links grommited together to support continuous horizontal 7.5 mm diameter aluminum rods.
- .2 Vertical links secured in place by 10.5 mm diameter aluminum sleeves over every fourth horizontal aluminum rod.
- .3 Spacing of horizontal aluminum rods 38 mm on centre.
- .4 Spacing of vertical rods 152 mm on centre.
- .2 Bottom Bar: Tubular aluminum extrusion 51 mm wide x 76 mm high x 3 mm thickness.
- .1 Master keyed cylinders on both sides.
- .3 Guides: 34 mm wide x 70 mm deep x 2.54 thick extruded aluminum guide sections with built-in upset shoulders to provide curtain retention.
- .1 Guide fabricated with a bell mouth to provide smooth curtain operation.
- .2 Steel stoppers mounted to end plate to prevent roll over and travel above finished bulkhead.
- .3 Guides fitted with rigid PVC strip to ensure smooth and quiet operation.
- .4 Structural steel support minimum 4.5 mm thickness.
- .5 Guides fastened to steel angles, HSS supports or HSS spacers with concealed fasteners at maximum 610 mm on centre.
- .4 Counterbalance: Constructed of steel pipe of adequate diameter to prevent deflection exceeding 0.76 mm per foot of door width.
- .1 Pipe barrel enclosing oil tempered helical torsion springs that ensure proper counterbalancing action with 25% overload factor.

- .2 Spring tension adjustment by adjusting wheel and pin on the outside of the bracket plate.
- .5 Bracket Plates: Minimum 4.5 mm thick steel plate, prime painted.
- .6 Hood: Constructed of 1.01 mm clear anodized aluminum sheet, press-bent to form suitable coil enclosure.
  - .1 Maximum 3.6 m per section.
  - .2 Steel channel fabricated hood supports.
- .7 Finish: 6063 aluminum alloy with T-5 temper. Factory finish 10 micron clear anodizing.
- .8 Acceptable product, Amstel Model ARG156AC, similar product by Dynamic or acceptable substitution.

## **2.2 MOTOR OPERATION**

- .1 Door operated at speed of 200 mm per second by open drip-proof electric motor with gear reducer in oil bath. Operator to include a geared limit switch and an electronically interlocked emergency chain operator.
- .2 Motor starter housed in a NEMA 1 housing and include a magnetic reversing starter size O, a 24 volt control transformer and complete terminal strip to facilitate field wiring.
- .3 Motor activation by a 3 button push-button station in a NEMA 1 enclosure.
- .4 Size motor as required by door size. Motor operators to be ULC listed.
- .5 Safety Door Edge: Install on bottom bar of the door. Automatically reverse the door if the device detects an obstruction in the downward travel of the door. Operation of the safety device to be independent of interferences caused by temperature, barometric pressure, water infiltration or cuts in the rubber enclosure of the safety device.
- .6 Entrapment Protection: Photoelectric sensors that will reverse door if an obstruction breaks the beam during the door closing cycle
- .7 Provide end of travel indicator switches to confirm travel of door. Mount switches on the track.
- .8 Provide one switch for 'fully open' and another switch for 'fully closed'.
- .9 Provide access to control circuitry for control of 'stop', 'open' and 'close' functions.
- .10 Provide interconnect to prevent motor operation while door is locked.
- .11 Provide interface for all status and control functions via a clearly labeled terminal strip.

## **3 Execution**

### **3.1 INSTALLATION**

- .1 Install door and hardware in accordance with manufacturer's instructions and reviewed shop drawings.
- .2 Rigidly support grille, guides and operator and secure to supporting structure.
- .3 Touch-up grille finish if damaged during installation.



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- .4 Replace any grille components that are damaged beyond touch-up.
  - .5 Install operator including electrical motors, controller units, pushbutton stations, relays and other electrical equipment and cylinder locks required for grille operation.
  - .6 Lubricate and adjust door operating components to ensure smooth opening and closing of grille.
  - .7 Provide on site training for Owner's maintenance personnel on maintenance and operation of coiling grille.
  - .8 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**PART 1        General**

**1.1            RELATED SECTIONS**

- .1        Section 06 10 00: Rough Carpentry.
- .2        Section 07 27 00: Air Barriers.
- .3        Section 07 62 00: Metal Flashing and Trim.
- .4        Section 07 92 00: Joint Sealers.
- .5        Section 08 11 16: Aluminum Doors and Frames.
- .6        Section 08 71 00: Finish Hardware.
- .7        Section 08 80 00: Glazing.
- .8        Section 09 21 16: Gypsum Board.
- .9        Electrical.

**1.2            REFERENCES**

- .1        Aluminum Association Designation System For Aluminum Finishes (AA)
  - .1        DAF 45 2003(R2009), Designation System For Aluminum Finishes.
- .2        Architectural Aluminum Manufacturers Association (AAMA)
  - .1        AAMA CW-DG-1-96, Aluminum Curtain Wall Design Guide Manual.
  - .2        AAMA CW-10-15, Curtain Wall Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.
  - .3        AAMA CW-11, Curtain Wall Manual - Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.
  - .4        AAMA T1R-A, Sound Control for Aluminum Curtain Walls and Windows.
  - .5        AAMA 501-05, Methods of Test for Exterior Walls.
  - .6        AAMA 503-14, Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
  - .7        AAMA 607.1-77, Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
  - .8        AAMA 609/610-15, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
  - .9        AAMA 612-15, Voluntary Specifications, Performance Requirements and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.
- .3        American Society for Testing and Materials (ASTM)
  - .1        ASTM A 36/A 36M-14, Specification for Structural Steel.
  - .2        ASTM A 123M-15, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

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- .3 ASTM A 167-99(2009), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .4 ASTM B 209M-14, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - .5 ASTM B 221M-14, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - .6 ASTM E 283-04(2012), Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - .7 ASTM E 330-02(2010), Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - .8 ASTM E 331-00(2009), Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - .9 ASTM E 1105-15, Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
  
  - .4 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint.
    - .2 CAN/CGSB-12.1-2017, Tempered or Laminated Safety Glass.
    - .3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
  
  - .5 Canadian Standards Association (CSA)
    - .1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
    - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
    - .3 CAN/CSA-S136-M07(R2012), Cold Formed Steel Structural Members.
    - .4 CAN/CSA-S157-05, Strength Design in Aluminum.
    - .5 CSA W59.2-M1991(R2008), Welded Aluminum Construction.
    - .6 CAN/CSA A440.2-09, Fenestration Energy Performance.
    - .7 CAN/CSA A440.4-07, Window, Door and Skylight Installation.
  
  - .6 IGMA 1997 TM – 3000-90(04), Glazing Guidelines for Sealed Insulating Glass Units.
  
  - .7 Glazing Contractors Association of British Columbia, Glazing Systems Specifications Manual.
  
  - .8 AAMA/WDMA/CSA 101/I.S.2/A440-08, North American Fenestration Standard (NAFS), Specification for Windows, Doors and Skylights.
  
  - .9 A440S1-08, Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440 NAFS, Specification for Windows, Doors and Skylights.
  
  - .10 British Columbia Building Code 2012.

### **1.3 SYSTEM DESCRIPTION**

- .1 Glazed vertical aluminum curtain wall system includes thermally broken tubular aluminum sections with reinforced self supporting framing, capped pressure plate, shop fabricated,

factory prefinished, vision glass, insulated metal infill panels, column covers, related flashings, all required anchorage and attachment devices.

- .2 Assembled system to permit re-glazing of individual glass (and infill panel) units from exterior without requiring removal of structural mullion sections.

#### **1.4 PERFORMANCE REQUIREMENTS**

- .1 Thermal performance requirements overall frame and glazing:
  - .1 U: TBD.
  - .2 SHGC: TBD.
- .3 Limit mullion deflection to L/175 up to 4115 mm and to L/240 plus 6 mm for spans over 4115 mm, with full recovery of glazing materials. Limit deflection of sunshade to L/120 under combined environmental loads.
- .4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20 and City of Vancouver Building By-Law.
- .5 Provide system to accommodate, without damage to components or deterioration of seals:
  - .1 Movement within system.
  - .2 Movement between system and perimeter framing components.
  - .3 Dynamic loading and release of loads.
  - .4 Deflection of structural support framing.
  - .5 Shortening of building concrete structural columns.
  - .6 Creep of concrete structural members.
  - .7 A mid-span slab edge deflection of L/360 of span, with a minimum allowance of 20 mm.
- .2 Limit air infiltration through assembly to 0.0003 m<sup>3</sup>/s/m<sup>2</sup> of wall area, measured at a reference differential pressure across assembly of 300 Pa as measured in accordance with ASTM E 283.
- .7 Vapour seal with interior atmospheric pressure of 25 mm sp, 22°C, 40% RH: No failure.
- .8 Water infiltration to meet B3 rating of CAN/CSA-A440.
- .9 System to provide for expansion and contraction within system components caused by a cycling temperature range of 100°C over a 12 hour period without causing detrimental affect to system components.
- .10 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .11 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapour retarder.
- .12 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.
- .13 Design glazing to take lateral loads for guardrails where required.

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**1.5 PRODUCT DATA**

- .1 Submit Product data in accordance with Section 01 33 00 - Submittals.
- .2 Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

**1.6 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- .2 Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, loads and anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
- .3 Indicate sunshade combined environmental loads and deflection.
- .4 Provide full size details of all perimeter and interface conditions. Show relationship to other work. Include attachment of flashings, air and water barriers and location of caulking. Show extrusion profiles and engagement of glass and infill materials.
- .5 Show methods of structural reinforcement and attachment to building, including provisions for thermal movement and building movements. Identify all structural fasteners.
- .6 Schedule glass types and sealed unit makeup. Identify finishes, sealants, location of isolation coatings and any other information required to indicate compliance with Contract Documents.
- .7 List all performance criteria and standards.
- .8 Provide a statement of system material compatibility.
- .9 Submit shop drawings under seal of registered professional engineer licensed to practice in British Columbia.
  - .1 Submit Schedule B-1, 'Assurance of Professional Design and Commitment for Field Review' and Schedule B-2, 'Summary of Design and Field Review Requirements' with shop drawings.
  - .2 Submit Schedule C-B, 'Assurance of Professional Field Review and Compliance' promptly on completion of work.
- .10 Maintenance Data:
  - .1 Submit maintenance data for incorporation into Project maintenance manual.
    - .1 Data for maintenance and cleaning of aluminum finishes.
    - .2 Data for maintenance of door and window operating hardware.
    - .3 Data for cleaning of glass.

**1.7 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittals.

- .2 Submit two samples 300 x 300 mm in size illustrating prefinished aluminum surface, specified glass units, glazing materials illustrating edge and corner.
- .3 Submit two samples 300 mm long illustrating finish and profile of profile glazing caps.

#### **1.8 DESIGN DATA**

- .1 Submit design data in accordance with Section 01 33 00 - Submittals.
- .2 Provide framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.

#### **1.9 TEST REPORTS**

- .1 Submit test reports in accordance with Section 01 33 00 - Submittals.
- .2 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.

#### **1.10 MOCK-UPS**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Provide one unit mock-up on site. Mockup to include glazed system and other vertical work mullions, muntins, structural member covers, vision glass light, capped mullions. Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, air seal, perimeter sealant and relationship to exterior envelope wall component materials.
- .3 Locate where directed.
- .4 Allow 72 hours for inspection of mock-up by Consultant before proceeding with work.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

#### **1.12 MOCK-UP FIELD TESTING**

- .1 Install one complete curtain wall unit x module width complete with flashings and air barrier membrane seals at perimeter and to adjacent building elements of the exterior envelope. Test the completed mock-up to standards of CAN/CSA-A440, B3 level. The Consultant will inspect the mock-up prior to installation of the remaining windows.
- .2 Refer to 3.4 for field testing requirements.

#### **1.13 PRE-INSTALLATION MEETING**

- .1 Convene one week before starting on-site installation of this Section to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building subtrades.
  - .4 Review manufacturer's written installation instructions and warranty requirements.

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**1.14 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 60 00 – Materials and Equipment.
- .2 Handle work of this Section in accordance with AAMA CW-10.
- .3 Protect prefinished aluminum sill surfaces with blue nitto. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

**1.15 ENVIRONMENTAL REQUIREMENTS**

- .1 Do not install sealants when ambient and surface temperature is less than 10°C.
- .2 Maintain this minimum temperature during and after installation of sealants.

**1.16 SEQUENCING**

- .1 Co-ordination: co-ordinate work of this Section with installation of fire stopping, air barrier placement, vapour retarder placement, flashing placement, installing ductwork to rear of louvres, and components or materials.

**1.17 WARRANTY**

- .1 For the work of this Section 08 44 00 – Curtain Wall, the 12 months warranty period is extended to 60 months.
- .2 Contractor hereby warrants that aluminum work will stay in place and remain leakproof including coverage for complete system failure in accordance with GC 24, but for 60 months.
- .3 Refer to Section 08 80 00 for glazing warranty.

**1.18 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused metal materials from landfill to metal recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

**PART 2 Products**

**2.1 MATERIALS**

- .1 Extruded aluminum: 6063 T6 alloy and temper to CSA3-S157.
- .2 Sheet aluminum: ASTM B 209M.
- .3 Steel sections: CAN/CSA-G40.21M; shaped to suit mullion sections.

- .4 Fasteners: stainless steel.
- .5 Bituminous paint: CAN/CGSB1.108, without thinner.
- .6 Glass units: refer to drawings and Section 08 80 00 for glazing types schedule.
- .7 Sealant:
  - .1 Perimeter sealant: refer to Section 07 92 00.
- .8 Anchors: 3 way adjustable hot-dipped galvanized steel or extruded aluminum.

## **2.2 CURTAIN WALL COMPONENTS**

- .1 Exterior Curtain Wall Framing – typical sealed units: 63.5 mm nominal width dimension for vertical members, 63.5 mm nominal width dimension for horizontal members, thermally broken with interior tubular section insulated from exterior pressure plate, suitable for triple glazed units.
  - .1 Acceptable product 63.5 mm mullion width: Kawneer 1600UT System 2 framing for 45 mm sealed triple glazed units, Alumicor 2600 Series Thermal Wall or acceptable substitution.
- .2 Matching stops and pressure plate of sufficient size and strength to provide adequate bite on glass and infill panels.
- .3 Drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system, internal mullion baffles to eliminate "stack effect" air movement within internal spaces.
- .4 EPDM sponge interior and EPDM rubber exterior gaskets for dry/dry glazing.
- .5 Reinforced mullion: 63.5 mm profile of extruded aluminum cladding with internal reinforcement of shaped steel structural section.
- .6 Horizontal and vertical profiles as indicated, or as required for reinforced spans.
- .7 Flashings, trims and panels: 1.02 mm thick aluminum, finish to match curtain wall mullion sections where exposed, secured with concealed fastening method.
  - .1 Trims include both interior and exterior trims to adjacent materials.
  - .2 Reinforce panels on backside to ensure flatness tolerances are maintained.
- .8 Exterior caps: standard depths as indicated.
- .9 Adapters:
  - .1 Door adapter: Thermally broken aluminum extrusions to manufacturer's standard fitting into glazing pocket at jamb and surface mounted at head.
- .10 Casement Ventilators: Open out casement frames with triple glazing.
  - .1 Water tightness: ASTM E331, no uncontrolled water penetration at inward test pressure of 720 Pa.
  - .2 Air infiltration: ASTM E283, maximum 0.3L/s x m2 of fixed area at inward test pressure differential of 400Pa.
  - .3 Wind load resistance: C3.



- .4 Resistance to forced entry: ASTM F588, Grade 20 at locations within 3.6 m from grade.
- .5 Multi-point locking with cast white bronze locking hardware.
- .6 Insect screens: Aluminum screen wire in 18 x 16 mesh, black colour.
- .7 Acceptable product, Kawneer Glassvent UT, Alumicor 5000 Vent Series or acceptable substitution.
- .11 Air barrier: adjacent envelope material specified in Section 07 27 00 - Air Barriers.
- .12 High density polyethylene blocks (HDPE) anti-rotation strip at glazing pocket air barrier membrane seal.
- .13 Submit the following information to the Consultant for review of substitutions:
  - .1 Drawings and specifications indicating the extrusions and structural properties of the assembly.
  - .2 Letters indicating conformance to the following:
    - .1 Air Filtration Requirement: ASTM E283 (0.0003 m<sup>3</sup>/s/m<sup>2</sup> @ 300 Pa).
    - .2 Water penetration @ 300 Pa.
  - .3 Letter stating the thermal properties of the assemblies and indicating that they meet ASHRAE 90.1.

## **2.3 FABRICATION**

- .1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .3 Prepare components to receive anchor devices. Install anchors.
- .4 Arrange fasteners and attachments to ensure concealment from view.
- .5 Prepare system components to receive exterior doors, and hardware specified in Section 08 71 00.
- .6 Reinforce framing members for external imposed loads as required.
- .7 Visible manufacturer's identification labels not permitted.
- .8 Fabricate frames to profiles and maximum face sizes as shown. Fit joints tightly and secure mechanically, conceal fastenings.
- .9 Provide structural steel reinforcement at hardware mounting points if required.
- .10 Mortise, reinforce, drill and tap frames and reinforcements to receive hardware using templates provided under this Section and Section 08 71 00 - Door Hardware.
- .11 Fabricate units square and true with a maximum tolerance of 3 mm for units with a diagonal measurement under 1800 mm, and 6 mm for units with a diagonal measurement over 1 800 mm.

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**2.4 FINISHES**

- .1 Finish exposed surfaces of aluminum components in accordance with AAMA 2605, Aluminum Association Designation System for Aluminum Finishes.
  - .1 Conform to AA-M12C22A31, AAMA 611, Architectural Class II Clear Anodic Coating for all exposed exterior and interior finishes.
- .2 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc rich.
- .3 Concealed steel items: galvanized in accordance with CSA G164 to 600 gm/m2.
- .4 Apply two coats of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

**2.5 SOURCE QUALITY CONTROL**

- .1 Perform work in accordance with GCABC Glazing Systems Specifications Manual, maintain one copy on site.
- .2 Manufacturer qualifications: company specializing in manufacturing the Products specified in this Section with minimum five years documented experience.
- .3 Installer qualifications: company specializing in performing the work of this Section with minimum five years documented experience, approved by manufacturer and a member in good standing of the Glazing Contractors Association of B.C.
- .4 Design structural support framing components to CAN/CSA-S157 under direct supervision of a professional structural engineer experienced in design of this work and licensed in the Province of British Columbia.
- .5 Perform welding Work in accordance with CSA W59.2.

**2.6 ELECTRIFIED HARDWARE COORDINATION**

- .1 Prepare frames to receive finish hardware and electrified hardware supplied and installed by Section 08 71 00.
- .2 Frame preparation for electrified hardware shall include preparing frames with holes and plastic knock-out grommets for cable pathway where required, and the installation of cabling within frame assemblies during installation where required.
- .3 Headers for overhead concealed automatic operators shall be finished and installed by this Section as part of the glazing system.
- .4 Install pull strings in all door raceways.
- .5 Provide mounting tabs for all flush mounted mortised hardware.
- .6 Coordinate with all affected trades.

**PART 3 Execution**

**3.1 EXAMINATION**

- .1 Verify dimensions, tolerances, and method of attachment with other work.

- 
- .2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this Section.

### **3.2 INSTALLATION**

- .1 Install curtain wall glazing system in accordance with manufacturer's instructions.
- .2 Install structural glazing in accordance with manufacturer's instructions.
- .3 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .4 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .5 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .6 Provide thermal isolation where components penetrate or disrupt building insulation.
- .7 Install sill flashings.
- .8 Install head flashings at glazing system and connection to wall components.
- .9 Coordinate attachment and seal of perimeter air barrier and vapour retarder materials. Prime aluminum surfaces for self-adhesive membrane flashing.
- .10 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .11 Install louvres, associated flashings, blank-off plates and screening. Fit blank-off plates tight to ductwork.
- .12 Install opening sash in method to achieve performance criteria.
- .13 Install perimeter sealant to method required to achieve performance criteria. Sealant, backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealants.
- .14 Install glass and infill panels in accordance with Section 08 80 00 – Glazing, to glazing method required to achieve performance criteria. Place sealant on up-slope side of the pressure plate cover caps; finish the surface with a slope to encourage drainage over the cap.
- .15 Handle and install glass to prevent edge damage. Use rolling block to rotate large units. Do not install glass showing edge damage.
- .16 Install aluminum composite panels and wood composite panels as face to insulated back pans where indicated.

### **3.3 SITE TOLERANCES**

- .1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.

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.2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.

.3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

### **3.4 FIELD QUALITY CONTROL**

.1 Inspection will monitor quality of installation and glazing.

.2 Test installed window assemblies to specified performance ratings. Mock-up of installation within wall assembly will be tested. After mock-up is approved, window assembly tests will be performed on completed installation. A minimum of 1 test will be conducted. Each failed test will require that unit to be re-tested plus one more unit.

.3 Units tested will be randomly selected. In-situ test to be in accordance with ASTM E1105. Both the unit and the transition between the unit and adjacent wall assembly will be tested. No water infiltration as defined by CAN/CSA A440 allowed.

.4 Arrange construction of an air tight chamber to permit water penetration testing. Provide 120v power and water at 20 psi.

### **3.5 MANUFACTURER'S FIELD SERVICES**

.1 Curtain wall product manufacturers to provide field surveillance of the installation of their Products.

.2 Structural sealant glazing system product manufacturers to provide field surveillance of the installation of their Products under provisions of Section 01 45 00 - Quality Control.

.3 Monitor and report installation procedures and unacceptable conditions to Consultant.

### **3.6 CLEANING**

.1 Remove protective material from prefinished aluminum surfaces.

.2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

### **3.7 PROTECTION**

.1 Protect finished Work from damage.

.2 Repair damage to adjacent materials caused by glazed aluminum curtain wall installation.

### **3.8 CLEAN UP**

.1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.

.2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**PART 1        General**

**1.1            RELATED SECTIONS**

- .1        Section 07 92 00: Joint Sealants.
- .2        Section 08 11 00: Metal Doors and Frames.
- .3        Section 08 11 16: Aluminum Doors and Frames.
- .4        Section 08 44 00: Curtain Wall.

**1.2            REFERENCES**

- .1        American National Standards Institute (ANSI)
  - .1        ANSI/ASTM E 330-02(2010), Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- .2        .American Society for Testing and Materials (ASTM)
  - .1        ASTM C 542, Specification for Lock-Strip Gaskets.
  - .2        ASTM D 2240-05(2010), Test Method for Rubber Property - Durometer Hardness.
  - .3        ASTM E 84-17, Test Method for Surface Burning Characteristics of Building Materials.
  - .4        ASTM E119-16a, Standard Test Method for Fire Tests of Building Constructions and Materials.
- .3        Canadian Door and Window Manufacturers, Certification Program.
- .4        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-12.1-2017, Safety Glazing.
  - .2        CAN/CGSB-12.3-M91(R2017), Flat, Clear Float Glass.
  - .3        CAN/CGSB-12.4-M91(2017), Heat Absorbing Glass.
  - .4        CAN/CGSB-12.5-M86, Mirrors, Silvered.
  - .5        CAN/CGSB-12.8-2017, Insulating Glass Units.
  - .6        CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
  - .7        CAN/CGSB-2.55, Glass Cleaner.
- .5        Canadian Standards Association (CSA)
  - .1        AAMA/WDMA/CSA101/I.S.2/A440-08, Standard Specification for Windows, Doors and Unit Skylights.
- .6        Environmental Choice Program (ECP)
  - .1        ECP-45, Sealants and Caulking.
- .7        Glass Association of North America (GANA) Glazing Manual.

- .8 Glass Association of North America (GANA) Laminated Glazing Reference Manual.
- .9 NFPA 252, Standard Methods of Fire Test of Door Assemblies.
- .10 NFPA 257, Standard on Fire Test for Window and Glass Block Assemblies.
- .11 City of Vancouver Building By-Law 2014.
- .12 ASHRAE 90.1.

### **1.3 PERFORMANCE REQUIREMENTS**

- .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
  - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
- .2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to design pressure as listed in structural general notes as measured in accordance with CAN/CGSB-12.20.
- .3 Limit centre-of-glass deflection to the lowest of the following:
  - .1 The displacement associated with the structural capacity of the glazing unit.
  - .2  $L/100$  where L is the shortest side dimension of the unit measured in inches.
  - .3 19 mm.
- .4 Thermal Loading: Design glass to resist thermal loads at service including those induced by differential shading within individual lites.
- .5 Safety Glazing: Provide safety glazing as required by applicable codes, whether or not indicated in the project drawings.
- .6 Design glass acting as guard rails for lateral loads required in British Columbia Building Code.

### **1.4 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
  - .1 Shop Drawings: Indicate clearly materials and methods. Indicate coordination with other trades. Submit calculations proving all glazing systems performance and compliance with specified loads. Submit under seal of registered professional engineer licensed in the Province of British Columbia.
  - .2 Submit test assemblies of bullet resistant glass in accordance with UL 752 for specified ratings.
  - .3 Letters of Assurance: The engineer is to submit the following Schedules:
    - .1 Submit Schedule B-1, 'Assurance of Professional Design and Commitment for Field Review' and Schedule B-2, 'Summary of Design and Field Review Requirements' with shop drawings.

- .2 Submit Schedule C-B, 'Assurance of Professional Field Review and Compliance' promptly on completion of work.

## **1.5 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittals.
- .2 Submit duplicate 300 x 300 mm size sealed unit samples of low-E glass, and coated spandrel glass to Consultant for approval.
- .3 Submit duplicate 450 x 450 mm samples of stochastic frit patterned glass on single glazing lites to Consultant for approval.

## **1.6 MOCK UPS**

- .1 Provide mock-up of frit patterned exterior glass, for approval by Consultant, as indicated on drawings.
- .2 Erect mock-up within specified curtain wall framing.

## **1.7 CLOSEOUT SUBMITTALS**

- .1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 77 00 – Contract Closeout.

## **1.8 QUALITY ASSURANCE**

- .1 Perform work in accordance with IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Maintain one copy of each standard document on site.
- .3 Glazing installer to provide evidence of minimum 5 years uninterrupted experience in successful installation of similar or more complex installations and membership in good standing with the Glazing Contractors Association of British Columbia.
- .4 Insulating glass manufacturer to be a member in good standing of the Insulating Glass Manufacturers Association of Canada.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

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

## **1.10 WARRANTY**

- .1 Manufacturer Warranty: Provide ten (10) year written extended warranty from the date of Substantial Completion, for defective materials and faulty engineering.
- .1 Sealed Insulating Units: to be free from material defects obstructing vision as a result of dust or film formation on the inner surfaces of the glass caused by failure of the hermetic seal.

- .2 Monolithic Glass – Annealed, Heat Strengthened or Tempered: replace units not meeting quality criteria.
- .3 Laminated Glass: replace sealed units exhibiting delamination.
- .4 Mirrors: to be free from defects of backing or edge coating delamination.

## **1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused glass, metal and wiring materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **PART 2 Products**

### **2.1 MATERIALS**

- .1 Float glass: to CAN/CGSB-12.3, Glazing quality, 6 mm thick.
- .2 Safety glass: to CAN/CGSB-12.1.
  - .1 Tempered: type 2, Class B clear float glass.
  - .2 Laminated: type 1, Class B clear float glass (tempered where noted), interlayer minimum 0.76 mm PVB, or acceptable substitution, – clear or coloured as scheduled, diffuse white in privacy screens indicated.

### **2.2 MATERIALS AND SEALED INSULATING GLASS**

- .1 Exterior Sealed Vision Unit Glazing: Triple Insulating Glass Units, 45 mm thickness, heat strengthened, low E surface #2.
  - .1 Glass thickness: 6 mm.
  - .2 Inter-cavity space thickness:
    - .1 13.5 mm between lights.
  - .3 Spacer: Warm edge Ultrabar black.
  - .4 Seal: Primary Sealant: Polyisobutylene (PIB) black.  
Secondary Sealant: Polysulphide black.
  - .5 Performance Requirements: Performance based on 45 mm sealed insulating units with 6 mm glass lites.
    - .1 U-value: 0.40.
    - .2 Solar Heat Gain Coefficient: (SHGC): 0.45.
  - .6 Argon filled (90%).



- .2 Exterior Sealed Glazing - Doors: Double Insulating Glass Units, 25 mm thickness, heat strengthened, low E surface #2.
  - .1 Glass thickness: 6 mm.
  - .2 Inter-cavity space thickness:
    - .1 13.5 mm between lights.
  - .3 Spacer: Warm edge Ultrabar black.
  - .4 Seal: Primary Sealant: Polyisobutylene (PIB) black.  
Secondary Sealant: Polysulphide black.
  - .5 Performance Requirements: Performance based on 25 mm sealed insulating units with 6 mm glass lites.
    - .1 Winter U-value: 0.25.
    - .2 Solar Heat Gain Coefficient: (SHGC): 0.38.
  - .6 Argon filled (90%).

## **2.3 ACCESSORIES**

- .1 Setting blocks: Neoprene, EPDM or Silicone, 80-90 Shore A durometer hardness to ASTM D 2240, to suit glazing method, glass light weight and area.
- .2 Spacer shims: Neoprene or Silicone, 50-60 Shore A durometer hardness to ASTM D 2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
  - .1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper; sized to suit; black colour.
  - .2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2 %, designed for compression of 25 %, to effect an air and vapour seal.
- .4 Glazing splines: resilient polyvinyl chloride or silicone, extruded shape to suit glazing channel retaining slot, black colour.
- .5 Glazing clips: manufacturer's standard type.
- .6 Lock-strip gaskets: to ASTM C 542.
- .7 Structural Silicone: High strength silicone sealant specifically designed and tested for structural glazing. Compatible setting blocks and gaskets.
  - .1 Colour: Selected by Consultant.

## **PART 3 Execution**

### **3.1 EXAMINATION**

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

- 
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

### **3.2 PREPARATION**

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

### **3.3 INSTALLATION: EXTERIOR -DRY METHOD (GASKET AND TAPE AND PRESSURE PLATE)**

- .1 Install gasket and mitre corners, allowing adequate length for shrinkage. If system utilizes an interior tape, install in lieu of gasket.
- .2 Install neoprene corner blocks with curtain wall sealant.
- .3 Install a bead of curtain wall sealant adjacent to gasket extending 75 mm from each corner.
- .4 Install setting blocks at one-quarter points on base.
- .5 Install glazing and position so that intermediate spacer aligns with frame.
- .6 Install setting block at mid-point top to provide air stop.
- .7 Apply shim tape to pressure plate or gasket if system utilizes an exterior gasket system, and install pressure plate and thermal break ensuring tape is aligned and fully concealed.
- .8 If temporary fastenings are used, replace with standard pressure plates at the end of each working day.
- .9 Seal all butts of pressure plates.
- .10 Retighten after an adequate period, allowing for bleed-out of tape and positioning of shim.
- .11 Install cover plates where required.
- .12 At sloping walls, apply a bead of silicone at lower edge of glazing extending 150 mm up either side.
- .13 Applicable – Glazed aluminum curtain walls.

### **3.4 INSTALLATION: EXTERIOR - DRY METHOD (PREFORMED GLAZING)**

- .1 Cut glazing spline to length; install on glazing light. Seal corners by butting spline and sealing junctions with sealant.
- .2 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .3 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- .4 Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

- 
- .5 Trim protruding tape edge.

**3.5 INSTALLATION: EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)**

- .1 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
- .2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .5 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line. Place glazing tape on glazing light or unit with tape 6 mm below sight line.
- .6 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
- .7 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

**3.6 INSTALLATION: EXTERIOR - WET METHOD (SEALANT AND SEALANT)**

- .1 Place setting blocks at 1/4 points and install glazing light or unit.
- .2 Install removable stops with glazing centred in space by inserting spacer shims both sides at 600 mm intervals, 6 mm below sight line.
- .3 Fill gaps between glazing and stops with sealant to depth of bite on glazing, maximum 9 mm below sight line to ensure full contact with glazing and continue air and vapour seal.
- .4 Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

**3.7 INSTALLATION: EXTERIOR - INTERIOR - DRY METHOD (GASKET AND GASKET)**

- .1 Seal all inside corners of frames with small joint sealant.
- .2 Place setting blocks at one-quarter points along glazing channel.
- .3 Apply stops to frame and insert glass.
- .4 Unpack and lay out gaskets on flat warm area to permit recovery of shape.
- .5 Install gaskets under compression from corners inward
- .6 Applicable – aluminum entrances and storefronts.

**3.8 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)**

- .1 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

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- .2 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
  - .3 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
  - .4 Place glazing tape on free perimeter of glazing in same manner described.
  - .5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
  - .6 Knife trim protruding tape.
  - .7 Applicable – wood frames, pressed metal window frames and metal doors.

**3.9 INSTALLATION: INTERIOR WET/DRY METHOD (TAPE AND SEALANT)**

- .1 Cut glazing tape to length and install against permanent stops, projecting 1.6 mm above sight line.
- .2 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .3 Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of light or unit.
- .4 Install removable stops, with spacer shims inserted between glazing and applied stops at 600 mm intervals, 6 mm below sight line.
- .5 Fill gaps between light and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
- .6 Trim protruding tape edge.
- .7 Applicable: wood frames, architectural woodwork.

**3.10 CLEANING**

- .1 Remove glazing materials from finish surfaces.
- .2 Remove labels after work is complete.
- .3 Clean glass and mirrors.

**3.11 PROTECTION OF FINISHED WORK**

- .1 After installation, mark light with an "X" by using removable plastic tape or paste.

**3.12 CLEAN UP**

- .1 As work proceeds and at completion remove all excess and waste materials.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 20 00: Finish Carpentry
- .2 Section 09 91 00: Painting.

**1.2 REFERENCES**

- .1 ASTM D2240-91, Test Method for Rubber Property - Durometer Hardness.
- .2 ANSI Z97.1, Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- .3 ASTM D256, Standard Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials.
- .4 ASTM D638, Standard Test Method for Tensile Properties of Plastics.
- .5 ASTM D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced plastics and Electrical Insulating Materials.
- .6 ASTM D792, Standard Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement.
- .7 ASTM D1929, Standard Test Method for Ignition.
- .8 City of Vancouver Building By-Law 2014.
- .9 ASTM B209-10, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .10 CAN/ULC S134-92, Standard Method of Fire Test of Exterior Wall Assemblies.

**1.3 PERFORMANCE REQUIREMENTS**

- .1 Size plastic glazing and frames to withstand dead loads and positive and negative live loads acting normal to plane of glass to a design pressure suitable for protection application indicated.

**1.4 SUBMITTALS**

- .1 Submit shop drawings and samples in accordance with Section 01 33 00: Submittals.
- .2 Indicate plans, elevations, sections and details of the system. Indicate gauges of brake metals, finishes, flashings, sealants and anchorage details.
- .3 Submit shop drawings under seal of Professional Structural Engineer Registered in British Columbia.
  - .1 The engineer is to submit the following Schedules:
    - .1 Schedule S-B, "Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional (SRP)", and

- .2 Schedule S-C, "Assurance of Professional Field Review and Compliance by Registered Professional (SRP)".
- .4 Samples:
  - .1 Submit duplicate 300 x 300 mm samples of plastic wall panel material, of colour and profile specified.
  - .2 Submit duplicate 150 mm long samples of each aluminum frame section in specified finish.
  - .3 Submit duplicate 150 mm long samples of each gasket type.
- .5 Submit manufacturer product literature and test data on plastic wall panels.
- .6 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 77 00 – Contract Closeout.

#### **1.5 MOCK UP**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Provide typical window mock-up on site. Mockup to include glazing system and other vertical work mullions, muntins, structural member covers, polycarbonate panels, mullions and caps. Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, air seal, perimeter sealant and relationship to exterior envelope wall component materials.
- .3 Locate where directed.
- .4 Allow 72 hours for inspection of mock-up by Consultant before proceeding with work.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

#### **1.6 DESIGN CRITERIA**

- .1 Deflection of cladding system, not to exceed 1/240 th of the span for the specified wind forces.
- .2 Accommodate thermal movement in cladding and between cladding and structure without distortion or damage to cladding.
- .3 Design and size components to withstand dead and live loads caused by pressure and suction of wind, snow and hail, acting normal to plane of system as calculated in accordance with City of Vancouver Building By-Law.
- .4 Design and size components to withstand seismic loads and displacement as calculated in accordance with City of Vancouver Building By-Law. Design and size components to accommodate a 1% interstory displacement.
- .5 Design wall system to following tolerances:
  - .1 Maximum variation from plane: 20 mm / 10 metres.
  - .2 Maximum offset from true alignment between two adjacent members abutting end to end in line : 1 mm.

## **1.7 QUALITY ASSURANCE**

- .1 Materials and Products shall be manufactured by a company continuously and regularly employed in the manufacture of glazing systems using cellular polycarbonate panel systems for a period of at least ten (10) years. Manufacturers shall provide a list of at least ten (10) projects having been in place a minimum of five (5) years.
- .2 Erection shall be by the manufacturer or an installer experienced in erection of systems of the type specified.
- .3 The manufacturer shall be responsible for the configuration and fabrication of the complete system, and will ensure that it fully meets all requirements of this specification.

## **1.8 DELIVERY STORAGE AND HANDLING**

- .1 Deliver products to jobsite in manufacturer's original, unopened containers bearing labels as to type of material and manufacturer's name.
- .2 Store cladding products in accordance with manufacturer's recommendations. Protect from elements.
- .3 Site store cladding products under cover in a dry, clean location, off the ground in a well ventilated area below 80 degrees F.
- .4 Handle products to prevent damage. Do not drop, slide or drag materials.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

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

## **1.10 WARRANTY**

- .1 Provide manufacturer's written warranty covering breakage, abrasion resistance, coating failure, loss of light transmission and yellowing.

## **1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Construction Waste Management Plan.

# **2 Products**

## **2.1 MATERIALS**

- .1 Glazing Panels:
  - .1 Appearance: Extruded panels 16 mm wide with an integral extruded multi-cell core and uniform in colour.
    - .1 Exterior skins interconnected and spaced apart by supporting continuous ribs perpendicular to the skins.
    - .2 The cross section space between the exterior skins to be divided by parallel intermediate walls.

- .3 Panels of polycarbonate resin with permanent, co-extruded, ultraviolet protective layer on both sides of the panel that is a permanent part of the panel.
- .4 Interior cells of the cellular polycarbonate sheets to be blown clean prior to being sealed. Top and bottom of each sheet to be sealed with an air permeable filter tape.
- .2 Panels extruded in one single length.
- .3 Panels incorporate a tongue and groove that is extruded at each side of the panels.
- .4 Perimeter framing and mullions dry glazed, using no sealant, welding or adhesives.
- .5 Panels and framing to allow for free thermal movement without compromising weather tightness of the completed system.
- .2 Air infiltration: Per ASTM E-283, 0.042 SCFM/ft of dry glazed joint at test pressure of 12 psf.
- .3 Water Penetration: There shall be no water penetration when tested vertically per ASTM E-331 at test pressure of 12 psf.
- .4 Impact and Cyclic Loading: ASTM E1996, 350 ft-lbs.
- .5 Expansion/Contraction: 0.0000375 in/in/°F.
- .6 Impact Loading: ASTM E695, 500 ft lbs.
- .7 Colour: Clear.
  - .1 Light transmission: 58%.
  - .2 SC: 0.62.
- .8 Flammability: CC1 fire rating classification as tested to ASTM D635.
- .9 Acceptable product, CPI Pentaglas 16 or acceptable substitution.
- .10 Gasketing recommended by manufacturer.
- .11 Fasteners: Stainless steel series 300 fasteners to be used on exterior; neoprene seals on washers.

### **3 Execution**

#### **3.1 EXAMINATION**

- .1 Inspect pallets upon delivery for evidence of damage.
- .2 Inspect and verify that frame openings are correct size and conform to recommendations of plastic glazing sheet manufacturer.



### **3.2 PREPARATION**

- .1 Clean frame contact surfaces with compatible solvent and wipe dry. Do not allow solvent to pool in glazing channels.
- .2 Immediately prior to installation expose glazing edges of plastic sheet by peeling back factory applied protective masking to a dimension sufficient for edge engagement.

### **3.3 INSTALLATION:**

- .1 Install plastic glazing in accordance with manufacturer's recommendations for edge engagement and expansion allowance.
- .2 Use only glazing accessories that have been approved by manufacturer of plastic glazing sheet.
- .3 Use methods of attachment to structure that include provisions for thermal movement.
- .4 Remove protective masking immediately after all glazing operations are completed.

### **3.4 ADJUSTING AND CLEANING**

- .1 Comply with manufacturer's instructions if cleaning becomes necessary.
- .2 Use only cleaning agents and techniques that have been approved by the manufacturer.
- .3 During installation protect exposed surfaces against accumulation of foreign material, dirt and damage.
- .4 Interior glazing surfaces to be cleaned as the panels are being installed. Clean exterior as each phase of the work is completed.
- .5 Before final acceptance, repair and/or replace and defective materials or work.

### **3.5 PROTECTION OF FINISHED WORK**

- .1 Protect installed work by affixing polyethylene film or other covering approved by plastic glazing manufacturer to framing members as required to protect plastic glazing from other construction operations.

### **3.6 CLEAN UP**


- .1 Upon completion of installation, clean protection products and accessories in accordance with manufacturer's recommended cleaning methods.
- .2 Remove surplus materials, rubbish and debris from installation as work progresses and upon completion of work.
- .3 Dispose of waste material in conformance with Construction Waste Management Plan.

**END OF SECTION**

## DOOR SCHEDULE

### ABBREVIATIONS USED IN DOOR SCHEDULE:

Alum. C	Aluminum Curtainwall	Horz.	Horizontal	RO	Rough Opening
Alum. S	Aluminum Storefront	HR	Handrail	SC	Solid Core
Btm.	Bottom	Lam	Laminated Glass	SG	Single Glazing
c/w	Complete with	Mtl	Metal	Sim.	Similar
Dbl.	Double Glazing	N/A	Not Applicable	STC	Sound Transmission Coefficient
Ex.	Existing	O/H	Overhead	Temp	Tempered
GL	Glazing (tempered)	Pnl	Panel	UNO	Unless Noted Otherwise
HC	Handicapped	Pr	Pair	Wd	Wood
Hdwe	Hardware	Pref.	Prefinished	WG	Wired Glass
HM	Hollow Metal	PSF	Pressed Steel Frame		

GENERAL NOTES REGARDING DOOR SCHEDULE:		Revisions shown thus:	
<b>A</b>	See Section 08710 - Finish Hardware for Finish Hardware specifications and Finish Hardware Set Schedule.		
<b>B</b>	Schedule is meant as a guide. Refer to drawings to confirm dimensions, wall types and details, as these may affect the overall frame widths. Confirm all dimensions on site prior to fabrication.		
<b>C</b>	For Door Types, refer to Door Type Drawings DT-1		
<b>D</b>	For Aluminum Frame Types, refer to Frame Type Drawings FP-1. For Steel Frames, refer to Frame Type Drawings FP-2, FP-3.		
<b>E</b>	All exterior glass doors shall be double glazed. All glazing for doors, door lites and sidelites shall be as specified and scheduled. All interior doors to be single glazed. All glazed lites to be clear tempered glass unless noted otherwise.		
<b>F</b>	Exposed fasteners on frames to be countersunk, filled, sanded & painted to conceal.		
<b>G</b>	All solid core wood doors to be 45 mm thick.		
<b>H</b>	Under cut doors and incorporate grilles in doors as required by mechanical engineering documents		

### HARDWARE OPERATION REQUIREMENTS

<b>1</b>	Lockset
<b>2</b>	Latchset
<b>3</b>	Privacy set
<b>4</b>	Magnetic Lock
<b>5</b>	Electric Strike
<b>6</b>	Remote door release
<b>7</b>	Exit Hardware
<b>8</b>	Exit Hardware with 15 sec delay
<b>9</b>	Card Reader
<b>10</b>	Key Pad

## DOOR SCHEDULE

<b>11</b>	Automatic door operator c/w push pads and or buttons
<b>12</b>	Closer
<b>13</b>	Roller Catch
<b>14</b>	Pulls
<b>15</b>	Push Plate
<b>16</b>	Thumbturn
<b>17</b>	Deadbolt
<b>18</b>	Astragal
<b>19</b>	Door Coordinator
<b>20</b>	Flushbolts
<b>21</b>	Floor Stop
<b>22</b>	Wall Stop
<b>23</b>	Overhead stop
<b>24</b>	Overhead Holdopen
<b>25</b>	Magnetic Holdopen
<b>26</b>	Kick plates
<b>27</b>	Door edge protection
<b>28</b>	Door Seals for acoustics, weather or smoke separation
<b>29</b>	Threshold
<b>30</b>	Door Contact

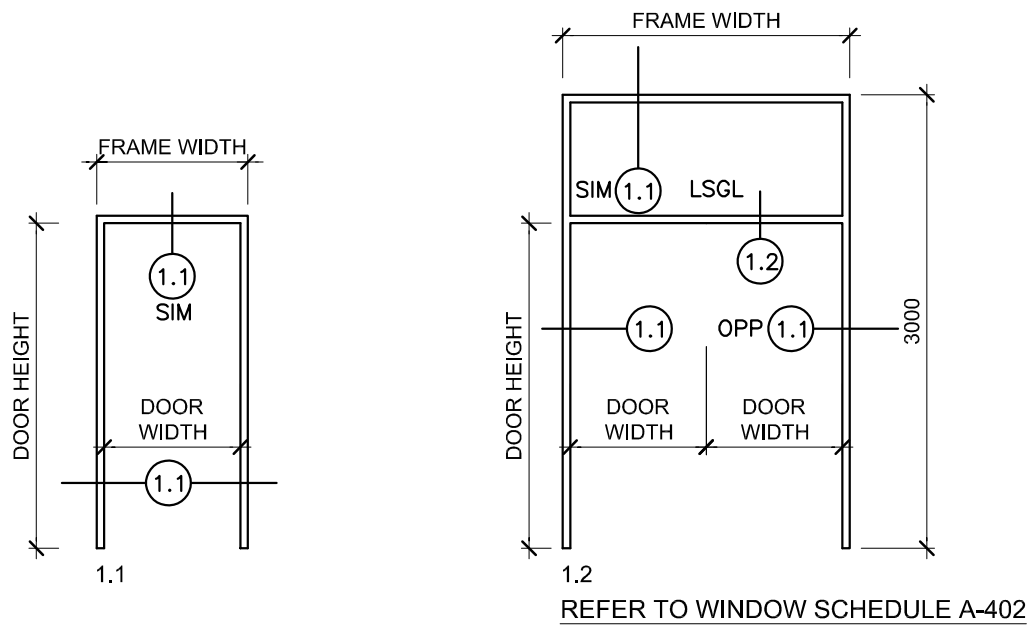
# Door Schedule



Door #	From	To	Door Rating	Door Type	Size	Frame Type	Hdwe Group	Remarks	Operation Notes	Colours
<b>MAIN FLOOR</b>										Refer also to Finishes Schedule for PT colours
1000	CORRIDOR - EXISTING	LOUNGE		/	2-915 x 2135	/		EXTG DOOR		
1000a	VESTIBULE 1000	ELECTRICAL 1000A		D3.1	1067 x 2135	F2.2				
1000a	VESTIBULE 1000	STAFF WC 1000B		D2.1	915 x 2135	F2.1				
1000b	VESTIBULE 1000	EXTERIOR		D1.1	1220 x 2135	F1.1				
1000c	VESTIBULE 1000	EXTERIOR		D1.1	1220 x 2135	F1.1				
1001	VESTIBULE 1000	LOBBY 1001		D3.2	2-915 x 2135	F2.1				
1001A	LOBBY 1001	COATS 1001A		D2.1	2-915 x 2135	F2.1				
1003	CORRIDOR 1002	WASHROOM 1003		D2.1	915 x 2135	F2.1			DBL SWING	
1004	CORRIDOR 1002	WASHROOM 1004		D2.1	915 x 2135	F2.1			DBL SWING	
1005	CORRIDOR 1002	STORAGE 1005		D2.1	915 x 2135	F2.1				
1005A	STORAGE 1005	STORAGE 1005A		D2.1	915 x 2135	F2.1			DBL SWING	
1005B	STORAGE 1005	STORAGE 1005B		D2.1	915 x 2135	F2.1			DBL SWING	
1006	CORRIDOR 1002	WASHROOM 1006		D2.1	915 x 2135	F2.1			DBL SWING	
1007	CORRIDOR 1002	HOTWATER TANK 1007	1 HR	D3.1	1067 x 2135	F2.1				
1008	DINING HALL 1008	EXTERIOR		D1.1	1220 x 2135	F1.1				
1009	DINING HALL 1008	SERVERY 1009		D3.3	915 x 2135	F2.1				
1008A	DINING HALL 1008	SERVERY 1009		D4.1	2800 x 1285	N.A.		OH SHUTTER	MOTORIZED	
1010	SERVERY 1009	PANTRY 1010		D3.1	915 x 2135	F2.1			CLOSER	
1010A	PANTRY 1010	LOADING BAY 1011	1 HR	D3.1	2-915 x 2135	F2.1			CLOSER	

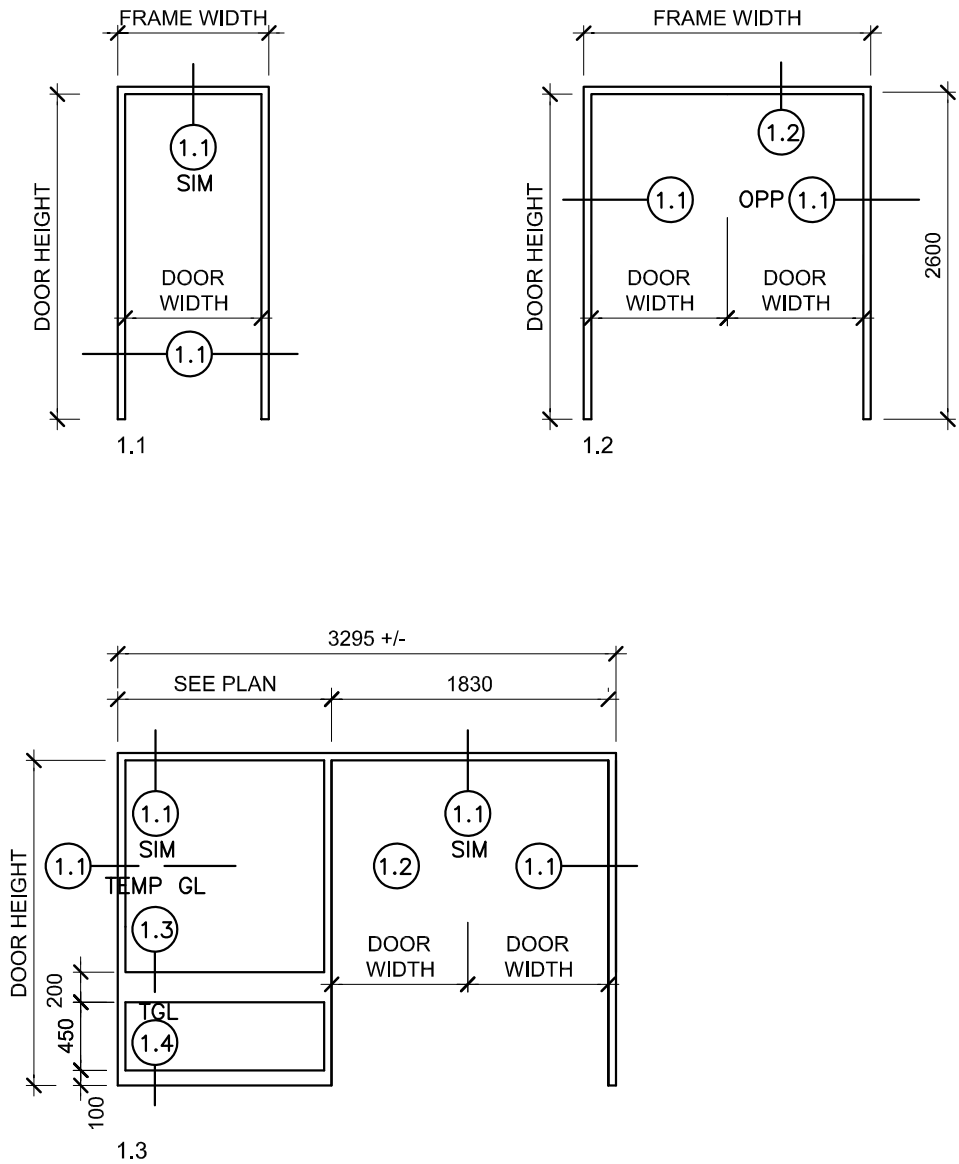
FRAME TYPES

Series 1 - Aluminum Frames



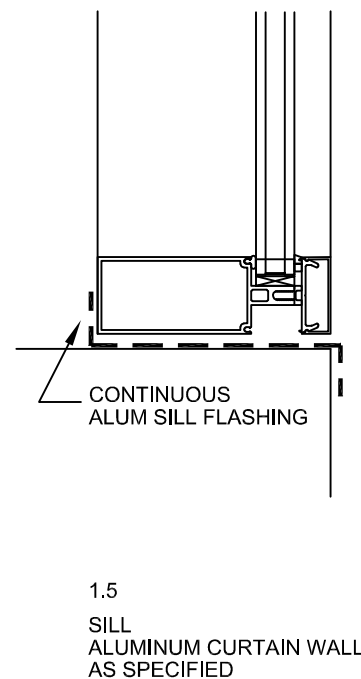
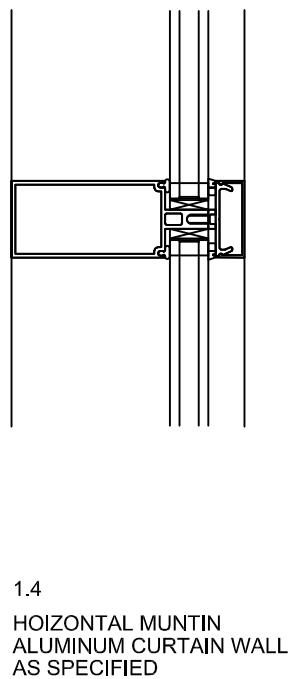
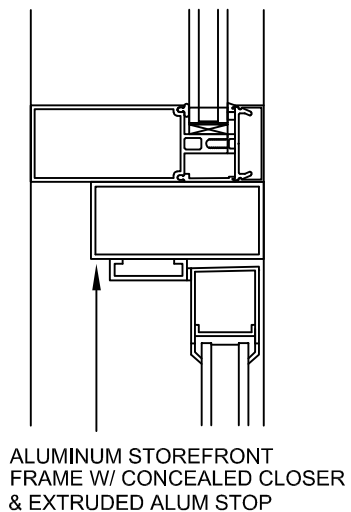
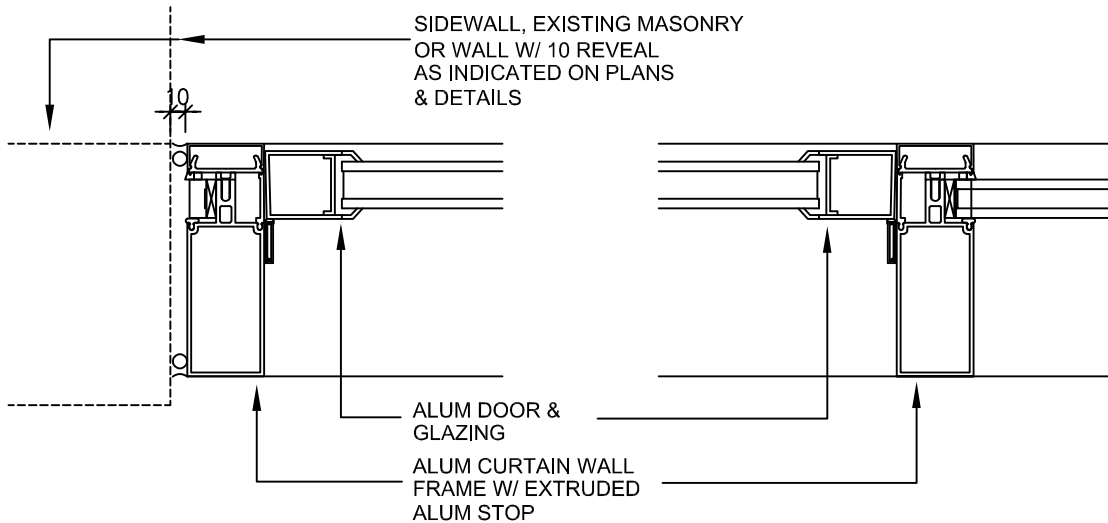
FRAME TYPES

Series 2 - Pressed Steel Frames



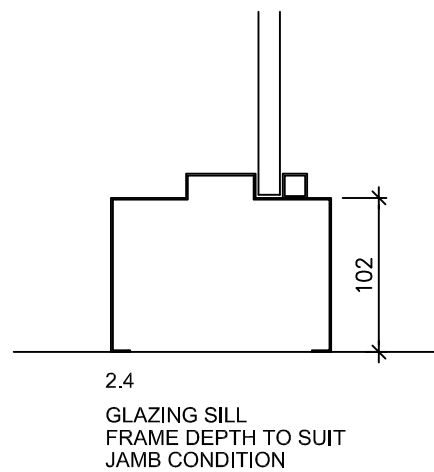
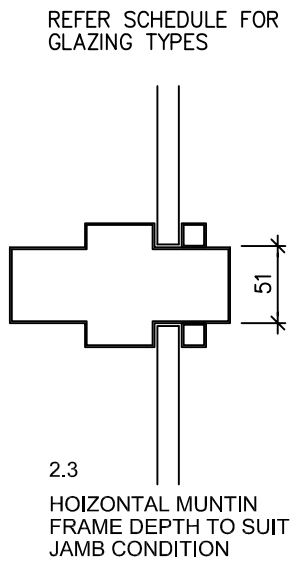
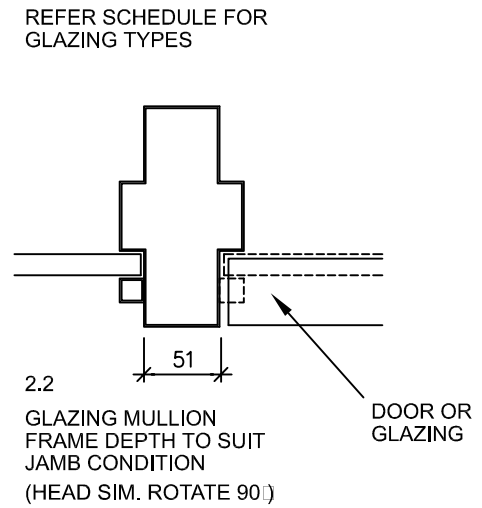
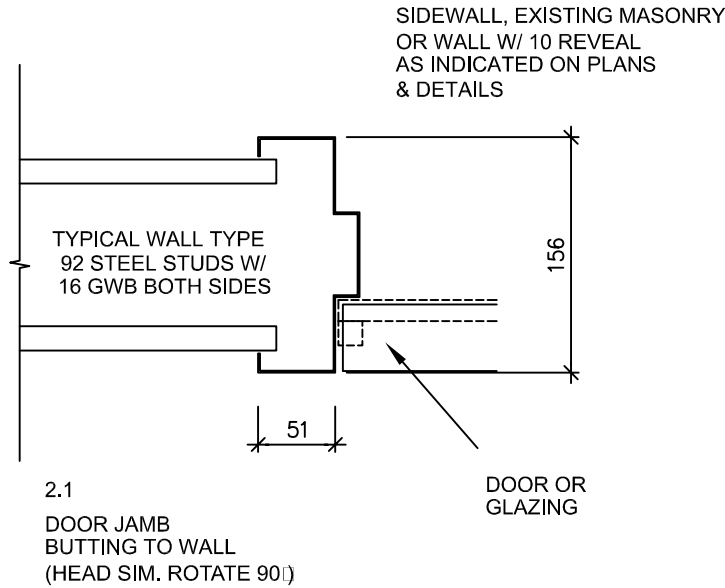
## FRAME DETAILS

### Series Type 1- Aluminum Profiles



## FRAME DETAILS

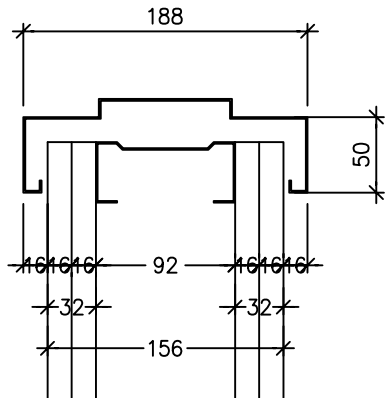
### Series Type 2- Pressed Steel Profiles



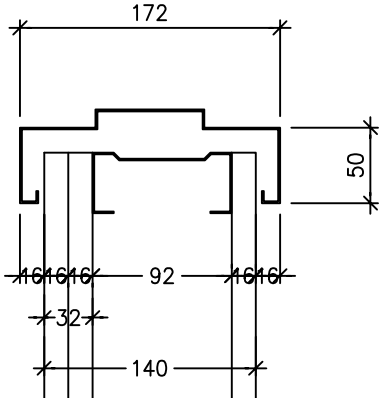


FRAME DETAILS

Series Type 2- Pressed Steel Profiles



2.5



2.6

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 07 21 16: Blanket Insulation.
- .3 Section 07 26 13: Above Grade Vapour Retarder.
- .4 Section 07 84 00: Fire Stopping.
- .5 Section 08 11 00: Metal Doors and Frames.
- .6 Section 08 11 16: Aluminum Doors and Frames.
- .7 Section 09 51 00: Acoustic Ceilings.
- .8 Section 09 65 16: Resilient Flooring.
- .9 Section 09 91 00: Painting.
- .10 Section 10 28 00: Toilet, Bath and Laundry Accessories.
- .11 Mechanical.
- .12 Electrical.

**1.2 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-10, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of.
- .3 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board.
- .4 BC Wall & Ceiling Association, Wall & Ceiling Institute Specifications Standards.
- .5 Carry out all work in accordance with the applicable regulations and recommendations of the Worker's Compensation Board.

**1.3 SUBMITTALS**

- .1 Submit product data in accordance with Section 01 30 00 – Submittals.

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Deliver and store material undamaged in original wrapping or containers with manufacturer's labels intact.

- .2 Prevent damage to materials during handling and storage. Keep gypsum wallboard and cementitious materials under cover and free from dampness.

## **1.5 ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain temperature minimum 10°C, maximum 21°C for 7 days prior to and during application of gypsum boards and joint treatment, and for at least 4 days after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Provide proper ventilation to eliminate excessive moisture and humidity.
- .4 Provide adequate lighting to carry out the work.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Fire-Resistant Gypsum Board: to ASTM C1396/C1396M, with core specially formulated for increased fire resistance and labeled by ULC or WH in accordance with CAN/ULC S102, 15.9 mm thickness, 1200 mm wide x maximum practical length, ends square cut, edges tapered.
- .2 Steel Drill Screws: to ASTM C1002 for 0.84 mm studs or ASTM C954 for 0.84 mm studs, self-drilling, self-threading case hardened with Philips-type head. Lengths suitable for penetration of 12 mm minimum into metal furring or metal studs.
  - .1 Use 25 or 31 mm long minimum #6 Type S or S-12 wafer or bugle head self-tapping corrosion-resistant screws for exterior sheathing.
  - .2 Use 31 mm long corrosion resistant #8 flat waferhead screws with a minimum 10 mm head diameter with counter-sinking ribs for moisture resistant sheathing.
- .3 Stud Adhesive: to CAN/CGSB-71.25.
- .4 Laminating Compound: as recommended by manufacturer, asbestos-free.
- .5 Metal Corner Beads: Minimum 0.40 mm, Z120 zinc coated sheet steel to ASTM A653, beaded angle with perforated 28.3 mm or 31.8 mm flanges. Use extended leg beads for double wallboard application. Acceptable alternative are compound adhesive applied trim beads consisting of strong paper tape laminated to galvanized metal; Westroc Super Bead Outside Corner B-1U, Inside Corner B-2, L Trim B-4, similar trims by CSM Goldline or acceptable substitution.

- .6 Metal Casing Beads: Minimum 0.40 mm, Z120 zinc coated sheet steel to ASTM A653, 'L' type or 'J' type as required, beaded angle or casing with one side knurled for joint filling; suitable for thickness of gypsum board. See .9 for acceptable manufacturer alternative.
- .7 PVC Mouldings: Rigid PVC mouldings conforming to ASTM-ZD3678, corner beads, cap or casing beads; prefinished in satin white as commercially available for use against exterior door and window frames.
- .8 Shadow Mould: 35 mm high, 12 mm reveal, snap-on trim, of 0.6 mm base steel thickness galvanized sheet prefinished in satin enamel white colour.
- .9 Acoustic Sealant: To CAN/CGSB 19-21 one component, gun grade, non-staining, non-hardening, permanently flexible synthetic rubber. Tremco Acoustical Sealant, PRC PR 181 Acoustical Sealant or acceptable substitution.
- .10 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .11 Joint Treatment Material: Joint compound, joint tape and taping compound to conform to ASTM C475.
  - .1 Tape: 50 mm spark perforated paper tape of type recommended by manufacturer of gypsum board products.
  - .2 Jointing Compound: Casein, vinyl or latex base, slow setting, bedding and finishing compounds of type recommended by manufacturer of gypsum board.
  - .3 Wet Areas Joint Treatment:
    - .1 Joint Tape: 50 mm wide, 10 x 10 glass mesh tape.
    - .2 Reinforcing Fabric: Balanced, alkali-resistant open-weave glass fiber fabric, 4.30 oz/yd<sup>2</sup>, conforming to ASTM D 1682 and ASTM D 578.
    - .3 Joint Compound: Portland Cement formulation complying with ASTM C 150 Type I.
  - .4 Water: Fresh, clean, potable water free from deleterious matter, acids or alkalis.
- .12 Batt Insulation: Refer to Section 07 21 16.

### **3 Execution**

#### **3.1 INSPECTION**

- .1 Examine site conditions and underlying work for defects or discrepancies that might impair the work of this Section.
- .2 Ensure that all bridging, anchors, blocking, backing, plumbing, mechanical and electrical work is installed, tested and approved by authorities and the Consultant before starting work.

#### **3.2 WORKMANSHIP**

- .1 Install gypsum board by tradesmen skilled in this trade in accordance with AWCC Specification Standards Manual, Sections 9.5 and 9.6 Part 3 and as follows:

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**3.3 APPLICATION**

- .1 Partitions types as indicated on the drawings and as scheduled.
- .2 Ceiling heights as indicated and/or detailed.
- .3 Full height partitions, floor to underside of metal deck or concrete structure, including fire rated partitions as indicated. Top of partitions to have structural deflection allowance of 1/360 of structural span.
- .4 Plan installation of butt-end joints to reduce the amount of joint finishing.
- .5 Do not locate joints on the same stud on opposite sides of partitions. Stagger end joints occurring on same side of partitions. Use largest practical sheets to minimize joints.
- .6 Keep vertical joints minimum 300 mm away from jamb lines of door, window and other openings.
- .7 Cut sheets to fit accurately, butt edges of boards in moderate contact, do not force into place. Remove ragged edges or burrs with rasp or sandpaper.
- .8 Cut gypsum board by scoring and breaking, or by sawing, working from the face side. When cut by scoring, cut through the face paper with a sharp knife; snap back the gypsum board from the cut face. Score cutouts for pipes, fixtures or other small openings in outline on both sides before knocking out or cut out with a saw.
- .9 Set all ends and edges of gypsum board over framing members. Erect with length of the sheet at right angles to the supports.
- .10 Provide suspended gypsum board ceilings and bulkheads where indicated. Erect gypsum board attached to ceiling supports with the length of the sheet at right angles to the supports.
- .11 Include all cutting and fitting of gypsum board to accommodate recessed items in framing, and to accommodate piping and duct penetrations in partitions.
- .12 Install control joints in large wall areas of gypsum board and as follows:
  - .1 Where a partition, wall or ceiling traverses a construction joint (expansion), seismic or building control element in the base building structure.
  - .2 Where a wall, partition or ceiling runs in an uninterrupted straight plane exceeding 8 m.
  - .3 Interior Ceilings With Perimeter Relief: Maximum linear dimensions between control joints 15.24 m and maximum total area between control joints 232.25 m<sup>2</sup>. Install control joints where ceiling framing members change direction.
  - .4 Interior Ceilings Without Perimeter Relief: Maximum linear dimensions between controls joints 9.1 m and maximum area of 83.61 m<sup>2</sup>. Install control joints where ceiling framing members change direction.
  - .5 Exterior Ceilings: Maximum linear dimensions between controls joints 9.1 m and maximum area of 83.61 m<sup>2</sup>. Install control joints where ceiling framing members change direction.

**3.4 SINGLE LAYER APPLICATION**

- .1 Erect gypsum board vertically or horizontally, whichever results in fewer end joints. Locate end joints over supporting members.

- .2 Keep end joints away from prominent locations and central partitions of ceilings.
- .3 Drive screws with a power screw-gun and set with countersunk heads slightly below the surface of the gypsum board. Do not break the surface of the board.
- .4 Install perimeter screws between 9 mm and 12 mm from edges and ends, opposite the screws on adjacent boards. Space screws for other areas on 300 mm centres in field.
- .5 Space screws for fire rated gypsum board on 200 mm centres at edges and on 300 mm centres on board fields on walls and on 200 mm centres on ceilings unless otherwise required by ULC Design Test assembly for fire rating specified.
- .6 Ensure fasteners do not contact framing behind resilient channels.

### **3.5 DOUBLE LAYER APPLICATION**

- .1 Apply first layer to supports with enough screws to hold in place. Apply second layer over first layer and secure as specified for single layer application using enough screws to penetrate both layers and the support.

### **3.6 METAL ACCESSORIES**

- .1 Corner Beads: Install to all external corners, using longest practical lengths. Fasten with screws at maximum 150 mm centres alternate sides.
- .2 At external corners of double layer application use extended leg beads and anchor through both layers of gypsum board. Use metal angle section on external corner of first layer.
- .3 Casing Beads and Miscellaneous Trim: Install to all openings and wherever gypsum board abuts a dissimilar material using longest practical lengths. Secure at maximum 300 mm centres.
- .4 Install slatwall after finish painting.

### **3.7 FINISHING**

- .1 Tape, fill and sand field joints and internal angles as follows.
- .2 Fill and sand corners, exposed screws, beads and trim as follows.
- .3 Mix joint filler and apply tape in strict accordance with printed manufacturer's directions.
  - .1 First, embed the tape.
  - .2 Second, apply leveling coat over tape.
  - .3 Third, apply skim coat to filled areas of gypsum board.
- .4 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .5 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .6 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

- .7 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .8 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .9 Mix joint compound slightly thinner than for joint taping.
- .10 Apply thin coat to entire filled surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
- .11 Allow skim coat to dry completely.
- .12 Remove ridges by light sanding or wiping with damp cloth.
- .13 Allow ample drying time between coats of filler.
- .14 Joints above finished ceiling in fire rated partitions to be taped only.
- .15 Levels of Finish:
  - .1 Ceiling spaces and unexposed plenums - Level one.
  - .2 Ceilings exposed to view - Level four.
  - .3 Walls exposed to view - Level four.
  - .4 Mechanical, Electrical, crawl space and similar service spaces - Level two.

### **3.8 INSULATION**

- .1 Install thermal and sound insulation blankets between steel studs in thermal/sound insulated partitions as scheduled. Fit insulation tightly between studs to full height of partitions.
- .2 Fit insulation tightly around and behind outlets.
- .3 Fit insulation tightly between deck flutes and top of stud track at room to room partitions.
- .4 At electrical boxes in all gypsum board sound insulated partitions install incombustible mineral fibre insulation around each box and fill joint between boxes with insulation. Fill joints around pipes, ducts and other penetrations through gypsum board sound insulated partitions with mineral fibre insulation to prevent sound transmission.

### **3.9 ACOUSTICAL SEALANT**

- .1 Seal joints between all gypsum board partitions and floors with acoustical sealant to prevent noise transmission.
  - .1 Extrude a full 9 mm diameter bead into each joint to effectively block airborne sound transmission. Install two beads of sealant at two layer applications.
- .2 Seal joints between edge of gypsum board surface and mechanical and electrical service penetrations, on both sides of sound rated partitions, prior to taping and filling, with a bead of acoustical sealant.

### **3.10 ADJUST**

- .1 Perform all necessary patching and making good around all sleeves, conduits and cutouts using materials specified in this Section of work.

- .2 Clean thoroughly and remove all excess materials from other finished surfaces. Protect and keep clean glass, aluminum work and convection units.

**3.11 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**



**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural Drawings: Cast-in-Place Concrete.
- .2 Section 07 21 13: Board Insulation.

**1.2 REFERENCES**

- .1 CSA A82.22, Gypsum Plasters.
- .2 CSA A82.30, Interior Furring, Lathing and Gypsum Plastering.
- .3 ASTM C28, Specification for Gypsum Plasters.
- .4 ASTM C206, Specification for Finishing Hydrated Lime.
- .5 ASTM C926-18a, Standard Specification for Application of Portland Cement-Based Plaster.
- .6 BC Wall and Ceiling Specification Standards Manual.

**1.3 QUALITY ASSURANCE**

- .1 The Association of Wall and Ceiling Contractors Specification Standards Manual, with authorized additions and amendments will be used as a reference standard and will form part of this Section.
- .2 All plastering products used on this project must meet or exceed the requirements specified under Part 2 – Products of Section 9.1 of Specification Standards Manual for the Wall and Ceiling Industry 2012.
- .3 Reference in this Section to Section Number, Parts and Item numbers means those Sections, Parts and Items contained within the A Specification Standards Manual for the Wall and Ceiling Industry 2012.
- .4 Products and installation to be in metric measurement as specified under Section 9.1 of Specification Standards Manual for the Wall and Ceiling Industry 2012

**1.4 PRODUCT DELIVERY STORAGE AND HANDLING**

- .1 Deliver and store material in undamaged original wrappings or containers, with manufacturer's labels and seals intact.
- .2 Prevent damage to materials during handling and storage. Keep plaster and cementitious materials under cover and free from dampness.

**1.4 SITE CONDITIONS**

- .1 Ensure temperature and ventilation conditions are maintained as required under Section 9.1 – Part 3, Specification Standards Manual for the Wall and Ceiling Industry 2012
- .2 Protect work of this Section against damage by other sections for minimum 48 hours after application.
- .3 Avoid plaster spattering of adjacent surfaces, particularly aluminum and glass. Promptly remove all plaster droppings. Mask adjacent surfaces where machines are used.

- 
- .4 Protect work of other sections from damage resulting from work of this section.
  - .5 Examine underlying surfaces and adjoining work and report, in writing to the Consultant, visible defects at time of installation which might impair the plastering work.
  - .6 Commencement of work implies acceptance of surfaces to receive plaster.

## **1.5 COOPERATION**

- .1 Cooperate with other trades to accommodate diffusers, grilles, light fixtures, etc located in furred and plastered surfaces.
- .2 Supply in sufficient time, inserts and accessories required to be built into work of other trades. Provide assistance where necessary in setting such items.

## **1.6 SUBMITALS**

- .1 Provide samples of cement parging finish on rigid insulation for approval by Consultant. Submit duplicate minimum size 300 x 300 mm samples.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Pre-mixed san/cement blend for coating or parging over rigid foam insulation. Acceptable product, TrueFoam Parge Plus, W.R. Meadows 825 Parge-All or acceptable substitution.

### **2.3 WATER**

- .1 Clean and free from injurious amounts of oil, acid, alkali or other deleterious matter.

## **3 Execution**

### **3.1 WORKMANSHIP**

- .1 As required by Specification Standards Manual for the Wall and Ceiling Industry 2012, Section 9.1 – Part 3.

### **3.2 PREPARATION OF SURFACES**

- .1 Prepare surfaces to receive plaster in accordance with Specification Standards Manual for the Wall and Ceiling Industry 2012, Section 9.1 – Part 3 as applicable.

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**3.3 MIXING**

- .1 Mix plasters in accordance with Specification Standards Manual for the Wall and Ceiling Industry 2012, Section 9.1 – Part 3 as applicable.

**3.4 FOUNDATION INSULATION COATING**

- .1 Install foundation coating according to manufacturer's written recommendations.
- .2 Ensure insulation is secured to foundation and wall substrate.
- .3 Mix components according to manufacturer's instructions.
- .4 Tape joints, corners and fastener heads with self-adhesive fiberglass tape.
- .5 Scrape the surface of the insulation with a steel brush or rasp.
- .6 Pre-coat all taped areas using a wide putty knife.
- .7 Using a brush consistency apply coating with a semi-circular motion; alternatively apply with trowel using a thicker mixture.
- .8 Apply approximately 3 mm thickness in approved texture.
- .9 Work on approximately 1 m2 areas at a time. Clean brush periodically.
- .10 Protect application against rapid surface evaporation due to heat and wind.

**3.5 CUTTING AND PATCHING**

- .1 Cut out and patch defective plaster and cracks prior to painting and decorating.

**3.6 ADJUST AND CLEAN**

- .1 Promptly as work proceeds and at completion, clean up and remove from site all rubbish and surplus materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Structural Metal Stud Framing.
- .2 Section 07 21 00: Cladding Support System.
- .3 Section 07 21 13: Board Insulation.
- .4 Section 07 27 00: Air Barriers.
- .5 Section 07 62 00: Metal Flashing and Trim.
- .6 Section 09 91 00: Painting.
- .7 Mechanical.
- .8 Electrical.

**1.2 REFERENCE STANDARDS**

- .1 The Association of Wall and Ceiling Contractors Specification Standards Manual, with authorized additions and amendments will be used as a reference standard and will form part of this Section.
- .2 All plastering products used on this project must meet or exceed the requirements specified under Part 2 – Products of Section 9.9 of Specification Standards Manual for the Wall and Ceiling Industry 2012.
- .3 Do work by skilled tradesmen experienced in the application of exterior Portland cement plaster (stucco).

**1.3 COOPERATION**

- .1 Cooperate with Mechanical and Electrical trades to allow for proper sequence of installation. Accommodate grilles, light fixtures and outlet boxes in furred spaces.

**1.4 MATERIAL DELIVERY STORAGE AND HANDLING**

- .1 Deliver and store all materials undamaged in original wrapping or containers with manufacturer's labels and seals intact.
- .2 Handle and store materials to prevent damage, inclusion of foreign matter and rusting of metals.
- .3 Ship corner beads, casing beads, control joints and trims in rigid packages. The Consultant will reject bent or deformed material.

**1.5 ENVIRONMENTAL CONDITIONS**

- .1 Do not apply stucco to surfaces that are frozen or contain frost.
- .2 Protect stucco against freezing for a period of 48 hours after application. Do not use frozen materials in the mix. Locate heat sources to prevent a concentration of heat or fumes on the stucco.
- .3 Do not apply stucco if the ambient temperature is less than 4 degrees C.

- .4 Protect stucco from uneven and excessive evaporation during hot, dry weather.
- .5 Allow base coats to properly cure before applying finish coats.

#### **1.6 PROTECTION**

- .1 Protect the work of this Section from damage by other trades.
- .2 Protect the work of other trades from damage during the application of stucco. Avoid stucco materials contacting glass or aluminum. Promptly remove all stucco droppings and overspray from adjacent surfaces. Mask adjacent surfaces where necessary.
- .3 Provide and maintain drop cloths, tarpaulins or other necessary protective coverings to provide suitable protection.

#### **1.7 SUBMITTALS**

- .1 Submit texture samples in accordance with Section 01 33 00 – Submittals.
- .2 Submit duplicate 300 x 300 mm sample panels of each texture of stucco.
- .3 Submit samples of vent moldings for Consultant's approval.
- .4 Submit shop drawing bearing the stamp and signature of a qualified Professional Structural Engineer registered and licensed to practice in the Province of British Columbia.
- .5 Indicate design loads, all details, reinforcement, and method of assembly. Show fabrication and installation details, fastening details, field jointing and splicing anchor reinforcing, and structural supports. Indicate member sizes, locations, thickness, exclusive dimensions, openings, control joint locations and materials, requirements of related work and critical installation procedures.
- .6 Letters of Assurance: Provide Letters of Professional Assurance as required by the City of Vancouver Building By-law for design review and field review by the registered professional engineer who signed and sealed the shop drawings upon completion of the work.

#### **1.8 MOCK-UP PANEL**

- .1 Construct a sample mock up panel of stucco, including materials of entire assembly, approximately 1.2 square metres in area. Approved panel may be part of the finished work.
  - .1 Construct panel approximately 3 weeks prior to anticipated commencement of the scheduled work.
- .3 Use materials and workmanship intended for the job.
- .4 Cooperate with other Sections involved in the mock up panel.
- .5 Do not commence remainder of the stucco until the mock-up panel is inspected and approved by the Consultant.

#### **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

- 
- .2 Divert unused materials from landfill to recycling facility.
  - .3 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 STUCCO MATERIALS**

- .1 Portland Cement: Type 10 conforming to CAN/CSA A5 or Type I/II to ASTM C150.
- .2 White Cement: Conforming to CAN/CSA A5 or ASTM C150.
- .3 Masonry Cement: Type H, conforming to CAN/CSA A8, or Type I or type I/II to ASTM C91.
- .4 Hydrated Finishing Lime: Conforming to C206, Type S.

### **2.2 AGGREGATES**

- .1 Sand: Clean, well graded fresh sand conforming to CSA A82.57M or ASTM C897.
- .2 Lightweight Aggregate: Approved product manufactured for the purpose intended, conforming to CSA A82.57M or ASTM C897 containing maximum 5% fines passing through No. 100 sieve.

### **2.3 OTHER MATERIALS**

- .1 Water: Clean potable water.
- .2 Admixtures: Manufactured specifically for bonding, pumping or curing for use in stucco mixes.
- .3 Fibres: For base coat, polypropylene, nylon or alkali-resistant glass fibres to ASTM C1116.
- .4 Drainage Mat: Delta Dry Stucco and Stone, BASF Drainage Mat DF or acceptable substitution.
- .5 Bug Screen: Delta Bug Screen or acceptable substitution. Non-woven polyester matting, 1.5 m x 38 mm x 12 mm.

### **2.4 LATH AND ACCESSORIES**

- .1 Furring and Lath: All steel materials cold-rolled to ASTM A653/A653M with hot dipped galvanized minimum Z275 coating to ASTM A525.
  - .1 Main Runner or Carrying Channels: 38 mm x 15 mm x minimum 1.52 mm 'U' shaped steel channels.
  - .2 Cross-Furring Channels: 19 mm x 15 mm x minimum 1.52 mm 'U' shaped steel channels.
  - .3 Vertical Furring Channels: 19 mm x 15 mm x 1.52 mm.
  - .3 Hangers: Minimum 3.65 mm diameter steel wire and/or 4.8 mm diameter zinc coated or cadmium plated steel rods.
  - .4 All wire zinc coated annealed low-carbon steel wire to FSQQ-W-461g.AS.

- .5 Tie Wire: Minimum 1.22 mm diameter zinc coated annealed steel wire.
- .6 Lath: Diamond mesh, 1.84 kg/m<sup>2</sup>.
- .7 Screws: #8 self-drilling, self-tapping pan-head type corrosion resistant, length to penetrate stud 12 mm.
- .4 Accessories:
  - .1 Cornerite: Expanded 0.45 mm thick sheet steel; 63.5 mm legs, galvanized finish.
  - .2 Corner Bead: 0.46 mm thick galvanized sheet steel, galvanized woven wire mesh.
  - .3 Striplath: Expanded 0.45 mm thick sheet steel; 150 mm wide galvanized finish.
  - .4 Stucco Stops: Square 0.46 mm thick galvanized sheet steel, perforated or expanded flanges.
  - .5 Expansion/Control Joints: One piece W shaped 0.45 mm thick galvanized steel control joint with expanded flanges.
  - .6 Deflection Control Joint: Two piece standard galvanized deflection control joint for horizontal application.
  - .7 Reinforcing Mesh: 0.91 mm diameter galvanized steel woven 25.4 mm mesh.

## **2.5 MIXES**

- .1 Portland Cement stucco base coat mixed in the following volume proportions:
  - 1 part Portland Cement
  - 2 1/2 - 4 parts sand scratch coat - first    3-5 parts sand brown coat - second
  - 3/4 to 1 1/2 maximum parts lime

## **2.6 STUCCO THICKNESSES**

- .1 Exterior: Three coat system, 22 mm on expanded metal lath on drainage mat.
  - .1 9 mm first and second coats, 4 mm third coat.

## **3 Execution**

### **3.1 WORKMANSHIP**

- .1 Apply stucco by tradesmen skilled in this trade and in accordance with procedures to produce a quality application.
- .2 Apply light sand float finish by approved skilled applicators.
- .3 Construct a sample panel on site containing trim, stops and metal panel. Sample panel may be part of the Work. Sample panel will be inspected and approved by the Consultant prior to completion of the remaining work.

### **3.2 ENVIRONMENTAL CONDITIONS**

- .1 Do not apply stucco to frozen surfaces or surfaces containing frost.
- .2 Protect stucco finish against freezing for a minimum of 24 hours after application.

- .3 Ensure ambient air temperature is a minimum of 4°C during application of base and finish coats and for a minimum of 24 hours after application.
- .4 Store materials at a minimum temperature of 4°C.
- .5 Protect basecoat and finish from uneven and excessive evaporation in warm, dry or windy weather.

### **3.3 DRAINAGE MAT INSTALLATION**

- .1 Install drainage mat over preservative treated strapping and board insulation according to manufacturer's recommendations.
- .2 Install with blue strip facing the weather.
- .3 Butt seams without overlap.
- .4 Install bug screen at base of drainage mat according to manufacturer's recommendations.

### **3.4 LATH AND TRIM INSTALLATION**

- .1 Apply wall lath with long dimension at right angles to hat channel supports drainage mat. Apply first course at bottom and work up. Work from right to left. Stagger vertical laps. Attach to framing at furring crimp on 150 mm centres. Attach through hat channels and into lightweight steel framing with non-corrosive fasteners. Do not attach to mid-span hat channels that are attached to sheathing.
- .2 Install expanded stucco lath to suspended metal framing at maximum 400 mm centres with galvanized fasteners. Install metal lath with the long dimension perpendicular to the supports. Offset ends of sheets where possible.
- .3 Provide a 150 mm wide by 450 mm long strip of diamond mesh metal lath diagonally at each corner of openings.
- .4 Attach lath accessory trims to supports with 1.37 mm tie wire at maximum 150 mm centres.
- .5 Erect accessories straight, plumb, level, rigid and at the proper plane. Use full length pieces to minimize joints, one piece for lengths up to 3,000 mm; at least 1,800 mm for cut closure lengths. Fit lengths tight together, accurately align and secure each side of joints. Mitre and fit corners accurately, free from rough edges.
- .6 Provide stucco stop where shown or where plaster butts against surface having no trim, concealing the junction. Secure beads at maximum 300 mm centres.
- .7 Install control joints to align with building features or at 3 000 mm maximum, if not shown.

### **3.5 MIXING**

- .1 Carry out as follows:
  - .1 Use watertight containers.
  - .2 Keep equipment clean and free from set and hardened materials.
  - .3 Use only freshly mixed materials.
  - .4 Mix only as much plaster as can be used in one hour.
  - .5 Protect mixes from frost, dust and evaporation.
- .2 Only mixing by mechanical means is allowed.



- .1 Mix each batch for a minimum of 2 minutes or until all ingredients are uniform in mix and colour after all ingredients have been added.
- .2 Place required amount of water into mixer then add plaster materials.
- .3 Determine proper consistency by slump testing
- .4 Take material for testing from the nozzle of the hose.
- .5 Maximum allowable slump - 50 mm using 150 mm base with a 100 mm top diameter.
- .6 Fibre may be used for the first coat on metal reinforcement. Maximum 0.45 kg fibre to be used per 22.7 kg bag of cementitious materials.

### **3.6 STUCCO APPLICATION**

- .1 Accurately measure ingredients. Proportion successive batches similarly.
- .2 Manually apply scratch coat with sufficient material and pressure to form a positive, good and fully keyed plaster base. Take care to avoid excessive pressure against mid-span areas between framing. Scratch horizontally to roughen the surface.
- .3 Manually apply the brown coat after the scratch coat has set. Bring out the ground or stops, straightened to a true surface with rod and darby.
- .4 Apply brown coat with sufficient pressure to form a positive bond. Leave surface smooth to receive finish. Only apply finish coat after brown coat has dried.
- .5 Dampen the surface with water to obtain uniform suction where any previous coat has become dry.
- .6 Apply finish coat with sufficient pressure and material to ensure tight contact with and complete coverage of the second coat. Bring to specified finish.
- .7 Sand Finish: Devoid of coarse aggregate, applied in a thin coat completely covering brown coat and floated to a true plane surface with a sponge rubber float to yield a fine textured, sandpaper-like finish.
- .8 Apply finish in accordance with manufacturer's written instructions. Finish coat to match approved samples for texture, to be uniform in colour and texture and to be free of defects detrimental to appearance and performance.

### **3.7 CURING**

- .1 Ensure ambient air temperature is a minimum of 10 °C during application and curing of stucco coats.
- .2 Cure scratch coat a minimum of seven days before brown coat is applied.
- .3 Cure brown coat a minimum of ten days before finish is applied.
- .4 Cure scratch and brown coats by moist curing to prevent shrinkage cracking and drying before hydration and hardening takes place.
- .5 Sufficient moisture to be retained or intermittently applied as required to the stucco surface to permit the hydration process of the cementitious materials to continue and to prevent shrinkage cracking.

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**3.8 SHRINKAGE CONTROL**

- .1 Stucco base coat to be free of measurable shrinkage cracks after minimum ten day curing period.
- .2 Measurable cracks defined as exceeding 0.2 mm cumulative width in any 1 metre portion of stucco panels.

**3.9 REMEDIAL SHRINKAGE CRACK TREATMENT**

- .1 Demolish stucco panels with measurable cracking and replace at no cost to Owner.
- .2 Pretreat minor cracks, if acceptable to Consultant, before applying finish coats.

**3.10 CUTTING AND PATCHING**

- .1 Cut out and patch defective stucco and cracks. Reapply a thin finish coat to the entire affected panel to match adjacent panels.

**3.11 CLEAN UP**

- .1 Clean up promptly and as the work proceeds. Remove from the site any surplus material or rubbish from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 06 20 00: Finish Carpentry.
- .3 Section 09 21 16: Gypsum Board.
- .4 Section 09 91 00: Painting.
- .5 Mechanical.
- .6 Electrical.

**1.2 SYSTEM DESCRIPTION**

- .1 Supply all labour, materials, accessories and erection equipment required to provide a complete installation of the acoustic suspended ceiling system as described and where indicated on the Finish Schedule and the reflected ceiling plan.
- .2 Check Mechanical and Electrical for additional information.
- .3 Install ceilings to ensure lighting, fixtures, cover plates, diffusers and grilles may be fitted neatly into panels without tees, joints and cuttings.

**1.3 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials.
- .3 Specifications Standards Manual of the Association of Wall & Ceiling Contractors of B.C.
- .4 British Columbia Building Code 2012.
- .5 Seismic Design Standards to ASTM-E580.
- .6 ASTM A641-09a(2014), Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire.
- .7 ASTM C423-09a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .8 ASTM C 635-13, Standard Specifications for Metal Suspension Systems for Acoustic Tile and Lay-In Panel Ceilings.
- .9 ASTM C 636-13, standard Practice for Installation of Metal Ceiling suspension Systems for Acoustical Tile and Lay-In Panels.
- .10 ASTM E 580-16, Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.

- .11 ASTM E 84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.

#### **1.4 SUBMITTALS**

- .1 Submit acoustic tile samples in accordance with Section 01 33 00 Submittals.
- .2 Submit shop drawings of design details illustrating compliance with Seismic Design Standards; produced, signed and sealed by a registered professional structural engineer licensed in British Columbia.
  - .1 The engineer is to submit the following Schedules:
    - .1 Submit Schedule S-B, 'Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional' with shop drawings.
    - .2 Submit Schedule S-C, 'Assurance of Professional Field Review and Compliance by Supporting Registered Professional' promptly on completion of work.

#### **1.5 QUALIFICATIONS**

- .1 Work to be carried out by mechanics experienced in this Work under the direction of a Supervisor employed by approved acoustical contractors.

#### **1.6 STORAGE AND PROTECTION**

- .1 Materials to be kept in original packages bearing name brand of manufacturer. Do not store more than 6 cartons high.
- .2 Protect materials from damage on construction site.

#### **1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15°C and humidity of 20 - 40% before, during and after installation.
- .3 Store materials in work area minimum 48 hours prior to installation.

#### **1.8 MAINTENANCE MATERIALS**

- .1 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- .2 Extra materials to be from same production run as installed materials. Supply only new, unhandled, undamaged materials in original sealed packaging complete with manufacturer's labels.
- .3 Clearly identify each type of acoustic unit, including colour and texture.
- .4 Deliver to Owner, upon completion of the work of this Section.

#### **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

- .2 Do not dispose of unused materials into landfill.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS**

- .1 Hangers: ASTM A641 Class 1 zinc coating, soft temper, pre-stretched with a yield stress load at least three times design load, and minimum 12 gauge.

### **2.2 SUSPENSION**

- .1 Suspension components: Medium to Heavy Duty System. ASTM C-635. Exposed system.
  - .1 Main tees, cross-tees and perimeter mouldings formed from commercial quality cold rolled steel, zinc coated, with double web design, rectangular bulb and 23.8 mm exposed flange with a rolled cap. Main tee members with cross-tee holes at 150 mm o.c. and hanger wire holes at 50 mm o.c..
  - .2 Cross-tee members with web extended to form a flush, positive interlock with main tees.
  - .3 Exposed faces finished in a low satin sheen to match lay in panels.
  - .4 Perimeter trim: shadow mould.
  - .5 Acoustic ceiling hangers by Mason Hangers or acceptable substitution.
  - .6 Approved system USG DX/DXL or similar system by Armstrong, Bailey, Chicago Metallic, Hunter Douglas or acceptable substitution.

### **2.3 ACOUSTIC PANELS**

- .1 AT1: Acoustic Tiles: Square edge, 24 mm grid face, fine textured with factory applied latex paint on acoustically transparent membrane and CAC backing.
  - .1 Class A Flame Spread rating ASTM E84, labeled and listed by UL or ULC for a Flame Spread of 0 - 25 under Hazard Classification.
  - .2 NRC of 0.70.
  - .3 CAC of 35.
  - .4 Light reflectance of 0.86.
  - .5 Panels treated to inhibit panel sag.
  - .6 Inherently anti-microbial and humidity resistant.
  - .7 Sizes: 610 mm x 1219 mm x 19 mm.
  - .8 Colour: Flat White 050.

- .1 Acceptable product, CGC Eclipse Clima Plus 78575 or acceptable substitution.

### **3 Execution**

#### **3.1 EXAMINATION**

- .1 Review Mechanical and Electrical Work that affects this Section.
- .2 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

#### **3.2 INSTALLATION**

- .1 Install acoustical panels and tiles in ceiling suspension system after the completion and testing of all Work of other trades in the ceiling space.
- .2 Install perimeter shadow mould to walls after walls are painted to ensure painting is completed 100 mm above ceiling line. Attach suspension to two adjacent walls, allow suspension to float on the two opposite adjacent walls.
- .3 Install custom perimeter trim to suspended area ceilings indicated.
- .4 Erect suspension system by setting off with the grid lines as indicated on the drawings, in straight lines in both directions and neatly fitted to walls.
- .5 Attach hangers to structure by approved methods capable of carrying applied loads with a safety factor of 1 to 4.
- .6 All soffits of exposed tee supports flush and level, with minimum joints in an approved pattern. Joints square, tight, flush and reinforced with splines. Maximum deflection 1/360 of span.
- .7 Level ceiling system with electronic laser beam to tolerance of 3 mm in 3 600 mm. Perform leveling with support hangers taut to prevent any subsequent deflection of the main runners when ceiling loads are imposed.
- .8 Sharply bend and tightly wrap wire loops to prevent vertical movement or rotation of the runners within the loops.
- .9 Install system, spacers, bracing and vertical compression members to meet seismic code requirements.
- .10 Clean and remove all dust from the sides of the exposed T-bars prior to installing acoustic panels.
- .11 Install acoustic panels to layouts indicated using specified tiles. Cut and fit panels neatly against abutting surfaces.

#### **3.3 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

#### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural drawings: Cast-In-Place Concrete.
- .2 Section 03 35 00: Concrete Finishes.
- .3 Section 09 21 16: Gypsum Board.
- .4 Section 10 26 00: Wall Protection.
- .5 Mechanical.

**1.2 REFERENCES**

- .1 ASTM F1303, Standard Specification for Vinyl Sheet Floor Covering With Backing.
- .2 Resilient Wall Base: ASTM F 1861, Type TP.
- .3 ASTM F1913-04(2010) Standard Specification for Vinyl Sheet Floor Covering Without Backing.
- .4 Surface Sealer Floors: CAN/CGSB-25.20- M88
- .5 Detergent Resistant Floor Polish: CAN/CGSB-25.21- M89

**1.3 SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 Submittals.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long welding rod.

**1.4 CLOSEOUT SUBMITTALS**

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

**1.5 EXTRA MATERIALS**

- .1 Provide extra materials of resilient sheet flooring and adhesives for maintenance repair.
- .2 Provide 2 % of each colour, pattern and type flooring material required for this project for maintenance use.
- .3 Extra materials to be in one piece and from same production run as installed materials.
- .4 Clearly identify each roll of sheet flooring and each container of adhesive.
- .5 Deliver to Owner and obtain a receipt, upon completion of the work of this section.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and 48 hours after installation.
- .2 Ensure concrete slab is sufficiently cured prior to proceeding with installation.

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**1.7 QUALITY ASSURANCE**

- .1 Installation of flooring materials to be performed by Journeypersons with one or more of the following qualifications:
  - .1 Provincial Trades Qualification.
  - .2 Federal Red-Seal Certification.
  - .3 INSTALL Certification.

**1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Construction Waste Management Plan.
- .4 Dispose of unused finish and adhesive materials at hazardous material collections site.
- .5 Do not dispose of unused finish and adhesive materials into sewer system, into streams, lakes, onto ground or in other locations where it will pose health or environmental hazard.

**2 Products**

**2.1 MATERIALS**

- .1 VT1: Vinyl floor covering conforming to ASTM F1700, Class III, Type B, with PUR-reinforced surface plank style, homogeneous polymeric calendared layers with a 28 mil PVC wear layer.
  - .1 Thickness: 2.5 mm.
  - .2 Wear Layer: 0.71 mm.
  - .3 Size: 19.76 cm x 121.91 cm wide planks.
  - .4 Static Coefficient of Friction: ASTM D2047, minimum 0.5 SCOF.
  - .5 Static Load Limit: ASTM F970, passes 250 psi with less than 0.0005" residual indentation.
  - .6 Fire Performance, Critical Radiant flux: ASTM E648, Class 1.
  - .7 Acceptable product, Johnsonite Tarkett I.D. Inspiration 70 of acceptable substitution.
    - .1 Colour: 24231128 Rustic Oak, Medium Brown.
- .2 NS1: Safety Flooring: Slip resistant sheet flooring with aluminum trioxide throughout material thickness and silicon carbide at the surface.
  - .1 Wear Layer: Quantum Guard HP Urethane Oxide topcoat cured by UV process.
  - .2 Overall thickness: 2.0 mm
  - .3 Weight: 2.4 kg/m<sup>2</sup>.
  - .4 Static load limit: ASTM F970, 1000 psi.
  - .5 Size: 2 m roll.
  - .6 Slip Resistance: ASTM D2047, dry – 0.78, wet – 0.80.
  - .7 Surface Burning: Conforms to CAN/ULC S102.2.
  - .8 Weld rods 153 by flooring manufacturer.
  - .9 Colour: Selected by Consultant from manufacturer's standard colour options.
  - .10 Acceptable product, Altro Walkway 20 or acceptable substitution.
    - .1 Colour: Savannah VMI2050.



- .3 NS2: Slip Resistant sheet Vinyl: To ASTM F1913, vinyl with slip retardant particle evenly suspended throughout thickness.
  - .1 Thickness: 2.5 mm.
  - .2 Weight: 329 kg/m<sup>2</sup>.
  - .3 Sheet width: 2.0 m.
  - .4 Fire test data: CAN/ULC S 102.2, ASTM E 648 Class I.
  - .5 Wear resistance: to ASTM C 501.
  - .6 Colour: 691 Soft Fleece.
  - .7 Welding rods 1290036 by flooring manufacturer.
  - .8 Acceptable material: Tarkett Sommer Granite Safe-T or acceptable substitution.
- .4 Resilient base: to CAN/CSA-A126.5, Type - rubber, minimum 1200 mm length and 152 mm high x 3.2 mm thick.
  - .1 Style – coved.
  - .2 Colour: Johnsonite 09 Clay
  - .3 Acceptable material: Armstrong, Johnsonite, Burke, Flexco or acceptable substitution.
- .5 Flash Coved Base Supports: Continuous plastic as recommended by flooring manufacturer, minimum 19 mm radius.
- .6 Sub-floor filler and leveler: 2 part latex-type cement filler requiring no water as recommended by flooring manufacturer for use with their product. Acceptable material; Armstrong S-194 Patch, Underlayment and Embossing Leveler, S-183 Fast Setting Cement-Based Underlayment or S-194 Fast Setting Cement-Based Patch and Skim Coat.
- .7 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, at or below grade. Interior adhesives, sealants and sealant primers VOC content to comply with content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168.
- .8 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

### **3 Execution**

#### **3.1 SITE VERIFICATION OF CONDITIONS**

- .1 Ensure substrates are clean and dry by using test methods recommended by flooring manufacturer.
- .2 Install flooring materials to approved substrates only after all other trades, especially gypsum board and painting, have been completed.
- .3 Do not proceed with installation until all unsatisfactory conditions have been corrected and ensure that all surfaces to receive resilient flooring are clean, dry and smooth and free from paint, varnish, oils, release agents, waxes, sealers and curing and hardening compounds not compatible with adhesives employed.

#### **3.2 PREPARATION**

- .1 Confirm that curing, hardening and sealing compounds have not been applied to concrete slab in conformance with resilient flooring manufacturer's printed instructions.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

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- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
  - .4 Install leveler strips, back to back to provide a water dam at accessible showers, according to manufacturer's recommendations.

### **3.3 SHEET VINYL APPLICATION**

- .1 Arrange flooring layout for minimum number of seams. Place seams in low traffic areas and minimum 300 mm away from parallel joints in flooring substrates.
- .2 Match edges of floor coverings for colour shading and pattern at seams.
- .3 Scribe, cut and fit floor coverings to fit tightly to vertical surfaces, permanent fixtures, pipes, edges, thresholds, service covers and built-ins.
- .4 Extend flooring into recesses, etc.
- .5 Adhere flooring to substrate by method approved by floor covering manufacturer.
- .6 Comply with flooring manufacturer's recommendations, including those for trowel notching, adhesive mixing, as well as working and adhesive open times.
- .7 Complete installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive, spreader marks or other surface imperfections.
- .8 Immediately after laying sheet goods into adhesive, roll sheet floor covering in both directions from centre out to embed covering in adhesive and eliminate trapped air.
- .9 At walls, doors and other locations where access by roller is impractical, press floor covering firmly in place with flat-bladed instrument or hand roller. Repeat after one hour.
- .10 Prepare seams and perform heat welding according to manufacturer's recommendations, to produce tightly fitted seams without gaps or overlaps.
- .11 Remove visible adhesive immediately after flooring installation.
- .12 Protect flooring until Substantial Completion.

### **3.4 PLANK TILE APPLICATION**

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install flooring to square grid pattern with all joints aligned with pattern grain parallel to width of room for all units.
- .4 As installation progresses, and after installation, roll flooring in 2 directions with minimum 45 kg roller to ensure full adhesion.
- .5 Cut tile and fit neatly around fixed objects.
- .6 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

- .7 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .8 Install edge strips at unprotected or exposed edges where flooring terminates.
- .9 Install continuous bead of clear silicone sealant at joint where flooring terminates against walls prior to installing rubber base.

### **3.5 FLASH COVE BASE APPLICATION**

- .1 After subfloor preparation, install vinyl cove stick and vinyl cap strip where sheet vinyl is to be coved up the wall.
- .2 Provide internal flash cove where shown on the drawings, to heights shown, including cove fillet support strip and cove edge cap trim. Pay attention to wall coverings details for transitions to flash cove.
- .3 Flash cove on wall surfaces that are sound, solid, smooth, dry, clean and free of foreign substances.
- .4 Apply contact adhesive to the wall and to the back of the flooring.
- .5 Allow adhesive to dry before making contact.
- .6 Roll the floor covering into place and trim as required, fir into cap strip and roll with a hand roller.
- .7 Fit internal corners net without any gaps.
- .8 Make external corners by a butterfly piece fitted net without any gaps.
- .9 Seam groove and heat weld corners when adhesive has set.

### **3.6 BASE APPLICATION**

- .1 Lay out base to keep number of joints at minimum. Base joints at maximum length available and 1 200 mm minimum away from corners.
- .2 Use manufacturer recommended Cove Base Adhesive. Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions.
- .7 Cope internal corners. Wrap around for right angle external corners.

### **3.7 CLEANING**

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

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**3.8 PROTECTION**

- .1 Protect materials from time of final set of adhesive until final inspection.

**3.9 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

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**1.1 RELATED SECTIONS**

- .1 Structural drawings: Cast-in-Place Concrete.
- .2 Section 04 22 00: Concrete Unit Masonry.
- .3 Section 05 50 00: Metal Fabrications.
- .4 Section 06 10 00: Rough Carpentry.
- .5 Section 07 46 23: Wood Siding.
- .6 Section 07 46 46: Fibre reinforced Cementitious Panels.
- .7 Section 07 72 23: Roof Hatch.
- .8 Section 06 20 00: Finish Carpentry.
- .9 Section 08 11 00: Metal Doors and Frames.
- .10 Section 08 14 00: Wood Doors.
- .11 Section 09 21 16: Gypsum Board.
- .12 Section 09 25 13: Stucco.

**1.2 WORK INCLUDED**

- .1 Provide labour, materials, services and equipment necessary to complete the Work as indicated in this Section and the drawings. Colour Schedule will be provided by the Consultant prior to commencement of the Work.
- .2 Finish surfaces as indicated in Schedules in this Section.
- .3 Preparation of surfaces to receive paint finishes in accordance with MPI requirements.
- .4 If in doubt of any area to receive paint finish, request clarification from Consultant prior to Submission of Bids. Typically all new finish materials and walls where infill or alterations take place are to be painted.

**1.3 QUALITY ASSURANCE**

- .1 Acceptable materials, workmanship and all items affecting the Work of this Section are to be in accordance with the Master Painter's Institute "Architectural Painting Specification Manual", (MPI) latest edition, and Master Painters and Decorators Association of B.C. "Maintenance and Repainting Specification Manual", latest edition.
- .2 Use paint manufacturers and products listed under the latest issue of Approved Products List section of the MPI Painting Manual.
- .3 Provide a copy of the above Manuals on site during the performance of painting work.
- .4 Painting firm to have a minimum of five years experience and employ only qualified journeymen and apprentices on site. Apprentices to work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .5 All painting and decorating work to be inspected by a Paint Inspection Agency acceptable to the Consultant and the local MPI Accredited Quality Assurance Association. The painting contractor shall notify the Paint Inspection Agency a minimum of one week prior

to commencement of work and provide a copy of the project painting specification, plans and elevation drawings, including pertinent details, as well as a Finish schedule.

- .6 All surfaces requiring painting to be inspected by the Paint Inspection Agency prior to commencement of painting work or after the prime coat shows defects in the substrate. Paint Inspection Agency to notify the Consultant and Construction Manager in writing of any defects or problems.
- .7 The painting contractor shall receive written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator or supplier to ascertain appropriate and manufacture compatible finish coat materials to be used before painting any such work.

#### **1.4 SUBMITTALS**

- .1 Submit list of all painting materials to the Consultant for review prior to ordering materials.
- .2 Submit two sets of Material Safety Data Sheets for review and for posting at job site prior to commencement of work.
- .3 Submit work schedule to the Consultant for Owners approval when requested or required during painting of occupied areas.
- .4 Submit a list of all products and colours used on the project for inclusion in the Maintenance Manual. List products in relation to finish system and include the following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour number(s).
  - .4 MPI Environmentally Friendly classification system rating.
  - .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .5 Steel fabricator to provide certification that the specified surface preparation and priming has been performed utilizing the appropriate MPI approved primer.

#### **1.5 SAMPLES**

- .1 The Consultant will select all required colours and provide a set of colour chips with Colour Schedule.
- .2 Match finished work to samples provided.
- .3 Repaint any work not matching samples provided.
- .4 When requested by the Consultant prepare and paint designated surface, room or item in selected colours with paint or coating illustrating selected colours, gloss/sheen, textures and workmanship to Master Painter's Institute Architectural Painting Specification Manual standards for review and approval. When approved, surface, area, room and items will become the acceptable standard of finish quality and workmanship for similar on-site work.

#### **1.6 DELIVERY AND STORAGE**

- .1 Deliver materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, colour designation and instructions for mixing and reducing.
- .2 Provide all precautionary measures to prevent fire hazards and spontaneous combustion. Store in accordance with requirements of Master Painter's Institute Manual.

ISSUED FOR CONSTRUCTION JUNE 25, 2018

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**1.7 PROJECT CONDITIONS**

- .1 Minimum 5 degrees C surface temperature or surrounding air temperature required to apply alkylid finishes. Minimum 7 degrees C surface and air temperature for interior latex painting. Minimum 10 degrees C surface and air temperature for exterior work.
- .2 Provide adequate 24 hour ventilation and heating facilities to maintain temperatures above 7 degrees C for 24 hours before, during and after application of finishes.
- .3 Provide minimum 270 lx lighting level on surfaces to be finished.
- .4 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.
- .5 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- .6 Painting in occupied facilities to be carried out during silent hours only. Schedule operations to approval of Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.
- .7 Schedule painting operations to prevent disruption of occupants in and about the building.
- .8 Ventilate areas being painted to the outdoors to prevent paint odours from being dispersed throughout the building.

**1.8 PROTECTION**

- .1 Protect other surfaces from paint and damage. Make good damage resulting from inadequate protection.
- .2 Fire Safety Requirements
  - .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .3 Remove all electrical plates, surface hardware, fittings and fastenings prior to painting. Store, clean and replace removed items on completion of the Work in each area. Do not clean hardware with solvent.

**1.9 GUARANTEE**

- .1 Furnish a British Columbia Canadian Painting Contractors Association two year Guarantee, or a 100% Two Year Maintenance Bond on completion of the Work. The Guarantee or Maintenance Bond will warrant that the Work has been performed in accordance with the standards and requirements of the latest edition of the Canadian Painting Contractors Association Architectural Painting Specification Manual.
- .2 The Work will be inspected by an independent inspector acceptable to the Consultant and to the British Columbia Painting and Decorators Association. The appointed inspector will be responsible to the Consultant.
- .3 Include the cost of the Guarantee or Maintenance Bond and Inspection in the Contract Price of this Section.

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- .4 If using a Maintenance Bond guarantee supply to the Contractor a facsimile of the Bond to be used with tender, include written proof of ability to furnish Maintenance Bond.
- .5 The guarantee will cover making good any defects in work of this trade due to faulty workmanship or defective materials which appear during the two year period following certified date of substantial performance of the Work.
- .6 Submit consent of surety with Bid Submission as proof of ability to supply a 100% two year Maintenance Bond if a Master Painter's Institute Accredited Quality Assurance Association's Guarantee option is not used.

#### **1.10 MAINTENANCE MATERIALS**

- .1 Submit maintenance materials in accordance with Section 01 77 00 –Closeout Submittals.
- .2 Submit one - four litre full, unopened can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Owner, obtain receipt for delivered material and store where directed.

#### **1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.,) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:
  - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
  - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .7 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection for verifiable re-use or re-manufacturing.
- .8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.



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**2 Products**

**2.1 ENVIRONMENTAL REQUIREMENTS**

- .1 For exterior – overall duty cycle performance of paint products will take precedence over paint material VOC content levels.
- .2 For interior – only LOW odour, LOW VOC, of MIN E3 MPI rating are acceptable, subject to Consultant's approval.

**2.2 MATERIALS**

- .1 Paint, varnish, stain, enamel, lacquer and fillers of type specified for specific uses and as listed in the "Approved Products List – latest edition" and indicated by code numbers referred to in the Master Painter Institute Architectural Specification Manual, latest edition.
- .2 Only qualified products with LEED rating are acceptable for use on this project, subject to duty cycle performance.
  - .1 All paint materials must be rated under Environmental Notation System (ENS) with acceptable VOC ranges as listed in the MPI Approved Product List under "E" ranges.
  - .2 All materials must be lead and mercury free.
  - .3 Where required use only materials having a minimum MPI Environmentally Friendly E3 rating based on VOC (EPA Method 24) content levels.
- .3 Paint materials for each coating formula to be products manufactured by approved manufacturers.
- .4 Paint materials without manufacturer's label will not be allowed.
- .5 Apply paint materials in accordance with manufacturer's directions.
- .6 Paint materials to have good flowing and brushing properties and dry free from blemishes.
- .7 Use ready-mixed and pre-tinted paint. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment and colour and gloss uniformity. Do not exceed paint manufacturer's recommendations for thinner use.
- .8 All painting work to be in accordance with MPI Premium Grade finish requirements.

**2.3 MIXING AND TINTING**

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

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

## **2.4 GLOSS/SHEEN RATINGS**

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

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

- .2 Gloss level ratings of painted surfaces as specified herein and/or as noted on Finish Schedule.

## **3 Execution**

### **3.1 EXAMINATION**

- .1 The appointed Inspector will inspect all surfaces to be painted in conjunction with the painting subcontractor.
- .2 Investigate moisture content of surfaces to be painted and report findings to Consultant. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer. Commencing work indicates acceptance of the surfaces and job conditions.
- .3 Maximum moisture content as follows:
- .1 Plaster and wallboard: 12%.
  - .2 Masonry/Concrete: 12%.
  - .3 Concrete Block/Brick: 12%.
  - .4 Wood: 15%.

### **3.2 PREPARATION OF SURFACES**

- .1 Prepare new and existing surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to the MPI Manual in regard to specific requirements for the following:
- .1 environmental conditions
  - .2 pH testing
  - .3 acid etching
  - .4 rust stain removal
  - .5 asphalt surfaces
  - .6 vertical and horizontal concrete surfaces

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- .7 brick unit masonry
  - .8 structural steel and metal fabrications
  - .9 galvanized and zinc coated metal
  - .10 aluminum and copper surfaces
  - .11 dimension and dressed lumber
  - .12 wood doors
  - .13 wood paneling and casework
  - .14 gypsum board
  - .15 canvas and cotton coverings
  - .16 bituminous coated surfaces
- 
- .2 Protect all adjacent surfaces and areas from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
  - .3 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
  - .4 Inspect all surfaces prior to painting; finish painting of defective surfaces indicates acceptance of substrate and any costs of making good will be borne by this Section, including re-painting of entire defective surface.
  - .5 Exterior and interior scheduled painted steel to receive a minimum of SSPC SP-6 commercial blast surface preparation and application of MPI system primer at point of origin.

### **3.3 APPLICATION**

- .1 Method of application to be the accepted trade method. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush application.
  - .1 Work paint into cracks, crevices and corners. Paint surfaces not accessible to brushes by spray, daubers or sheepskins.
  - .2 Brush out runs and sags.
  - .3 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application.
  - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
  - .4 Brush out immediately all runs and sags.
  - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by the Inspection Agency.
- .5 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Perform all colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials allowed only with Consultant's written permission.

- .7 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .8 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .9 Sand and dust between each coat to remove visible defects.
- .10 Apply a minimum of four coats of paint where deep or bright colours are to be used to achieve satisfactory results.

### **3.4 MECHANICAL AND ELECTRICAL**

- .1 Do all painting, banding, stenciling identification and labeling of other surfaces and equipment to colours and finishes indicated in Division 15.
- .2 Unless otherwise noted, paint all unfinished conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, in the following areas:
  - .1 Where exposed to view in all exterior and interior areas.
  - .2 In all interior high humidity areas.
  - .3 In all boiler room, mechanical and electrical rooms.
- .3 In unfinished areas leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks. Do not paint over nameplates.
- .4 Paint inside of ductwork where visible behind louvres, grilles and diffusers beyond sight line with primer and one coat of dull black paint. Paint inside of light valances gloss white.
- .5 Paint interior and exterior grilles, hoods, fans, and piping not factory finished.

### **3.5 RESTORATION AND TOUCH UP**

- .1 Clean and re-install all hardware items that were removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

### **3.6 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this section.
- .2 Remove combustible rubbish materials and empty cans each day. Dispose in accordance with requirements of authorities having jurisdiction.

- .3 Dispose of waste materials in conformance with Construction Waste Management Plan.

**3.7 PAINTING SCHEDULE**

.1 Exterior Surfaces

.1 Asphalt Surfaces, Concrete slabs

EXT 2.1A Install according to manufacturer's recommendations to a dry film thickness of 7 mils.

Warning markings 100 mm wide yellow

.2 Cementitious Composition Board

EXT 3.3K High Performance Architectural Latex over w.b. alkali resistant primer

.3 Structural Steel and Metal Fabrications

EXT 5.1D Premium Grade – gloss level 5

.4 Galvanized Metal

EXT 5.3B Premium Grade – gloss level 5

.5 Wood Beams, Wood Siding

EXT 6.2H Premium Grade Polyurethane Clear, 2 component (over stain)

MPI product 13, colour to later selection by Consultant.

1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> coats – site applied – MPI product 78.

.6 Dressed Lumber

EXT 6.3K Premium Grade Solid Colour Stain, W.B. over alkyd primer

.7 Stucco

EXT 9.1K Premium Grade High Performance Architectural Latex over w.b. alkali resistant primer

.2 Interior Surfaces

.1 Concrete Masonry Units

INT 4.2D Premium Grade High Performance Architectural Latex Premium Grade – gloss level 5

.2 Galvanized Metal not chromate passivated

INT 5.3A Premium Grade – gloss level; 2 - low contact, 5 - high contact

.3 Structural Steel and Metal Fabrications

INT 5.1R Modified Premium Grade - gloss level 5

INT 5.1S MPI#107 water based Anti-corrosive primer

MPI#141 High Performance Latex topcoat

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- .4      Pressed Steel Door Frames and Doors  
         INT 5.3M High Performance Architectural Latex – Premium Grade gloss level 4
- .5      Dressed Lumber - painted  
         INT 6.3A Premium Grade – gloss level 4
- .6      Dressed Lumber - stained  
         INT 6.3EE Premium Grade
- .7      Wood Paneling  
         INT 6.4Q Fire Retardant, Clear, S.B.
- .8      Gypsum Board  
         INT 9.2 B Premium Grade Gloss level 3 – walls Gloss level 3 – ceilings  
         INT 9.2F Epoxy, W.B. (Tile Like) Premium Grade

**3.8            COLOUR SCHEDULE**

- .1      P1: Benjamin Moore      OC-130 Cloud White, gloss level 3; ceilings and bulkheads.
- .2      P2: Benjamin Moore      OC-131 White Down, gloss level 3; general wall colour.
- .3      P3: Benjamin Moore      HC-116 Guilford Green, gloss level 3; accent wall colour.
- .4      P4: Benjamin Moore      HC-25 Quincy Tan, gloss level 4; metal doors and frames.

**END OF SECTION**

**PART 1        General**

**1.1            RELATED SECTIONS**

- .1        Section 06 10 00: Rough Carpentry.
- .2        Section 09 22 16: Gypsum Board.
- .3        Section 09 65 16: Resilient Flooring.

**1.2            REFERENCES**

- .1        CAN/ULC S102, Test for Surface Burning characteristics of Building Materials and Assemblies.
- .2        CAN/ULC S102.2, Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

**1.3            SUBMITTALS**

- .2        Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- .3        Indicate, by large scale details, all materials, finishes, dimensions, anchorage and assembly.
- .4        Submit manufacturer's product data in accordance with Section 01 33 00 – Submittals. Include flame spread and smoke developed testing according to CAN/ULC S102/S102.2 as applicable.
- .5        Submit samples in accordance with Section 01 33 00 - Submittals.
- .6        Submit duplicate 300 mm long samples of profiles and colours for corner guards, wall and door protection.

**1.4            WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2        Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3        Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

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**PART 2      Products**

**2.1            MATERIALS**

- .1      WP1: Wall Protection: Construction Specialties Acrovyn, suede texture, 1.02 mm thick.
  - .1          Colours: Selected by Consultant.
- .2      WP2: Corner Guards: Surface mounted, 90 degree 6 mm radiused cover over continuous PETG retainer, 76 mm returns, colour matched end caps. Refer to drawings for heights.
  - .1          Acceptable product, Construction Specialties Acrovyn SM-20N or acceptable substitution.
  - .1          Colour: 305 Mushroom.
- .3      WP3: Handrail: 142.7 mm high Acrovyn handrail/bumper guard with quick lock mounting system. Colour matched corners and ends.
  - .1          Acceptable product, Construction Specialties Acrovyn HRB-20N or acceptable substitution.
  - .1          Colour: 305 Mushroom.
- .4      WP4: Crash Rail: 127 mm high Acrovyn, continuous aluminum retainer. Colour matched ends.
  - .1          Acceptable product, Construction Specialties Acrovyn SCR-50N or acceptable substitution.
  - .1          Colour: 305 Mushroom.
- .5      WP5: Door Protection: Construction Specialties Acrovyn 4000, 1.02 mm thick.
  - .1          Colour: 305 Mushroom.

**PART 3      Execution**

**3.1            PREPARATION**

- .1      Ensure temperature at installation is between 18°C and 24°C and below 80% relative humidity. Maintain installation temperature after installation to ensure adhesive cure and minimize shrinkage/expansion.
- .2      Allow materials to acclimatize to room temperature for minimum 24 hours prior to installation. Break down wall protection sheets into stacks of maximum 25 sheets.

**3.2            INSTALLATION**

- .1      Comply with manufacturer's installation procedures for surface preparation and installation.
- .2      Remove protective wrapping.
- .3      Install units on solid backing and erect with materials and components straight, level and plumb, tight and in alignment.



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**3.3 CLEAN UP**

- .1 Upon completion of installation, clean protection products and accessories in accordance with manufacturer's recommended cleaning methods.
- .2 Remove surplus materials, rubbish and debris from installation as work progresses and upon completion of work.
- .3 Dispose of waste material in conformance with Construction Waste Management Plan.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 09 21 16: Gypsum Board.
- .3 Section 09 22 16: Non-Structural Metal Framing.
- .4 Mechanical.
- .5 Electrical

**1.2 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittals.
- .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame.

**1.3 CLOSEOUT SUBMITTALS**

- .1 Provide product, operation and maintenance data for toilet and bath accessories for incorporation into Maintenance Manual.

**1.4 DELIVERY AND PROTECTION**

- .1 Deliver materials in original, unopened, labeled manufacturer's packaging.
- .2 Protect items stored on site from damage.
- .3 Protect items installed from damage until date of substantial completion.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

**2 Products**

**2.1 MATERIALS**

- .1 Stainless steel sheet metal: to ASTM A167, Type 304, with satin finish.
- .2 Fasteners: concealed screws and bolts hot dip galvanized or stainless steel, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use. Use through bolts on toilet partitions.
- .3 Selected items are based on Bobrick; substitution of similar models from Bradley, A & J Washroom Accessories, ASI/Watrous acceptable.

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**2.2 ACCESSORIES**

- .1 WA1: Electric Hand Dryer: Bobrick B-7120.
- .2 WB1: Coat Hook: Bobrick B-670.
- .3 WC1: Soap Dispenser – Wall mounted: Bobrick B818615.
- .4 WC2: Soap Dispenser – Counter mounted: Bobrick B-8221.
- .4 WC3: Hand Sanitizer: Supplied by Owner, Install by Contractor.
- .5 WD1: Paper Towel Dispenser - Roll: Bobrick B-2860.
- .6 WE1: Sanitary Napkin Disposal: Bobrick B-270.
- .7 WE3: Toilet Tissue Dispenser w/Shelf: Bobrick B-2892.
- .8 WG1: Mirror: Bobrick B-290 2436
- .9 WH1: Grab Bar: Bobrick B-816723.
- .10 WH2: Grab Bar: Pair 300 mm Bobrick B-6806.

**3 Execution**

**3.1 INSTALLATION**

- .1 Install and secure accessories rigidly in place as follows:
  - .1 Solid masonry or concrete: use bolt with lead expansion sleeve set into drilled hole.
  - .2 Frame walls: fasten into solid blocking provided within stud space.
- .2 Where washroom accessories penetrate a fire rated assembly, maintain integrity of rated assembly by installing 16 fire rated gypsum board in complete recess.
- .3 Install washroom accessories according to manufacturer's written instructions to recommended of indicated locations. Use tamper proof screws/bolts for fasteners.
- .4 Fill units with necessary supplies shortly before final acceptance of building.
- .5 Clean units of all finger prints, tape and markings. Clean and polish glass mirror.

**3.2 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

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**1 General**

**1.1 SUMMARY**

- .1 This specification provides performance based information sufficient for pre-qualified specialty manufacturers to custom design and engineer a roof and building mounted safety tie-back and lifeline anchor system incorporating fall arrest and fall restraint safety systems, and shall encompass specialty systems for the following conditions:
  - .1 Exterior mounted maintenance equipment supports.
    - .1 Rooftop Maintenance Equipment Operations.
  - .2 Manufacturers are required to provide complete engineering for fall arrest and restraint anchors, equipment supports; and provide required engineering information to the Consultant to enable complete design of building structures and reinforcements not forming a part of the scope of work for this Section.
  - .3 Manufacturers are required to provide commissioning documentation for the fall arrest and restraint devices, and exterior building maintenance supports to the Owners.
  - .4 This section only includes requirements for systems permanently attached to the building; it does not include items such as safety harnesses, travel restraint harnesses, bosun's chairs, moveable building maintenance or window washing platforms.

**1.2 RELATED SECTIONS**

- .1 Section 05 50 00: Metal Fabrications.
- .2 Section 06 10 00: Rough Carpentry.
- .3 Section 07 52 00: Modified Bituminous Roofing.
- .4 Section 07 61 13: Sheet Metal Roofing.
- .5 Section 07 62 00: Metal Flashing and Trim.

**1.3 REGULATORY REQUIREMENTS**

- .1 Conform to Provincial Occupational Health and Safety Regulations for Fall Protection.
- .2 Conform with additional requirements of CAN/CSA -Z91 and CAN/CSA-Z271 for standards relating to requirements of this Section, Provincial OH&S Regulations will supersede CAN/CSA standards.

**1.4 REFERENCES**

- .1 Roofing Contractors' Association (RCA) Roofing Contractors Association of British Columbia (RCABC):
  - .1 Roofing Contractor's Association of British Columbia (RCABC) Roofing Practices Manual.
- .2 American National Standards Institute ([ANSI](#)):
  - .1 ANSI A14.3-1992, Safety Requirements for Fixed Ladders.

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- .3 Canadian Standards Association ([CSA](#)):
- .1 CSA-G40.20-04, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CSA-G40.21-04, Structural Quality Steel.
  - .3 CAN/CSA-G164-M92 (R2003), Galvanizing, Hot Dip of Irregularly Shaped Articles.
  - .4 CAN/CSA-S16-01, Limit States Design of Steel Structures.
  - .5 CAN/CSA-S136-01, Cold formed steel Structural Members.
  - .6 CSA-S157-05, Strength Design in Aluminum.
  - .7 Can/CSA-Z271-98 (R2004), Safety code for Suspended Elevating Platforms.
  - .8 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
  - .9 CSA W47.2-M1987 (R2003), Aluminum Welding Qualification Code.
  - .10 CSA W59-03(2008), Welded Steel Construction (Metal Arc Welding).
- .4 WorkSafe British Columbia Occupational Health and Safety Reg. 296/97 as amended by 185/99, General Hazard Requirements, Parts 11 (Fall Protection) and 13 (Ladders, Scaffolds and Temporary Work Platforms).
- .5 Occupational Safety and Health Act (OSHA), OSHA Part 1910, paragraph 1910.66, Power Platforms for Building Maintenance.
- .6 International Window Cleaners Association (IWCA), ANSI 1-14.1, Window Cleaning Safety 2001.
- .7 Electrical Code and JIC Standards of Canada.
- .8 British Columbia Building Code 2012.

## **1.5 QUALIFICATIONS**

- .1 Manufacturer shall be a company specializing in the design and installation of permanent safety tie-back and life-line anchor, horizontal life-line systems, for exterior maintenance and window washing equipment systems and having a minimum of five (5) years of experience.
- .2 Manufacturer shall provide \$5,000,000.00 of specific product liability insurance for all aspects of their installation, design, and failure of the safety anchors and their installation.
- .3 Installing Subcontractors, if different than fabricator, shall have completed welding work similar in material, design, and extent to that indicated for this Project; with a record of successful in service performance; having welders certified by CWB for classification of work being performed; and having the same certifications as required by CSA and CWB for the fabricator and manufacturer.

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**1.6 DELEGATED DESIGN REQUIREMENTS**

- .1 Engineer and design a building maintenance system, fall protection and fall restraint systems sufficient for gaining access to exterior and interior vertical building surfaces that meets the requirements of the Provincial Occupational and Health Regulation, and as follows:
- .2 Fall Arrest and Fall Restraint System: Roof top maintenance system permitting free movement of persons over roof areas as required by CAN/CSA-Z91, and other standards referenced in 1.3 above; where differences occur, conform to the more restrictive requirement.
- .3 Rooftop Anchors: As instructed by manufacture in layout and design acceptable to Consultant.
- .4 Travel Restraint Systems: Design for one worker per system, and having an ultimate load capacity of a minimum 22.2 kN (5,000 lb-force) in any direction that a load may be applied.
- .5 Fall Arrest System: Design for one person, without shock absorber and capable of supporting a minimum of 22.2 kN (5,000 lb-force) per worker attached.
- .6 Horizontal Lifeline Systems: Design for a permanent horizontal cable lifeline system; base design on specific load requirements for this Project.
- .7 Structural connections to roof deck and additional reinforcement as required to prevent damage to roof deck; submit load requirements to the Consultant for their use in design the primary structures.
- .8 Delegated design engineer shall design and verify the installed system, any modification or additional anchor requirements, devices, and equipment required to complete the rooftop maintenance system.

**1.7 SUBMITTALS**

- .1 Submit design and anchor loadings to the Consultant within ten (10) days of award of this contract, so that primary structural support system design can be completed.
- .2 Submit following items in accordance with Section 01 33 00 – Submittals:
  - .1 Provide Work Plan Drawings showing individual primary suspension line and safety life line anchors used for window washing equipment and personnel.
  - .2 Provide shop drawings using CISC standard drafting practices; detailing fabrication of steel components including, but not limited to, the following:
    - .1 Indicate complete layout and configuration of system, locations, and all other components and accessories.
    - .2 Indicate design, fabrication details, plans, elevations, hardware and installation details, including details of cuts, connections, splices, camber, holes, and other pertinent data.
    - .3 Show interface with adjacent materials.

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- .4 Show locations of maintenance equipment and fall arrest anchors, configurations, dimensions, attachment details, and components required for complete system complying with provisions of this Section.
  - .5 Indicate methods of attachment to building structure.
  - .6 Seal and sign shop drawings by a professional engineer qualified in the province of the Work, and who was responsible for their preparation.
  - .7 Include restrictive and non-restrictive working usage notes and general safety requirements on shop drawings.
  - .8 Provide setting diagrams, templates, instructions and directions for installation of components supplied by this section to other Subcontractors, and necessary for the completion of work of this Section.
- .3 Submit Schedules of design and installation review signed and sealed by a qualified Professional Structural Engineer registered in the Province of British Columbia certifying that the anchors, layout and installation meet or exceed the requirements of WorkSafeBC/ Workers Compensation Board of B. C.
  - .4 Submit reduced plastic laminated or Plexiglas mounted as-built roof plan drawing indicating layout and location of anchors and tie-offs, and safe works and usage requirements that will be posted near roof access points in sufficient quantities for each access point to the roof or equipment access locations.
  - .5 Submit the following for inclusion in operations and maintenance manuals specified in Section 01 77 00 – Operations and Maintenance Data Manual:
    - .1 Special procedures, work plan drawings, and conditions requiring maintenance during the operational stage for materials specified in this Section.
    - .2 Safety Inspection Log Books required for yearly inspections.
    - .3 Provide on-site orientation and demonstration to Owner's key personnel, and suggestions for incorporating safe work practices into the Owner's Safe Work Practices Policy.
    - .4 List of accessory equipment, product data, and samples that can be used with the installed anchoring system; submittal does not imply purchase by Owner.

## **1.8 PREINSTALLATION CONFERENCE**

- .1 Arrange for pre-installation meeting with the Contractor, Consultant, manufacturer's representative, and affected Trade Contractors present.
- .2 Purpose of meeting is to discuss coordination issues, attachment requirements and use of fall restraints during the construction period.
- .3 Meet a minimum of six (6) weeks prior to beginning work of this Section, so that coordination issues affecting work of this section, or other Trade Contractors can be accounted for and corrected prior to any installation of materials.

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**1.9 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials on pallets with manufacturer's original protective packaging and identifying labels intact.
- .2 Store products in an area protected from and construction activities as designated by the prime contractor.

**1.10 COORDINATION**

- .1 Coordinate design of anchoring systems and maintenance equipment with the Consultant; provide anchoring and equipment loads acting on supporting structure in accordance with 1.7 above so that the primary structural system design can be completed.
- .2 Coordinate installation of materials of this section with Roofing Trade Contractor for sealing of membrane to anchors and flashing.

**1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused metal and wiring materials from landfill to metal recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

**2 Products**

**2.1 STEEL PLATE AND UPRIGHT MATERIALS**

- .1 Exposed Structural Units: Stainless steel, Type 304, 290 MPa, (42 ksi) yield strength. Single Insert: Cast stainless steel, Type 304.
- .2 Anchor pedestal to be Schedule 40 pipe, Hollow Structural Section and base plate assembly to be hot dipped galvanized.
- .3 Attachment Rings, and Other Hardware: In accordance with ASTM F887; drop forged or fabricated, 22.2 kN (5,000 lb-force) proof load.
- .4 Cast-in-Place Material: stainless steel type 304, 290 MPa yield strength.
- .5 Fasteners: Stainless steel type 304 or better, lock nut washers and hex nuts. Drilled anchor bolts, stainless steel type 304 inserts with HVA adhesive by Hilti Canada Ltd.
- .6 Galvanizing: Conforming to CSA-G164.
- .7 Mild Steel: Conforming to CSA-G40.21, Type W, yield strength 350 Mpa for HSS, yield strength 300 Mpa for plate and other sections.
- .8 Cold Rolled Steel: Conforming to CSA-S136, yield strength 380 Mpa, tensile strength 460 Mpa.
- .9 Welding Materials: in accordance with CSA-W59 by welders qualified to CSA-W47.1.



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.10 Acceptable manufacturer's:

- .1 Atlas Anchor Systems (B.C.) Ltd., and Pro-Bel Enterprises Ltd.
- .2 Manufacturers meeting or exceeding the requirements of this Section may apply to the Consultant prior to submission of bids for inclusion as an acceptable substitution.

**2.2 FLASHING AND SEALING MATERIALS**

- .1 Stainless Steel Flashing Cap: Pre-finished sheet stainless steel.
- .2 Joint Sealants: Non-skinning butyl sealant where not exposed to ultra-violet or neutral curing silicone sealant where exposed and as applicable to installation. Acceptable sealant is to be used for this type of installation.

**2.3 FABRICATION**

- .1 Connections: Weld and grind smooth in accordance with CWB requirements.
- .2 Fabricate engineered window washing/fall restraint and fall arrest system suitable for roof and deck mounting.
- .3 Size uprights for a minimum 203 mm (8") exposure above roof membrane in accordance with [RCABC] good roofing practices.
- .4 Fabricate seamless flashings where metal pier anchors are to be used.
- .5 Use a one piece stainless steel cap at top of pier anchors.

**2.4 FINISHES**

- .1 Anchors Fabricated from Mild Steel Pipe and Mild Steel Base Plates:
  - .1 Mild Steel Components: Hot-dip galvanize after fabrication, as follows:
    - .1 Pipe: ASTM A53.
    - .2 Stainless Steel Components: Manufacturer's standard.
  - .2 Galvanizing Repair Compound: zinc cold galvanizing compound in accordance with ASTM A780; field touch-up damaged galvanizing surface finishes with galvanizing repair compound.

**3 Execution**

**3.1 EXAMINATION**

- .1 Verify conditions as satisfactory to receive work of this Section.
- .2 Beginning work constitutes acceptance of existing conditions.
- .3 Verify layout of roof fall arrest anchors and that structural connections are suitable for work of this Section.

**3.2 PREPARATION**

- .1 Supervise and assist in setting of anchorage devices required for installation of work of this Section, but which do not form a part of the work of this Section.

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**3.3 INSTALLATION**

- .1 Install building maintenance system and safety anchors in accordance with manufacturer's written instructions and provisions of the Contract Documents, under the supervision of qualified Professional Structural Engineer registered in the Province of British Columbia and employed by manufacturer.
- .2 The manufacturer's engineer shall coordinate their activities with, and notify the Consultant where conflicts arise, or where site conditions require a modification to the engineered design indicated on the shop drawings.

**3.4 FIELD QUALITY CONTROL**

- .1 Provide field review by manufacturer in accordance with Section 01400 – Quality Control, and as follows:
  - .1 Provide field inspection and testing upon completion by manufacturer's technical representative.
  - .2 Note deficiencies and promptly make written report to Contractor, Owner and Consultant.
  - .3 Issue Letter of Compliance and certifications of system issued by a qualified professional engineer registered in the province of the Work.
  - .4 Complete inspection log book to certify the system for use; turn-over to Owner's representative.
  - .5 The Owner will require a complete commissioning of the fall arrest and restraint system, and window washing and equipment supports in accordance with the Owners commissioning plan.

**3.5 ADJUSTING**

- .1 Repair or replace defective installations not conforming to provisions of Contract Documents.

**3.6 TRAINING OF OWNER'S PERSONNEL**

- .1 Notify Owner of attachments, harnesses, equipment and personal safety items, not forming a part of the permanent installation specified in this Section, but which are required for a properly executed roof safety and rooftop maintenance system.

**3.7 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

**END OF SECTION**

## **1.0 CONTRACT DOCUMENTS**

### **1.1 GENERAL**

- .1 Prior to submitting a proposal the Bidder is to examine the following documents which will become part of the contract:
- .2 Bidding and Contract Requirements and Division 1 – General Requirements
- .3 Foodservice Equipment Specifications including:
  - .1 General Conditions
  - .2 Products
  - .3 Itemized Equipment Specifications including details
- .4 Foodservice Equipment Drawings
  - .1 Equipment Layout(s), Notes and Details, Architectural Requirements, Electrical Services, Mechanical Services & Load Data Schedule
- .5 Itemized Equipment Bid List and Summary
- .6 The General Conditions will be deemed to be part of the Contract Documents and are to be read in conjunction with said documents.
- .7 No delay and/or claims for extra expense on the part of the Foodservice Equipment Contractor (FEC), or their subcontractors, will be accepted for non-compliance with this section.
- .8 All contract documents of all trades for this Project are complementary and the FEC is to be familiar with all related documents.
- .9 The most recently issued documents take precedent over previous issues of the same or similar documents.
- .10 Project is LEED Gold level - FEC is to be familiar with all related documents

### **1.2 CERTIFICATES AND LETTERS OF ASSURANCE**

- .1 Bidders are to provide a Certificate for Seismic Restraint compliance.
  - .1 Letters of Assurance and Certificate for Seismic Restraint compliance are to be supplied from the applicable engineer, and to state that the installation and design meet all local, provincial, and federal relevant codes.
    - .1 Submitted shop drawings are to note that equipment conforms to Seismic Restraint guidelines. FEC to ensure applicable shop drawings are signed and sealed by the appropriate certifying engineer.
  - .2 Bidders are to use jurisdiction latest applicable form where required
  - .3 Bidders are to allow for cost to obtain such Certificate for Seismic Restraint compliance within Pricing.

### **1.3 n/a**

### **1.4 n/a**

### **1.5 ALTERNATES**

- .1 Bidders are to submit Bids based on the equipment, materials, and components as specified in the specifications and drawings.

- .2 Trade names and drawings used in the specification are for the purpose of showing size, construction, material, finish, and operation of the equipment required.
- .3 The following terms are utilized:
  - .1 "Approved Equal/Equivalent," which specifies that other manufacturers listed shall conform to all specific features of the prime specification
  - .2 "Approved Alternate", an open ended specification where two or more manufacturers produce comparable quality and function products, with little or no utility, installation or performance modifications required. Alternates are to have equivalent accessories as the first line specified item.
- .4 Bidders are required to apply per the bid submittal section, before the Closing Date, in writing to the Architect, for the approval of alternate equipment to the specification.
  - .1 Full data and brochures, are to be submitted on alternates offered.
  - .2 The Owner/Consultant reserves the right to accept or reject any proposed alternate without explanation. The Consultant shall be the sole judge of the quality and acceptability of the alternate offered.
- .5 Approval of an alternate applies to this project only. If materials or equipment of lesser value than those specified are substituted without written permission from the Owner/Consultant they shall be removed and replaced with the materials or equipment specified at the Bidders expense.
- .6 The Bidder is to bear all additional costs incurred due to dimensional or field utility changes incurred as a result of the acceptance of alternates.
- .7 All costs to revise services, rough-ins, existing site conditions for equipment that noted as an approved equivalent that the FEC elects to use are to be borne by the FEC

## **1.6 SPECIFICATIONS**

- .1 For the convenience of administration the Specifications have been divided into an Itemized Equipment Section, this in no way relieves neither the FEC nor any of their subcontractors or suppliers of their responsibility.

## **1.7 DIMENSIONS**

- .1 The FEC is to verify any and all dimensions shown on and noted in the Contract Documents with specified equipment and the site. FEC will be held responsible for any errors resulting from their failure to exercise such precautions.
- .2 The FEC is to verify any and all dimensions of existing works or structures from actual work or structure prior to ordering material, equipment or supplies. FEC will be held responsible for any errors resulting from their failure to exercise such precautions.

## **1.8 SITE CONDITIONS**

- .1 Visit the site and become fully informed of any and all existing site conditions.
- .2 Notify the Consultant, Owner and the Construction Manager in writing if it is in the FEC's opinion that the site is not adequate to ensure proper installation and protection of the equipment. Notification to be in writing with sufficient time to correct measures, by others, to meet the installation schedule.

## 2.0 ABBREVIATIONS

### 2.1 GENERAL

- .1 The following is a list terms and their commonly used abbreviations used throughout these Contract Documents:

Above finished floor	AFF	Fiberglass Reinforced Panel	FRP
American Iron and Steel Institute	AISI	Foodservice Equipment Contractor	FEC
American National Standards Institute	ANSI	gauge	ga.
American Society for Testing and Materials	ASTM	Inside diameter	I.D.
American Society of Heating, Refrig. & Air Conditioning Eng.	ASHRAE	kilowatt	kW
American Society for Mechanical Eng.	ASME	Mechanical Contractor	MC
American Woodwork Manufacturers Assoc. of Canada	AWMAC	millimetre	mm
Association	Assoc.	National Fire Protection Assoc.	NFPA
British thermal unit	BTU	National Sanitation Foundation	NSF
BTU per hour	BTUH	Not applicable	N/A
Canadian Gas Association	CGA	Not in contract	N.I.C.
Canadian Electrical Manufacturers Association	CEMA	Not to scale	N.T.S.
Canadian Standards Association.	CSA	phase	ph
complete with	c/w	Plumbing Contractor	PC
degrees Celsius	°C	Poly vinyl chloride	PVC
diameter	Dia.	Refrigeration	Ref. or refrig.
Electrical Contractor	EC	Typical	typ.
		Underwriter's Laboratories	UL
		Underwriter's Laboratories of Canada	ULC
		volts	v

## 3.0 SCOPE OF WORK

### 3.1 GENERAL

- .1 Provide and perform all labor, materials, tools, plant, crating and uncrating, delivery, distribution, assembly and set-in-place necessary for the supply, installation, and completion of all the foodservice equipment in strict accordance with the Contract Documents and local codes including, that which is reasonably inferred. Equipment to be supplied, assembled and set-in place ready for final connection by the Electrical and Mechanical trades. FEC to clean, test and demonstrate the equipment following the completion of all connections. No extra charge will be allowed for items or situations that the FEC should have been familiar.
- .2 Ensure satisfactory delivery, installation and operation of equipment.

- .3 Provide and assume responsibility for the construction safety at the Project Site and for compliance with the rules, regulations and practices required by the authorities have jurisdiction.
- .4 Supervise and provide required instructions for work to be performed by other contractors in connection with requirements for all equipment under this section.
  - .1 Coordinate all Work with that of other Trades, including the monitoring of the electrical and mechanical service connections.
- .5 Deliver equipment to the site pre-assembled with fittings pre-installed where possible, except when limited by size and transportation.
  - .1 Coordinate with the applicable trades for the separate installation date of the hood(s) and walk-in boxes.
- .6 Equipment located against a wall or column is to be installed tight to same and sealed with silicone sealer or stainless steel filler strips. If building components prohibit locating equipment tight to wall provide stainless steel fill strips to close up openings around top, sides and base
- .7 Confirm all sizes shown with Owner supplied equipment, i.e. trays, bun pans, insert pans. No extra will be allowed for a change in the size from those noted.
- .8 Provide service access areas on custom equipment requiring electrical or mechanical work, with access to common point connection points.
- .9 Provide all inserts, anchors, sleeves, bolts and similar items required to be attached or built into the building components to provide proper anchorage of equipment. Provide all necessary templates, instructions, direction and coordination of such items.
- .10 Test, clean and adjust all equipment as required to provide a first class condition facility in working order.
- .11 Do not supply any equipment to the site until the area in which it is required is completed and ready for equipment, or adequate secure storage is available, as coordinated by the Construction Manager.
- .12 Arrange and assist in demonstration of all factory demonstrations of all manufactured equipment.

### **3.2 CODES AND REGULATIONS**

- .1 All work and materials are to be in accordance with the latest rules, codes and regulations of agencies and/or authorities having jurisdiction.
- .2 The Contract Documents shall govern whenever they require larger sizes or higher standards that are required by regulations.
- .3 The regulations shall govern whenever the Contract Documents require something that will violate the regulations.
- .4 When seismic regulations are applicable, all equipment is to be fabricated and installed in accordance with those regulations. All seismic requirements are to be shown on all submittals. The FEC is to submit requested information to the agencies or authorities having jurisdiction.
- .5 No extra cost will be accepted for furnishing items required by the regulations, but not specified and/or shown on the drawings.
- .6 Rulings and interpretations of the authorities having jurisdiction are to be considered part of the regulations.
- .7 Refer to Division 01 74 19 for project waste management requirements

### **3.3 ELECTRICAL – BY FOODSERVICE EQUIPMENT CONTRACTOR**

- .1 Provide all equipment in this section complete in its operation, including internal wiring for equipment control panels, controls, junctions, cords and plugs, contactors and receptacles required by the specifications.
  - .1 All wiring and conduit to be pre-installed where specified so that only the connects, inter-connections and components listed in Work by Others and indicated on the applicable foodservice drawings are required to be performed by others on the site.
- .2 Provide electrical components in accordance with the components being used on the balance of the Project.
  - .1 Coordinate with the other trade for receptacles supplied and installed by them to ensure compatibility with specific plugs provided. FEC is responsible to make any changes necessary to cords and plugs for lack of such coordination.
- .3 For custom fabricated equipment the FEC is to coordinate with the applicable trade for access to service runs. The FEC is responsible to coordinate runs as to not interfere with the complete operation of the unit(s) and for the concealment of the service runs.
- .4 FEC to provide integral disconnect switches where noted.
- .5 FEC to coordinate interconnection wiring runs with EC.
- .6 FEC to provide and install adequate low water cut-off protection for electrically heated water tanks, pans, etc. as specified.
- .7 All machinery is to be isolated as required to prevent objectionable noises or vibrations.
- .8 On custom equipment where receptacles are shown to be supplied by the FEC, the FEC is to supply such, and set them integrally in place with conduit extended from the box to a position accessible by the EC.
- .9 Where custom equipment must be installed in more than one piece the FEC shall coordinate with the EC for the interconnection(s) as required to make equipment complete. The FEC is to ensure no excessive line runs and adequate service chases to perform such work.

### **3.4 MECHANICAL & PLUMBING – BY FOODSERVICE EQUIPMENT CONTRACTOR**

- .1 Provide all equipment in this section complete in its operation, including all valves, fittings, components and controls required by the specifications.
  - .1 All piping, manifolds, drains and fittings to be pre-install and pre-plumbed as specified so that only the connects, inter-connections and components listed in Work by Others and indicated on the applicable foodservice drawings are required to be performed by others on the site.
- .2 Provide suitable pipe slots, chases and/or do all drilling, punching and cutting of equipment required to provide access for MC/PC connections and/or runs.
  - .1 Work performed on the site shall be at the same level as if done in the shop.
- .3 Ensure proper clearance for cleaning, coordinate with MC/PC that all horizontal piping lines are run at the highest possible elevation above the floor.
- .4 Provide to the PC all faucets with aerators and replaceable seats as specified and check valves as required to prevent cross flow, to be installed by the PC.
  - .1 All faucets are to be of like manufacturer.
- .5 Insulate all indirect waste piping from ice bins, ice pans or similar items to prevent condensation.
- .6 Provide easy access in fixtures to all hub drains, funnel floor drains, and floor sinks.
- .7 n/a.

- .8 n/a.
- .9 n/a.
- .10 Where custom equipment must be installed in more than one piece the FEC shall coordinate with the PC for the interconnection(s) as required to make equipment complete. The FEC is to ensure no excessive line runs and adequate service chases to perform such work.

### **3.5 REFRIGERATION – BY FOODSERVICE EQUIPMENT CONTRACTOR**

- .1 n/a.
- .2 n/a.
- .3 n/a.

### **3.6 CHANGES IN WORK**

- .1 No changes in the work shall be instigated without an approved written order signed by the Owner.
- .2 No claim for a change in the Contract Price or change in the Contract time is valid unless there is an approved written order signed by the Owner.

### **4.0 COORDINATION WITH OTHERS**

#### **4.1 GENERAL**

- .1 Coordinate and cooperate with the Construction Manager in providing all information required by others for the proper connection and completion of the installation.

#### **4.2 CORRESPONDENCE WITH OWNER**

- .1 Refer to Division 1 for requirements
- .2 All correspondence from the FEC to the Owner or Construction Manager is to be copied to the Consultant.

#### **4.3 MEETINGS**

- .1 Refer to Division 1 for requirements
- .2 Arrange and attend an initial meeting with the Construction Manager to discuss responsibilities relating to the Project
- .3 Attend meetings as requested by the Construction Manager to coordinate foodservice aspects of the project with other trades
- .4 Provide confirmation of workers on site at any given time, if so requested by the Construction Manager

#### **4.4 CONSTRUCTION SCHEDULE**

- .1 Refer to Division 1 for requirements
- .2 The FEC is required to meet the construction schedule as set out or re-defined by the Construction Manager
- .3 The FEC is required to coordinate with the Construction Manager a separate installation date for the exhaust hood(s), ventilation assemblies and the boxes



#### **4.5 DISPUTES**

- .1 Refer to Division 1 for requirements

#### **5.0 RELATED WORK BY OTHERS**

##### **5.1 GENERAL CONTRACT**

- .1 Preparation and finishing of all building surfaces, openings and areas required for the Foodservice Facility.
- .2 Provide all slab work as noted on the applicable drawings, including masonry curbs or bases, floor depressions, openings for pass-through units. Slope floor in dishwashing area to area drains.
- .3 Provide additional support components as shown on applicable drawing(s) for wall or ceiling hung equipment.
- .4 n/a.
- .5 Provide and set sleeves and conduit as required.

##### **5.2 ELECTRICAL**

- .1 EC to provide the installation of all electrical services, the final connection of service to equipment, the supply of rigid conduit and junction boxes where exposed, the wiring from disconnects and switches to the power source, the interconnections indicated, and the wiring of fittings and controls supplied with equipment as called for on the applicable Contract Documents.
- .2 EC to provide wiring and conduit with adequate breaker protection, the supply of any disconnects or lockout devices, motor controllers, contactors, junction boxes, receptacles, etc. not supplied with the equipment.
- .3 n/a.
- .4 n/a.
- .5 n/a.
- .6 Rough-in and capping-off of services noted as Future.
- .7 Connection of all Owner supplied equipment.
- .8 Perform rough-in services as shown on the FEC supplied drawing(s).

##### **5.3 MECHANICAL/PLUMBING**

- .1 Provide the installation of gas, steam, water, drains, ventilation, and exhaust as called for on the applicable Contract Documents. Including all interconnections and final connections, and the installation of valves and fittings supplied with the equipment.
- .2 Provide all isolating valves on each water, gas, steam supply and backflow preventers, check valves, clean-out line strainers, pressure reducing valves and shock absorber as required for the final and proper connection of the equipment.
- .3 PC to mount FEC supplied faucets with aerators and replaceable seats. PC to coordinate with the FEC for the placement of such.
- .4 Provide and install all hand sinks, janitor sinks, and water stations as noted on the drawings.
- .5 Provide and install all required ventilator ductwork and components as required. Including final connection to canopies as noted.
- .6 Provide all floor drains where required.
- .7 Provide and install all piping sleeves for services requiring such.

- .8 Rough-in and capping-off of services noted as Future.
- .9 Connection of all Owner supplied equipment.
- .10 Perform rough-in services as shown on the FEC supplied drawing(s).

## **6.0 NOT IN CONTRACT EQUIPMENT**

### **6.1 GENERAL**

- .1 The FEC is to coordinate with other suppliers of equipment to confirm conformance with the design and line runs.
- .2 The FEC is to obtain and coordinate utility requirements for Owner supplied equipment.
- .3 The FEC is to coordinate with the Construction Manager for the placement of services for future equipment. Services are to be noted on FEC rough-in drawings

## **7.0 CLEANING AND REFURBISHING**

### **7.1 GENERAL**

- .1 Cleaning – where noted within the contract documents' cleaning refers to the 'construction cleaning' of equipment to be reused.
  - .1 Construction cleaning, for the purposes of the foodservice equipment, refers to the general cleaning practices of the industry for equipment within the construction area of a project. Equipment is to be surfaced cleaned and degreased. Wiping and power washing are accepted practices.
- .2 n/a

## **8.0 SUBMITTALS**

### **8.1 GENERAL**

- .1 Refer to Division 1 and Section 01 33 00 for requirements
- .2 All required submittals are to be submitted to the Consultant for design conformance review.
  - .1 Review by the Consultant/Construction Manager of submittals is a general procedure only and does not relieve the FEC of the responsibility to furnish equipment in compliance with the design documents, applicable code and regulation verification of utilities with equipment requirements, verification of all dimensions of equipment and building conditions or reasonable adjustments due to deviations.
- .3 Unless specifically directed in writing the FEC is not to proceed with any part of the Work until the Consultant has reviewed submittal(s) for that item.
- .4 The FEC could be required to identify on submittals installation in accordance with the SMACNA Guidelines for Seismic Restraint of Commercial Kitchen Equipment. It is the responsibility of the FEC to confirm such requirement with the authorities having jurisdiction.
  - .1 FEC to ensure applicable shop drawings are signed and sealed by the appropriate certifying engineer.
- .5 n/a.

## **8.2 MANUFACTURED EQUIPMENT BROCHURES & PRODUCT DATA**

- .1 Supply three (3) copies of product information/data/brochures of all manufactured equipment. Each set of securely bound brochures is to be noted with item numbers corresponding with the itemized equipment list, in numerical sequence, marked to show quantity, model numbers, special construction, and accessories.
  - .1 Provide manufacturer's brochures and Material Safety Data Sheets (MSDA) highlighting the stated VOC emission for each product used in the building
  - .2 Recycled Content: Provide a listing of the recycled content materials and products and show their cost and percentage(s) of post-consumer and/or post-industrial content per unit of product.
  - .3 Local/Regional Materials:
    - .1 Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
    - .2 Indicate location of extraction, harvesting and recovery; indicate distance between extraction, harvesting and recovery and the project site.
- .2 After review by the Consultant provide the number of sets deemed necessary by the Construction Manager for distribution.

### **8.3 SHOP DRAWINGS**

- .1 Refer to Section 01 33 00
- .2 Drawings prepared by the Consultant note basic equipment design intent only. It is the responsibility of the FEC to prepare shop drawings which illustrate clearly the FEC's understanding of the design intent, to describe thoroughly the methods of fabrication, materials and components being used, and to indicate any special procedures proposed in the process of assembly, delivery and installation.
- .3 The Consultant's design drawings are not to be reproduced, manually or by computer methods for use as the FEC's shop drawings under any circumstances. The design and specifications remain at all times the exclusive property of the Consultant.
  - .1 FEC can obtain written authorization and electronic files of the drawings from the Consultant only, and no other party, for a nominal fee
- .4 Provide a fully dimensioned drawing of each piece of custom fabricated equipment identifying all components, material and gauges, edges and construction details, and provide schematic diagrams of any pre-wiring or pre-plumbing incorporated as part of the work. Indicate on the submittal any related equipment. Drawings to be provided at not less than 1:20 scale or in isometric.
- .5 Provide a fully dimensioned drawing for any custom engineered equipment not provided with standard installation information and specifications. Note service connections and interconnections for electrical and plumbing requirements, dimensions and installation requirements. Coordinate with all others any information not supplied on the site.
  - .1 n/a
- .6 Provide roughing-in and connection drawings to note critical dimensions, locations of floor depressions, screeds, service sleeves, sumps, bases and curb, wall openings, equipment locations, structural detail for mounting foodservice equipment, requirements for services, for all equipment specified. Drawings are to note services for equipment to be installed including approved alternates accepted, and N.I.C. equipment. Drawings to be provided at not less than ¼" (1:50) scale.
  - .1 In the event that the rough-in has been completed prior to the award of the contract, check the existing facility and furnish all equipment to suit

- building conditions and utilities. No extra charges will be allowed for utility changes to fit equipment during installation and connection.
- .7 After review by the Consultant provide the number of sets deemed necessary by the Construction Manager for distribution.

#### **8.4 SAMPLES**

- .1 Provide sample(s) for approval where requested. Sample(s) to be labeled with Item number, project name, manufacturer, model number, contractor's name, pattern, etc. Sample(s) are to be provided at no additional cost.
- .2 Provide sample(s) in accordance with Section 01 33 00.

#### **8.5 SUPPLY OF CRITICAL MATERIALS**

- .1 Provide proof of ordering to the Construction Manager/Consultant for critical delivery items or any item as requested by the Construction Manager/Consultant.

#### **8.6 OPERATION AND MAINTENANCE MANUALS**

- .1 Refer to applicable part of other sections ie Section 01 33 00 or 01 77 00 for quantity.
- .2 Manuals to contain all necessary operating instructions, maintenance instructions, parts lists and warranty cards, for all manufactured and custom fabricated equipment prior to start-up of the equipment. Manuals are to be labeled with item numbers that agree with the plan, be in numerical sequence and be securely bound.
- .3 Each manual is to contain a covering page listing the name, address, telephone number, and fax number of the FEC and, if available, an after-hours service number. In addition the current name, address, telephone number, and fax number of all service agencies and equipment representatives is to be listed corresponding with each manufacturer listed.

#### **8.7 'AS-BUILT' DRAWINGS**

- .1 Refer to applicable part of Section 01 33 00 or 01 77 00 for requirements
- .2 Following Substantial Completion the FEC is to provide one (1) set of 'As-Built' drawings for the installed equipment layout to the Construction Manager.
- .3 'As-Built' Drawings are to note the FEC's identification and date of record.
- .4 Following Substantial Completion the FEC is to provide electronic cad file of 'As-Built' drawings for the installed equipment layout to the Construction Manager

#### **8.8 SYSTEMS DEMONSTRATION**

- .1 Instruct Owner/Operator in operation, adjustment, and maintenance of all food service equipment and systems. Demonstrations to be recorded on DVD
- .2 Refer to applicable parts of Sections 01 33 00 or 01 77 00 for requirements. Coordinate with Construction Manager

#### **9.0 FOODSERVICE EQUIPMENT CONTRACTORS USE OF THE SITE**

#### **9.1 GENERAL**

- .1 Refer to Division 1 requirements
- .2 Coordinate with the Construction Manager the areas of secure storage and work usage, and the operation of workers and equipment. The Construction Manager will have complete jurisdiction over the entry of the FEC's staff and vehicles to the site. The FEC is to arrange for and pay for any security required for performing work outside usual working hours.
- .3 FEC to enforce any Owner instructions or jurisdictional codes required for the site. Including health, safety, loss prevention, signs, and advertisements. No dangerous goods are permitted on the site without the written permission of the Construction Manager.
- .4 Prepare, maintain and keep clean areas of work. Debris is to be removed from the work areas periodically. No accumulation of debris will be accepted.
- .5 Provide for the repair of any and all damage to the site from the result of the installation of the equipment and the removal of debris from the areas.
- .6 Confirm on the site that all access routes for machinery, equipment and personnel. Coordinate with the Construction Manager for timing of wall erection, doorjamb installation and other components that may limit the clean installation of equipment. Should any building feature need to be removed due to incorrect information supplied by the FEC the cost shall be borne by the FEC.
- .7 Handle, store and protect all materials, equipment and components in accordance with the instructions and recommendations of the applicable manufacturer or supplier. Items to be kept clean, dry, and free from deterioration or damage. Lost goods or damage to goods, which occurs prior to final inspection, is the responsibility of the FEC.
- .8 Protect all surfaces and finishes from construction operations. Remove such protection as required to perform testing and start-up of equipment.
- .9 It is the responsibility of the FEC to coordinate the scheduling of delivery of equipment to the site with the Construction Manager. Failure to obtain material or equipment to meet the Construction Schedule will not be accepted as a basis for substitutions.

## **10.0 APPROVALS**

### **10.1 GENERAL**

- .1 The FEC is to fully comply with, apply for, obtain and pay for all necessary installation permits, inspections certificates, letters of assurance and labels of approval, required for this Project by authorities having jurisdiction over the Work or as required under the specifications, and submit same to the Contractor prior to final payment.
- .2 The FEC will supply to the Contractor copies of all applications for, permits, inspections and/or tests.
- .3 Should any equipment require on-site testing the FEC is to coordinate times with the Construction Manager and the Owner. A written report of each test is to be supplied to the Construction Manager/Consultant.
  - .1 Should testing show deficiencies in the workmanship or materials the equipment is to be replaced and the test redone. Costs for such are to be borne by the FEC.
- .4 All costs for approvals are to be borne by the FEC.

## **11.0 PROGRESS CLAIMS**

### **11.1 SUBSTANTIAL PERFORMANCE OF WORK**

- .1 Prior to final inspection of the Work carefully inspect the work to ensure that all work is complete and all deficiencies have been corrected.

## **12.0 INSPECTIONS AND DEFICIENCIES**

### **12.1 GENERAL**

- .1 Any deficiency in the work or materials noted by the Construction Manager, Owner or Consultant following substantial completion of the Work is to be corrected. The FEC is to commence with correction within seven (7) days of receiving notice of the deficiency.
- .2 If materials are not available to meet the deadline the FEC is to notify the Owner or Construction Manager and the Consultant of the delay. Reasonable extension for time obtaining or delivery of the materials will be granted.
- .3 If the FEC fails to promptly address or correct deficiencies the Construction Manager or Owner may perform or arrange for the performance by others the corrections. Should this occur the amount incurred to be payable to the other party shall be reduced from the amount payable to the FEC, This amount shall be equal to the costs suffered or incurred by the Owner. Should the cost exceed the amount payable to the FEC the FEC is to pay to the Owner the amount of the costs or excess, whichever is the lessor, on demand.
- .4 It is the responsibility of the FEC to prove that a defect, deficiency or damage of equipment has not arisen from a breach of warranty.

## **13.0 WARRANTY/GUARANTEE**

### **13.1 GENERAL**

- .1 Provide guarantee or warranty in the name of the Owner.
- .2 Provide guarantee that all work executed under these documents will be free from defects in material, workmanship and operation for a minimum period of one (1) year from the date of start-up and demonstration of the equipment.
- .3 Provide warranty on equipment commencing year from the date of Substantial Performance of the General Contract. Any significant delays in construction, etc. that affect the duration of the warranty from the time of installation are to be covered by coordination between the FEC, and the manufacturer/representative. FEC to coordinate with the Owner for the start-up and demonstration of the equipment to coordinate with the Substantial Performance date.
- .4 Provide all labour and materials to replace all components and workmanship that fails or is defective providing such failure is not due to improper usage by the owner. All repairs and replacement is to be made at the convenience of the Owner.

## **14.0 START-UP, TESTING, AND DEMONSTRATION OF EQUIPMENT**

### **14.1 GENERAL**

- .1 Arrange, plan and coordinate for complete demonstration of the equipment with the Owner and their designated staff.
  - .1 All Demonstrations to be recorded on DVD
  - .2 Refer to applicable parts of Sections 01 33 00 or 01 77 00 for requirements. Coordinate with Construction Manager

- .2 Confirm that all equipment has been cleaned, tested, and adjusted by qualified personal prior to the demonstration to ensure all correct services have been provided and that the equipment is fully operational.
- .3 Provide demonstration of all equipment by competent representatives.  
Demonstration to include proper function, proper operation, and proper cleaning of the equipment.
- .4 n/a.

**END OF SECTION**

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## **1.0 STANDARDS**

### **1.1 GENERAL**

- .1 All work is to conform to the current codes and requirements of the approving agency having jurisdiction over the Work. Where applicable provide appropriate inspection certificate or label. Conform to, as a minimum, but not limited to the following requirements:
  - .1 Canadian Electrical Code
  - .2 Canadian Standards Association
  - .3 Local building by-laws ie City of Vancouver Building Bylaw
  - .4 National Building Code of Canada
  - .5 National Fire Code of Canada
  - .6 National Fire Protection Association
  - .7 National Sanitation Foundation Standards
  - .8 Provincial Health Code
  - .9 Provincial Building Code
  - .10 Provincial Plumbing Code
  - .11 Provincial Gas Code
  - .12 Provincial Boiler Inspection Department
  - .13 Provincial regulations governing Mechanical Refrigeration plants
  - .14 SMACNA Guidelines for Seismic Restraints of Kitchen Equipment in applicable jurisdiction
  - .15 Workers' Compensation Board
  - .16 LEED Requirements
- .2 The regulations shall govern whenever the Contract Documents require something that will violate the regulations.
- .3 When seismic regulations are applicable, all equipment is to be fabricated and installed in accordance with those regulations. All seismic requirements are to be shown on all submittals. The FEC is to submit requested information to the agencies or authorities having jurisdiction.
- .4 No extra cost will be accepted for furnishing items required by the regulations, but not specified and/or shown on the drawings.
- .5 Rulings and interpretations of the authorities having jurisdiction are to be considered part of the regulations.

## **2.0 LISTED MANUFACTURERS ABBREVIATIONS**

### **2.1 GENERAL**

- .1 Except for custom fabricated items, a manufacturer and model number identifies each item. The first named manufacturer is the standard for the item including all finishes, options, and other features or accessories necessary to meet the project requirements.
  - .1 Should an additional manufacturer be named no notice other than that provided for in the bid process is required. However if the FEC chooses to use the alternate it is their responsibility to ensure that the model number and all substantial features, design elements, options, finishes, etc. identified or implied as part of the first named manufacturer are available and included with the selected alternate.
  - .2 If the FEC chooses to use the alternate any cost to revise adjacent equipment, services, etc. is to be borne by the FEC.

### **3.0 WORKMANSHIP**

#### **3.1 GENERAL**

- .1 All workmanship is to be at the best grade of a modern shop and field practice known to recognized fabricator/manufacturers specializing in this work.
- .2 Prefit and assemble all work in the shop, to confirm alignment and fit.
- .3 Joints and intersecting members are to be accurately fitted, and made in true planes with adequate concealed fastening. Overall work is to be fabricated and erected square, straight, true and accurately fitted. Provide adequate anchorage and reinforcing as required for use and per authority having jurisdiction and local codes.
- .4 Any punctures or drillings are to be reamed, with exposed edges clean and smooth.
- .5 Execute work according to details and reviewed shop drawings.
- .6 All moving parts are to have adequate lubrication. Access to oil holes; grease fittings, and all filler caps to be without the use of tools.
- .7 Remove or repair any equipment producing objectionable noise, as quietness of operation of all equipment is required.
- .8 All equipment design is to allow for safe and convenient operation. Any equipment requiring covers, guards, or other safety devices will be provided by the FEC at no extra cost. Devices are not to present substantial interference in the operation of the equipment, and allow easy access to guarded parts.
- .9 Equipment located against a wall or column is to be installed tight to same and sealed with silicone sealer or stainless steel filler strips. If building components prohibit locating equipment tight to wall provide stainless steel fill strips to close up openings around top, sides and base
- .10 Confirm all sizes shown with Owner supplied equipment, i.e. trays, bun pans, insert pans. No extra will be allowed for a change in the size from those noted.
- .11 Provide service access areas on custom equipment requiring electrical or mechanical work, with access to common point connection points.
- .12 Provide all inserts, anchors, sleeves, bolts and similar items required to be attached or built into the building components to provide proper anchorage of equipment. Provide all necessary templates, instructions, direction and coordination of such items.
- .13 Provide all equipment penetrations, cut-outs, openings etc. as required by service trades for service line runs and connections. Seal penetrations, cut-outs, openings etc. after service runs have been installed to a first class working condition
- .14 Test, clean and adjust all equipment as required to provide a first class condition facility in working order.

### **4.0 MATERIALS**

#### **4.1 GENERAL**

- .1 Stainless Steel – Type 304, Number 4 finish, 180 grit, free from pits and imperfections.
- .2 Galvanized Iron – ‘Satin Coat’, heavy hot dip, one coat primer and one coat of grey Hammerloid air-dry enamel.
- .3 Stainless Steel - U.S. Standard gauges.
- .4 Tubing – U.S. Standard 16 gauge (1.58mm) wall.
- .5 Gauges
  - .1 14 gauge - Utilized for all freestanding sinks, dishtables, countertops, overselves, single pan doors, stainless steel slides, stainless steel grids and underselves over 48" (1220 mm) long. Hat sections/channels; unexposed galvanized, exposed stainless steel. Exposed shelf brackets.

- .2 16 gauge (1.587 mm) - Utilized for all undershelves less than 48" (1220 mm) long, stainless steel bins (fixed or mobile), counter top sinks and vertical surfaces. Ducts; unexposed galvanized, exposed stainless steel.
- .3 18 gauge (1.27 mm) - Utilized for the chassis of all fixtures, double pan doors and drawer fronts
- .4 20 gauge (0.96 mm) - Utilized for all drawer bodies and door linings, refrigerator linings, drawer pans with 2B finish, dishwasher ducts, or a specified
- .6 All straight lengths are to be one piece with all seams and field joints fully welded. No raw, sharp or rough edges will be accepted.
- .7 Insulate where necessary to prevent electrolysis between metal-to-metal or metal-to-masonry or concrete contact.

## **5.0 COMMERCIALLY MANUFACTURED EQUIPMENT**

### **5.1 GENERAL**

- .1 All manufactured equipment is to be the latest model at the time of delivery.
- .2 The manufacturer's directions are to be followed in situations where the manufacturers of products used in this contract provide directions or prints covering points not shown on the drawings or specifications.
- .3 All doors are to be hinged as shown on applicable drawings or as specified.

## **6.0 CUSTOM FABRICATED EQUIPMENT**

### **6.1 GENERAL**

- .1 All specially fabricated equipment must be by one manufacturer acceptable to the Consultant and the Owner.

### **6.2 METAL TOP CONSTRUCTION**

- .1 All seams and joints are to be one-piece welded construction, reinforced on the underside with galvanized steel welded in place so tops can support heavy weight without deflection. Cross-braces not to be more than 30" (750 mm) on center.
  - .1 Field joints in stainless steel tops; where required due to limitation of sheet sizes, equipment sizes or installation requirements are to be welded, ground smooth and polished to blend with adjacent surfaces.
- .2 If inverted hat sections are used in lieu of channels, close ends.
- .3 Dishtable tops to have full channel support bracing across the short width at a maximum of 36" (915 mm) intervals. Neoprene adhesive strips, 1/8" (3 mm) thick, are to be installed between all channel supports and the table top for sound deadening.

### **6.3 EDGES AND CORNERS**

- .1 Edges are to be as detailed as shown on Standard Details, welded, ground and polished.
- .2 Corners on dishtables, drainboards, backsplashes and turned up edges are to have 1/2" (15 mm) or larger radius bends in all horizontal and vertical corners, coved at intersections unless specified otherwise.

### **6.4 SOUND DEADENING**

- .1 The underside of all metal top tables, counters, drainboards, sinks and dishtables are to have a hard drying mastic 1/16" (2 mm) minimum thickness with all reinforcements completely covered and sealed. Exposed mastic will not be accepted.

## **6.5 WELDING**

- .1 Is to conform to the requirements of CSA Specifications and be performed by a fabricator fully approved by the Canadian Welding Bureau to requirements of CSA Specifications.
- .2 File or grind exposed welds smooth and flush and polish to match adjacent surfaces.
- .3 Butt joints made by spot welding or riveting straps under seams and filling with solder are unacceptable. Puddled welds are unacceptable.
- .4 All seams and joints are to be shop welded or soldered as the nature of the material may require. Welds are to be ground smooth and polished to match original finish.
- .5 Framework of galvanized steel is to be welded construction. Where galvanizing has been burned off, the weld must be touched up with high-grade aluminum paint.

## **6.6 n/a**

## **6.7 CABINETS**

- .1 Cabinets to be built with access panel(s) in convenient position to access all drains, or make bottom shelves removable.
- .2 Cabinet sections are to be supported by at least four legs with feet not over 6'-0" (1830 mm) apart and spaced more closely if warranted by additional weight.
  - .1 Cabinets to be enclosed as specified, with mullions and gables 1-1/2" (38 mm) wide. Close open back of gables with stainless steel channel.
- .3 Where load centers are specified provide a stainless steel watertight enclosure with stainless steel hinged door. Allow access for service connections.
- .4 Stainless steel sliding doors are to be supported on an overhead track, with ball bearing rollers and lower guides. Doors are to be self-closing.
- .5 Stainless steel hinged doors are to have full-length stainless steel hinges, unless otherwise specified, recessed door handles, magnetic catches. Where door is double pan construction the door is to have a 1/2" (13 mm) insulation board core.
- .6 All interior removable shelves are to be easily removable through door space.
- .7 Cabinets mounted on curbs or masonry bases are to be fully sealed to same.
- .8 Heated cabinet construction to be as for unheated, except interior shelves shall be perforated, with heating units placed under bottom perforated shelf. Insulation shall be 1" (25 mm) fibreglass or as otherwise specified on all sides.

## **6.8 LEGS, FEET AND CROSS RAILS**

- .1 Equipment legs and cross rails shall be 1-5/8" (40 mm) 16 gauge (1.58 mm) stainless steel tubing unless otherwise specified. All welds at cross rails are to be continuous and ground smooth. Tack welds are not acceptable. Tops of legs to be fitted with Component Hardware model A20-0406 or A20-0206 leg sockets or approved equal. Gussets are to be welded to underside of sinks and bracing.
- .2 Bottom of legs to be fitted with Component Hardware model A10-0851 adjustable stainless steel foot or approved equal. Foot plug to be welded, ground and polished. When flanged feet with mounting holes are specified, use Component Hardware A10-0854 adjustable stainless steel foot or approved equal.
- .3 Enclosed cabinet bases mounted on 6" (150 mm) high legs are to be equipped with Component Hardware model A63-5002 adjustable stainless steel legs or approved equal.
- .4 Where required by authority having jurisdiction legs and feet are to be secured to floor per SMACNA Guidelines.

## **6.9 FASTENINGS AND FITTINGS**

- .1 All fastenings and fittings to be stainless steel and concealed unless otherwise specified. If specified, all exposed fasteners are to be stainless steel, supplied with truss heads or countersunk flat heads at accessible surfaces.
- .2 All lock washers, nuts and cotter pins are to be stainless steel. All fastenings are to have polished heads. No exposed screw or bolt heads will be permitted on fixtures or installation materials.
- .3 Butt joints made by riveting straps under seams and then filled with solder will not be accepted.
  - .1 Rivets of any kind, including pop-rivets, will not be accepted.

## **6.10 HARDWARE**

- .1 All hardware is to be of heavy-duty construction and identified on shop drawings by manufacturer and model number and is subject to final approval by the Consultant.
- .2 All hardware is to be identified with manufacturer's name and number so that broken or worn parts may be replaced.
- .3 Use common manufacturer of parts wherever possible.

## **6.11 SINKS**

- .1 Fabricated sinks are to have corners the same as for metal tops. One piece welded construction with bottom pitched to drains and double wall partitions. Multiple compartments to have continuous exteriors. Openings between compartments or applied panel will not be accepted.
- .2 Sink insets are to be 14 gauge (1.98 mm) stainless steel welded as an integral part of top.

## **6.12 DOORS**

- .1 All metal doors to be double pan type reinforced and stiffened to prevent flexing and filled with sound deadening material. Outer pan to be 18 gauge (1.27 mm) stainless steel with welded corners, ground smooth and polished. Inner pans to be 20 gauge (0.96 mm) stainless steel with 2B finish, fitted tightly into the outer pan and with a 1/2" (13 mm) sound deadening material core.
- .2 Sliding doors are to be mounted on large ball-bearing quiet rollers in 14 gauge (1.98 mm) stainless steel overhead tracks and be removable without the use of tools. All sliding doors are to be self-closing.
- .3 Hinged doors to be flush type, mounted on heavy duty, stainless steel lift-off hinges, or as specified.
- .4 Pulls shall be flush mounted Component Hardware model P62-1014 or approved equal.

## **6.13 DRAWERS**

- .1 All drawer pans are to have all coved corners. Pan to be mounted on fabricated 14 gauge (1.98 mm) stainless steel angle cradle frame. Frame to be supported on Component Hardware Series S52 or approved equal full extension slides with 200lbs. (91 kg.) Capacity per pair. Drawers to be easily removable without the use of tools. All drawers are to be self-closing.
- .2 Drawer fronts shall be double pan type with sound deadening material.
- .3 Drawers to have rubber bumpers or gaskets to prevent drawer from banging shut.
- .4 Drawer assemblies consist of a removable plastic liner. Liners are to be supplied by Component Hardware or Royalite, or equal.
- .5 n/a.
- .6 Drawers are to be provided with replaceable soft neoprene bumpers and, for refrigerated drawers, a full perimeter soft gasket.

#### **6.14 INSULATION**

- .1 All insulation to be board form or foamed in-place polyurethane. Fiberglass insulation is not to be used. Heated areas to have a minimum of 1" thick (25 mm) insulation. Cold areas to have a thickness as indicated in specifications or as noted on details or drawings. Insulation to be bonded to all surfaces.

#### **6.15 n/a**

#### **6.16 SHELVING**

- .1 All shelving over sinks to be set at a height, which will not interfere with the operation of swing faucets and lever controls.
- .2 Shelves in fixtures with enclosed bases to have the lower shelf turned up on back and sides, and snapped, to ensure a tight fit to enclosure panels. Intermediate shelves to be removable and adjustable unless otherwise specified.
- .3 Fixed shelves in open leg fixtures to be mitred and welded to leg.
- .4 Removable undershelves in open leg fixtures are to have 4 sides supported on braces. Front edge to be a boxed edge and other sides are to be turned up and hemmed.
- .5 Overshelves at service counters – For shelf mounted heat lamps the remote pilot light and switch are to be mounted on shelf edge on Cook's side unless otherwise specified.

### **7.0 COMPONENTS**

#### **7.1 GENERAL**

- .1 Casters – on all custom fabricated equipment supplied under this Section shall be heavy-duty ball or roller bearing wheels with non-marking urethane tires. Plate type shall be securely bolted to frame and secured with Locktite cement. Shank shall be plug and stem type, with bushing friction fit into uprights. Casters to be NSF approved.
- .2 Corner bumpers – Component Hardware model C60-1030, or equal, fastened to unit with stainless steel screws. Seal between bumper and equipment.
- .3 n/a.
- .4 n/a.
- .5 n/a.
- .6 Locks - Cylinder type Component Hardware Series P30 with two (2) keys. All doors for reach in refrigerated compartments, both fabricated and standard items, are to be fitted with cylinder locking type latches, and provided with master keys. Doors and drawers of fabricated items are to be fitted with locks and master keyed separate from refrigerated compartments. All keys to be labelled and turned over to the Owner.
- .7 Faucets – to be supplied for all sinks, bain-maries, water stations and other fixtures as specified and are to be supplied with non-splash aerator and water saving devices where required by local code.
  - .1 All faucets are to be supplied by the same manufacturer to ensure continuity in the facility and availability of replacement parts.
  - .2 All faucets are to be supplied with all necessary nipples and connections for a fully operational unit.
  - .3 Water inlets are to be located above the positive water level to prevent siphoning of liquids into the water system. Where conditions require a submerged inlet a suitable type check valve and vacuum breaker is to be used to prevent siphoning.
  - .4 All exposed fitting and piping is to be chrome plated
  - .5 Type - Fisher or T & S, Encore equivalent as follows or as specified under individual items – models noted are to be guidelines and updated to latest models:

- .1 Work table sinks – backsplash mounted,
  - 1. Goose neck Fisher model 1945
  - 2. Swing spout Fisher model 3252
- .2 Work table sinks – deck mounted, goose neck
  - 1. Single, Fisher model 1872
  - 2. Dual, Fisher model 1821
- .3 Work table sinks – deck mounted, swing spout
  - 1. Single, Fisher model 3112
  - 2. Dual, Fisher model 3312
- .4 n/a
- .5 Pot sinks – backsplash mounted swing spout Fisher model 5414
- .6 n/a
- .8 Drains and Wastes – Fisher or T & S, Encore equivalent as follows or as specified under individual items – models noted are to be guidelines and updated to latest models:
  - .1 Work table sinks – basket drain Fisher model 6556
  - .2 Work table sinks and Prep Sinks – lever waste
    - .1 With overflow Fisher model 10715
    - .2 Without overflow Fisher model 10766
  - .3 Pot Sinks –
    - .1 Lever waste with overflow Fisher model 10707
    - .2 Lever waste without overflow Fisher model 10758
    - .3 Stand pipe 38 mm Fisher model 6571 special length as required with 6541-2400 waste socket

## **8.0 MILLWORK EQUIPMENT**

### **8.1 GENERAL**

- .1 Refer also to Section 06 40 00
- .2 Standard of work to meet AWMAC Standards or higher for custom grade woodwork
- .3 Work is to be performed by skilled mechanics of the trade and is to be of the highest quality throughout, in such a manner as to fulfill the intent of the Contract Documents.
- .4 All fixtures are to be made by one manufacturer and assembled in single and complete units, as the dimensions will permit shipment to and installation at the building. Large pieces requiring sectional construction are to have their parts accurately fitted and aligned with each other, and provided with ample screws, glue and bolt blocks, tongues, grooves and splines, dowels, mortises and tenons, screws, bolts or suitable means of concealed fastening, as required to render the work substantial, rigid and permanently secured in proper position to each related section.
- .5 Sufficient additional material is to be provided to permit accurate scribing to walls, floors and related work, and allowance made wherever possible for shrinkage that may develop after installation. All units are to be provided with adequate cleating, blocking, crating and other forms of protection as necessary to prevent damage during shipping and handling.
- .6 Where required by code, all required materials are to be treated with fire retardant chemicals to achieve the required flame spreading performance rating. Retardant chemicals must be a type approved by local authorities.

### **8.2 COMPONENTS AND ASSEMBLY**

- .1 All fixtures are to be assembled without face screws or nails, except where it may be necessary to attach trim items. All face screws or nails that are necessary are to be countersunk and plastic wood or wood plugs used to cover heads, and the plug neatly touched up. The heads of all screws used in any assembly are to be countersunk below the surface.

- .2 Joints - Mortise and tenon, spline, dowel and/or pin block and glue work to avoid use of nails wherever practical. Make butt joints with an approved device for prevention of separation of members. Blind nail and conceal.
- .3 Plastic laminate is to be bonded to all exposed surfaces with contact cement fast bond EC2166 as manufactured by 3-M Products Company, or equal, to minimum 3/4" (19 mm) fir faced plywood applied under high pressure. All edges shall be carefully sanded to smooth finish, removing burns, nicks and cut marks. Plastic laminate joints are to be finished without wavy and unsightly joints.
- .4 Where solid core/monolithic tops are specified i.e. Nevamar Fountainhead or equivalent, such materials are to be installed by factory certified installers only.
- .5 Hinged doors are to be fabricated of 3/4" (19 mm) thick plywood with hardwood full perimeter edging with plastic laminate on face and self-edging on exposed sides. Door hinges, pulls and catches shall be supplied and installed as specified.
- .6 Sliding doors are to be fabricated of solid core plywood with hardwood edges and constructed similar to hinged doors. Doors are to be mounted on E-Z Glides track, and to be removable without the use of tools. Rubber stops are to be provided concealed in end stile or mullion.
- .7 n/a.
- .8 Any access panel is to be fabricated of 3/4" (19 mm) nominal thick hardwood and fabricated as a door. Each access panel to be provided with two (2) magnetic catches at top and two (2) 3/16" (5 mm) positioning pins at bottom.
- .9 Drawer sides and backs are to be constructed of 5/8" (16 mm) thick solid hardwood such as ash, oak or maple, or 5/8" (16 mm) finished birch interior plywood without plugs or defects. Sides to be French dovetailed into fronts, with backs lock-shouldered into sides. Drawer bottoms to be 1/4" (6 mm) tempered hardboard, dadoed into sides. Provide pulls as specified. The inside surfaces of all drawers shall receive one coat of Penetrating Primer and one coat of Glass lacquer.
- .10 Drawer fronts to be 3/4" (19 mm) thick, 5-ply veneer core construction, with veneer banded top edge to match face. Ends to be puttied, sanded and glazed to match top edge. All drawers to be provided with full extension glides.
- .11 Painted finishes to have exposed surfaces free from defects and blemishes that would show after being finished, regardless of grade specified. All surfaces specified to receive a paint or enamel finish are to receive one cross-coat of lacquer type undercoat. The undercoat is to be of appreciably different color from that of the finish coat, and of proper ground color with relation to the finish coat. After the undercoat has been thoroughly dried, surfaces are to be sanded smooth and two coats of enamel is to be applied. Back painting is to be provided for all cabinet and woodwork prior to installation.
- .12 Interior shelves are to be laminated and provided with self-edging on all sides.

## **9.0 REFRIGERATION EQUIPMENT**

### **9.1 REACH-INS – SELF-CONTAINED**

- .1 n/a.
- .2 All refrigerated compartments, fabricated and standard, are to be fitted with digital type thermometers. Thermometers are to be adjustable and are to be calibrated after installation.
- .3 Adequate air supply and exhaust must be provided for all self-contained refrigeration condensing units, both fabricated and standard, as required for proper operation.
- .4 All compressor units, condensers, refrigerants, valves and accessories forming a complete system are to be supplied in compliance with CFC regulations and the Montreal Protocol Refrigerants used, or their programmed replacements at installation date.



## **10.0 ELECTRICAL WORK**

### **10.1 GENERAL**

- .1 For all fabricated equipment, furnish and install all receptacles, switches, controls, conduit, and service fittings. Should load centers be specified they are to be complete with individual circuit breakers for each device built into or forming an integral part of the unit. Furnish to the EC a wiring schematic including circuit breaker diagram for load center. FEC to obtain approvals as required for the load center installation.
- .2 Ensure that all equipment furnished under this contract is wired, wound or constructed to conform with the characteristics of electrical and other services at the Project.
- .3 All plug-in equipment is to have plugs and neoprene cords furnished and installed. Coordinate work with EC so that the receptacles provided will match the specific plugs installed as part of the plug-in equipment. Any changes on cords and plugs required in the field due to lack of coordination between EC and FEC is the responsibility of the FEC.
- .4 All surface mounted receptacles indicated for fabricated equipment are to aluminum box complete with satin finish stainless steel cover and receptacle.
- .5 All built-in receptacles indicated for fabricated equipment are to be 2" x 4" x 1-1/2" (50 x 100 x 38mm) deep box tack welded to fixture and fitted with receptacle and satin finish stainless steel cover. Receptacles to be horizontal where possible.
- .6 Provide all applicable light bulbs/tubes required for equipment under this section.

## **11.0 VENTILATION WORK**

### **11.1 GENERAL**

- .1 Provide all labour, material and services required; verify sizes and locations of duct connections; and provide all exposed duct work from hoods, ventilators, and dishwashers to building duct work, including trim and watertight or grease tight connection.
- .2 n/a.

## **12.0 SEALING AND TRIMMING EQUIPMENT**

### **12.1 GENERAL**

- .1 Gaps and spaces between all equipment and walls, ceilings, floors and adjoining units not portable and with enclosed bodies are to be completely sealed against entrance of food particles or vermin. Close gaps and spaces by means of trim strips, welding, soldering or commercial joint materials as suited to the nature of the equipment and in compliance with local Health Department regulations.
- .2 Sealant to be mildew resistant silicone, Dow Corning 786 or approved alternate in either clear or approved color matching surrounding surfaces. Apply in accordance to manufacturer's directions with a smooth and sealed finish.
- .3 Trim is not an acceptable substitute for accuracy and neatness. When trim is required and accepted in lieu of rejection of items of equipment, it is the responsibility of the FEC to provide such trim at no additional cost.

## **13.0 STANDARD DETAILS**

### **13.1 GENERAL**

- .1 Standard details included as part of Contract Documents are to be considered guides to quality and scope of work involved. Where shop practices dictate, alternate construction

methods and component items of equal manufacturer may be substituted. It will be the responsibility of the FEC to prove the quality of the proposed methods.

#### **14.0 LABELS**

##### **14.1 GENERAL**

- .1 Identify all switches, controls, valves, circuits and characteristics of the equipment with engraved colored lamicoid nameplates. Letters to be black on a white background.
- .2 Do not apply any other labels, including the FEC's name identification plates to any piece of equipment.

**END OF SECTION**

**NOTE: Refer to the supplied information/shop drawings from the Foodservice/Kitchen Contractor for accurate information per the equipment to be supplied**

**1.1 GENERAL**

- .1 THESE DOCUMENTS ARE FOR DESIGN INTENT – IT IS THE RESPONSIBILITY OF THE FEC TO COORDINATE WITH THE CONSTRUCTION MANAGER & SITE TRADES WITH ACCURATE INFORMATION FOR THE EQUIPMENT BEING SUPPLIED
- .2 \*L046 refers to the Specifier Identification System – it is not part of the model number and is strictly for specifier identification purposes by the manufacturer
- .3 It is the responsibility of the FEC to ensure all equipment meets or exceeds approval by authority having jurisdiction. FEC to obtain approval where required
- .4 It is the responsibility of the FEC to provide faucets that coordinate with the applicable sink locations, faucet spout to extend to center of sink
- .5 It is the responsibility of the FEC to ensure all drawers are to have drawer locks
- .6 It is the responsibility of the FEC to ensure all equipment is installed to all applicable codes per authority having jurisdiction, including but not limited to SMACNA guidelines
- .7 All faucets to meet LEED / Energy Star guidelines for flow rates
- .8 Energy efficiency is a priority. FEC is to note if equipment meets Energy Star or an equivalent. All selected or proposed alternates are to meet or exceed this standard. It is the responsibility of the successful FEC to provide documentation to this affect
- .9 N.I.C. refers to equipment that is Not In Contract as not part of this section

**1.2 ITEMIZED EQUIPMENT**

**ITEM 1**

**SHELVING**

**3 REQUIRED**

Manufacturer: Metro  
Model: Super Erecta Shelf \*L046  
Approved: Nexel equivalent  
Alternate: Olympic equivalent  
Sizes: 3-1 required 1525 x 457mm  
2 required 1220 x 457mm  
Accessories: Standard with  
Epoxy coated finish  
4 posts, 74P, per unit or common posts permitted where units are end to end,  
with floor plates  
5 shelves per unit  
Note: Verify sizes with room conditions, prior to ordering

**FS-01**

**ITEM 2**

**JANITOR'S CABINET**

**1 REQUIRED**

Manufacturer: Eagle Group  
Model: F1916-VSCS-DL \*L046  
Approved: Custom Fabricated  
Alternate:  
Accessories: Standard with  
Service faucet  
Hose and bracket  
Services: Refer to Services Schedule  
Additional: Provide stainless steel back if building wall finish is painted drywall  
Note: FEC to ensure unit has applicable approvals – CSA

**ITEM 3**

**HAND SINK**

**1 REQUIRED**

Manufacturer: Eagle Group/Metal Masters  
Model: HSA-10-1FK \*L046  
Approved: Custom Fabricated  
Alternate: EFI equivalent  
Polar equivalent  
Accessories: Standard with  
Knee operated and wall mounted; sealed to wall  
Gooseneck faucet, p-trap and tail piece; basket drain  
Services: Refer to Services Schedule  
Additional: Tempering valve  
Accessories:  
Note: FEC to ensure unit has applicable approvals – CSA

**ITEM 4**                      **SINK UNIT**                      **1 REQUIRED**

Manufacturer: Custom Fabricated  
Size: Refer to plan and elevations; refer to Standard Details D-10.5, D-10.10, D-10.11, D-10.15  
Construction: Stainless steel construction as specified  
Edges up and rolled  
Back splash up 250mm/10" and splayed to wall, closed ends  
Bracing as required; coordinate sink area bracing with rough-in and drain line runs  
1 required pre-rinse sink, 510 X 510 x 200 deep, all welded, all coved, with removable perforated/mesh catch pan, with flush removable rack slides, to accommodate Disposal  
Allow for space for waste can  
Drainboards slope to sinks  
2 sinks 502 x 733 x 355 deep; all welded, rolled front and back  
Top reinforced for disposal control  
Components: 1 required backsplash mounted faucet with swing spout as specified, located as shown on plan at pot sinks, ¾"/19mm  
2 required lever wastes as specified  
2 required full sink covers, flush with work surface – rack must easily slide over cover when in place; refer to Standard Detail D-10.12 or equivalent  
2 sets of removable rack guides for each sink – ensure positioning and number is adequate for sliding full dish rack over sink  
Services: Refer to Services Schedule

**ITEM 5**                      **PRE-RINSE**                      **1 REQUIRED**

Manufacturer: Fisher  
Model: 13382 \*L046  
Approved: T & S equivalent  
Alternate: Encore equivalent  
Accessories: Standard with  
48"/1220mm hose length  
Wall bracket  
Vacuum breaker  
In-line dual check valve  
Nipples  
Elbows  
Wrist style handles

Services: Spray valve with designed flow restrictor – Ultra-spray Valve #2949  
Supply line – length as required  
Refer to Services Schedule

**ITEM 6**                      **DISPOSAL**                      **1 REQUIRED**

Manufacturer: Salvajor  
Model: 75-SA-6-AESS \*L046  
Approved: Hobart equivalent  
Alternate: In-Sink-Erator equivalent  
Accessories: Standard with  
ARSS Control Center series with water saver  
Collar mount  
Solenoid valve  
Flow control valve  
Mounting bracket  
150mm sink mount  
Services: Refer to Services Schedule  
Note: Electrical disconnect switch to be provided and installed by others (Electrical Division) per authority having jurisdiction

**ITEM 7**                      **DISHWASHER**                      **1 REQUIRED**

Manufacturer: Moyer Diebel  
Model: MD2000HT \*L046  
Approved: Hobart equivalent  
Alternate: Jackson equivalent  
Accessories: Standard with  
Corner located; corner operation splash baffle  
Integral booster, 21C (70F) degree rise booster  
Electric tank heat  
Single point electrical connection  
Flanged feet  
4 required peg racks  
2 required combination racks  
Drain water tempering kit  
Services: Refer to Services Schedule  
Note: Electrical disconnect switch to be provided and installed by others (Electrical Division) per authority having jurisdiction

**ITEM 8**                      **CONDENSATE CANOPY**                      **1 REQUIRED**

Manufacturer: Custom Fabricated  
Size: Refer to plan, elevation and Standard Detail D-10.22, approximately 1100 x 1100 x 450mm  
Construction: Stainless steel construction with tapered top  
Turned in boxed edge, shaped to catch condensation, sloped to drain at one corner  
1"/25 mm NSF drain with hose to counter top  
Hanging rods  
Stainless steel closure panels to ceiling – verify with site  
Note: Ensure unit is mounted at height to clear door of dishwasher when open

**ITEM 9**                      **CLEAN DISHTABLE**                      **1 REQUIRED**

Manufacturer: Custom Fabricated  
Size: Refer to plan and elevation; (depth to suit dishwasher positioning), refer to Standard Detail D-10.15  
Construction: Stainless steel construction as specified  
Up and rolled edges  
Back and end splash up 10"/250mm and splayed to wall, closed ends

**ITEM 10**                      **RACK SHELF**                      **1 REQUIRED**

Manufacturer: Custom Fabricated  
Size: Refer to plan and elevation; refer to Standard Detail D-10.13  
Construction: Stainless steel construction  
Note: Verify mounting height with Operator prior to installation

**ITEM 11**                      **OVERSHELF**                      **1 REQUIRED**

Manufacturer: Custom Fabricated  
Size: Refer to plan and elevation; 380mm deep; refer to Standard Details D-4.1  
Construction: Stainless steel construction as specified  
Shelf with boxed edges, back up and snapped, brackets as required  
Note: Coordinate with site for wall backing location

**ITEM 12**                      **UNDERSHELF**                      **1 REQUIRED**

Manufacturer: Metro  
Model: Super Erecta Shelf \*L046  
Sizes: 915 x 610 x 275mm high  
Approved: Nexel equivalent  
Alternate: Olympic equivalent  
Eagle equivalent  
Focus equivalent  
Accessories: Standard with  
Epoxy coated finish  
4 posts – modified height  
1 shelf

**ITEM 13**                      **DISH RACK**                      **1 REQUIRED**

Manufacturer: Metro  
Model: Metroseal 3 Super Adjustable Super Erecta Shelf \*L046  
Approved: Cambro equivalent  
Alternate: Nexel equivalent  
Olympic equivalent  
Size: 1220 x 457 x 1372 high  
Accessories: Standard with  
Metroseal 3 finish  
4 posts per unit  
5"/127mm HD casters, all swivel, 2 with brakes each with donut bumpers per unit  
4 shelves per unit

**ITEM 14**                      **spare**

**ITEM 15**                      **REACH-IN FREEZER**                      **1 REQUIRED**

Manufacturer: True  
Model: T23F-HC \*L046  
Approved Beverage Air equivalent  
Alternate:  
Accessories: Standard with  
Casters; locks on door side  
Celsius reading digital thermometer  
Door hinging as shown on plan (hinge on left side of door)  
Full size door with lock  
Epoxy coated wire shelves  
One additional shelf (four total)  
Cord and plug  
Services: Refer to Services Schedule  
Note: Energy Star or equivalent

**ITEM 16**                      **REACH-IN REFRIGERATOR**                      **1 REQUIRED**

Manufacturer: True  
Model: T-49-HC \*L046  
Approved Beverage Air equivalent  
Alternate:  
Accessories: Standard with  
Casters; locks on door side  
Celsius reading digital thermometer  
Door hinging as shown on plan  
Full size doors with locks  
Epoxy coated wire shelves  
One additional shelf per door  
Cord and plug  
Services: Refer to Services Schedule  
Note: Energy Star or equivalent

**ITEM 17**                      **HAND SINK**                      **1 REQUIRED**

Manufacturer: Eagle Group/Metal Masters  
Model: HSA-10-1FK \*L046  
Approved Custom Fabricated  
Alternate: EFI equivalent  
Polar equivalent  
Accessories: Standard with  
Knee operated and wall mounted; sealed to wall  
Gooseneck faucet, p-trap and tail piece; basket drain  
Services: Refer to Services Schedule  
Additional Tempering valve  
Accessories:  
Note: FEC to ensure unit has applicable approvals – CSA

**ITEM 18**                      **WORK COUNTER**                      **1 REQUIRED**

Manufacturer: Custom Fabricated  
Size: Refer to plan, elevation and site; refer to Standard Detail D-8.5  
Construction: Stainless steel cabinet construction as specified  
Top with boxed edges  
Back and sides up and splayed

	Stainless steel removable kickplates, adjustable bullet feet
	Cutouts in top for hot wells and soup well
	Recessed hot wells controls, grouped, labeled
	Recessed drain valve for hot wells, labeled, valve to be surface exposed not concealed in cabinet
	Heated base section with sliding doors; recessed infinite control mounted adjacent to heated section and labeled
	Solid bottom shelves with access panels as required to access drain & service lines
	Solid bottom and adjustable intermediate shelves
	2 required sinks approximately 355 x 457 x 250mm deep, all welded, all coved
	Swing doors with full length piano hinges; top edge handle (similar to drawers) and locks
Components:	2 required basket wastes without overflow as specified
	1 required backsplash mounted faucet with swing spout as specified
	3 required drawers with locks with removable plastic liners, 150mm deep
	Outlets as noted with stainless steel cover plates
	Valve extension for drain valve, manifold drains – valve not to protrude from leading edge of top, valve not be inside cabinet, valve to be easily accessible by staff
	Clips for electrical lines is required
Services:	Refer to Services Schedule
	Service runs to be concealed in back section of cabinet where possible; minimize any exposed services --- FEC to provide site coordination to ensure all service line runs are not hindering use of the interior storage space i.e. service line to run directly back into utility chase
Note:	Coordinate sub-trade service line runs to ensure no conflict with equipment and equipment use (i.e. verify all electrical lines are tight to cabinet side or top – hanging lines will not be accepted)
Sneeze-guard & Overshelf	Custom Fabricated
Size:	Refer to plan, elevation and section; length to accommodate hot wells
Construction:	Standard stainless steel construction with
	Fixed overshelf/sneeze-guard with vertical front, stainless steel top sized to accommodate heat lamp at hot wells, tempered glass (front and sides)
	sneeze-guard front mounted with décor acorn type nuts, 25mm square stainless steel support tubing – allow for heat lamp wiring in supports
Note:	Position unit as far forward on counter allowing for shutter
	Verify counter top with site opening

<b><u>ITEM 19</u></b>	<b><u>HOTWELL UNIT</u></b>	<b><u>1 REQUIRED</u></b>
Manufacturer:	Wells	
Model:	MOD-300TDM *L046	
Approved	Delfield equivalent	
Alternate:	Vollrath equivalent	
	Hatco equivalent	
Accessories:	Standard with	
	Drain valve extension kit	
	Drain screens	
	Individual infinite wells controls	
Services:	Refer to Services Schedule	
	Electrical disconnect switch to be provided and installed by others (Electrical	



Note: Division) per authority having jurisdiction  
Drain valve to be mounted in easily accessible location – not at back of cabinet

**ITEM 20**                      **SOUP WELL**                      **1 REQUIRED**

Manufacturer: Wells  
Model: HW-106D \*L046  
Approved: Delfield equivalent  
Alternate: Vollrath equivalent  
Hatco equivalent  
Accessories: Standard with  
Services: Refer to Services Schedule  
Note: Drain valve to be mounted in easily accessible location – not at back of cabinet

**ITEM 21**                      **HEAT LAMP**                      **1 REQUIRED**

Manufacturer: Hatco  
Model: GRAH-36 \*L046  
Approved: Merco equivalent  
Alternate: Gann equivalent  
APW equivalent  
Accessories: Standard with  
Stainless steel housing  
Services: Refer to Services Schedule  
Note: Mounted to overshef  
All wiring concealed – in overshef tubular support and under overshef top  
Control easily accessible on kitchen side

**ITEM 22**                      **TOASTER**                      **1 REQUIRED**

Manufacturer: Hatco  
Model: TQ3-10 \*L046  
Approved: Star equivalent  
Alternate:  
Accessories: Standard with  
Cord and plug  
Services: Refer to Services Schedule  
Note: Ensure unit has local approvals

**ITEM 23**                      **MICROWAVE OVEN**                      **1 REQUIRED**

Manufacturer: Panasonic  
Model: ~~NE-2180~~ **NE-2152** \*L046  
Approved: ACP equivalent  
Alternate:  
Accessories: Standard  
Cord and plug  
Services: Refer to Services Schedule

**FS-01**

**ITEM 24**                      **RETHERM UNIT - N.I.C. - Future**                      **1 FUTURE**

Manufacturer: Rational  
Model: CombiMaster Plus XS \*L046

<b><u>ITEM 25</u></b>	<b><u>HOT WATER DISPENSER</u></b>	<b><u>1 REQUIRED</u></b>
Manufacturer:	Bunn	
Model:	45300.0006 (H3X-SST) *L046	
Approved	Curtis equivalent	
Alternate:		
Accessories:	Standard	
Services:	Refer to Services Schedule	
Additional	Quick disconnect, as specified, for water service	
Accessories:	Filter system – Kleensteam/Everpure / Danamark or equivalent as recommended by manufacturer, size to suit unit and use – all components for a complete and operational system with one set of filters	

<b><u>ITEM 26</u></b>	<b><u>ICE/WATER DISPENSER</u></b>	<b><u>1 REQUIRED</u></b>
Manufacturer:	Scotsman	
Model:	HID312A-1 *L046	
Approved	Manitowoc equivalent	
Alternate:	Hoshizaki equivalent	
Accessories:	Standard	
Services:	Refer to Services Schedule	
Additional	Quick disconnect, as specified, for water service	
Accessories:	Filter system – Kleensteam/Everpure / Danamark or equivalent as recommended by manufacturer, size to suit unit and use – all components for a complete and operational system with one set of filters	
Services:	Refer to Services Schedule	

<b><u>ITEM 27</u></b>	<b><u>OVERCUPBOARDS</u></b>	<b><u>4 REQUIRED</u></b>
Manufacturer:	Custom Fabricated	
Size:	Refer to plan and elevation; 380mm deep; refer to Standard D-5.2 similar	
Construction:	Stainless steel cabinet construction as specified	
	Edges boxed	
	Solid bottom shelf, adjustable intermediate shelf	
	Swing doors with full length piano hinges, full width bottom edge handles, locks, magnetic catches	

<b><u>ITEM 800</u></b>	<b><u>WASTE CAN - N.I.C. - By Operator</u></b>	<b><u>LOT BY OPERATOR</u></b>
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<b><u>ITEM 801</u></b>	<b><u>DETER. DISPENSER - N.I.C. - By Operator</u></b>	<b><u>2 BY OPERATOR</u></b>
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<b><u>ITEM 802</u></b>	<b><u>COFFEE BREWER - N.I.C. - By Operator</u></b>	<b><u>1 BY OPERATOR</u></b>
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<b><u>ITEM 900</u></b>	<b><u>SOAP &amp; TOWEL DISP. - N.I.C. - By Others</u></b>	<b><u>LOT BY OTHERS</u></b>
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<b><u>ITEM 901</u></b>	<b><u>COUNTER - N.I.C. - By Others</u></b>	<b><u>1 BY OTHERS</u></b>
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FEC to provide:	4 sets of angle slides to accommodate glass/mug (full size) dish rack
Note:	Provide coordination with Millwork supplier to ensure units accommodate Operator racks

**ITEM 1000**

**MISCELLANEOUS TRIM**

**LOT REQUIRED**

Construction: 18 ga. stainless steel and ¾"/19 mm plywood with plastic laminate finish as required, noted and requested (this is over and above the specified standard requirements of a professional installation)

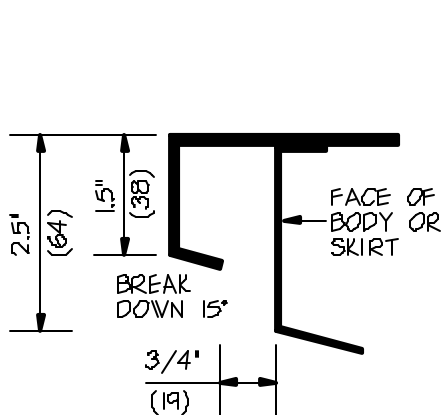
Locations: Where required as directed by the Foodservice Consultant

Note: Allow for approximately 25sqft/2.5 sq m. of additional stainless steel for filler and trim and 10sqft/1 sq. m. of plywood with plastic laminate finish as directed by the Foodservice Consultant

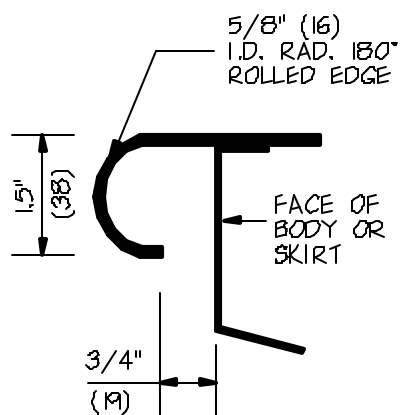
Note: Refer to item 901 for stainless steel angle slides for millwork counter (include pricing under this item)

**END OF SECTION**

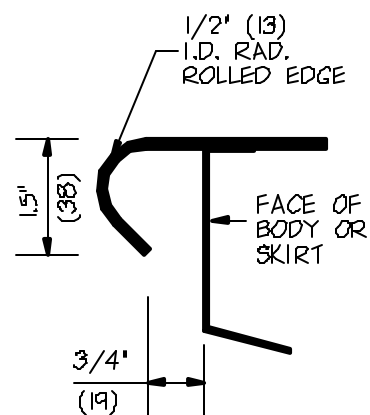
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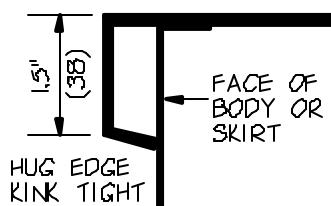
BOXED



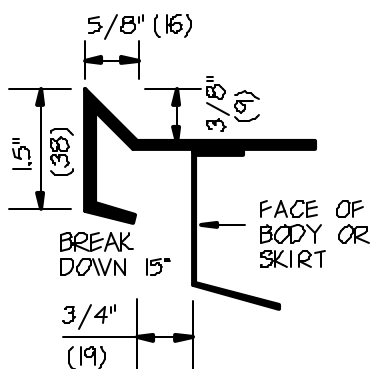
FULL ROLLED



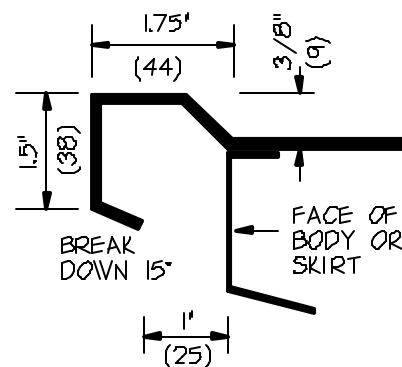
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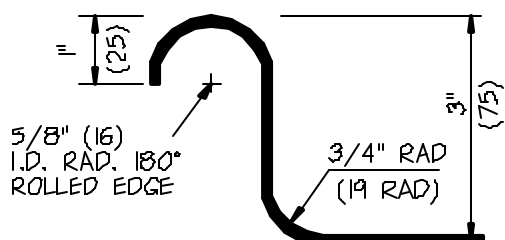
TIGHT BOXED



MARINE



BOXED MARINE



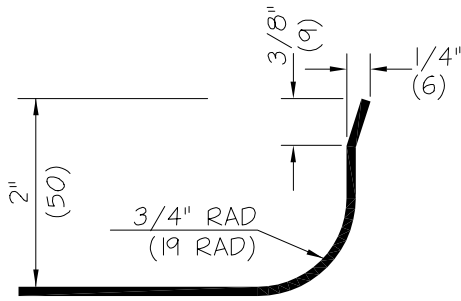
UP & ROLLED



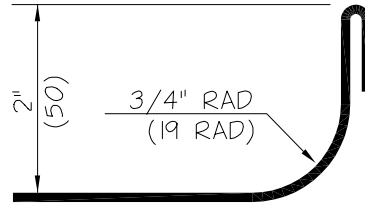
## EDGE DETAILS

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

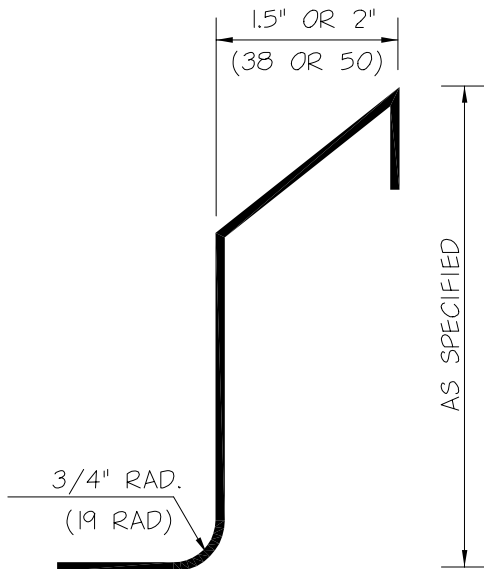
D-1.1



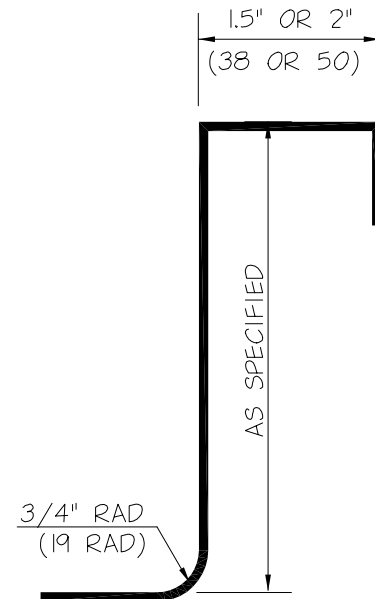
UP & SNAPPED



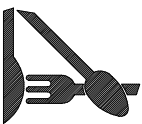
UP & HEMMED



UP & SPLAYED

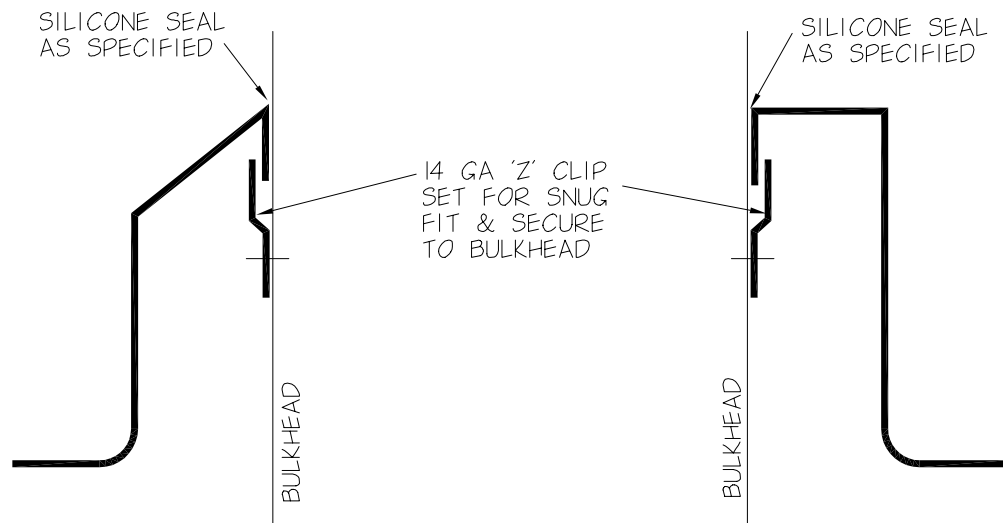


UP & BOXED



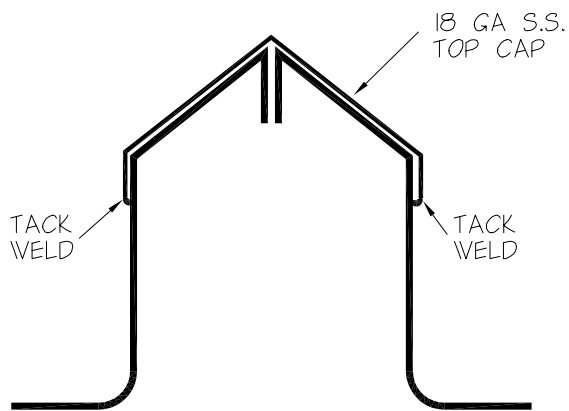
## BACKSPLASH DETAILS

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

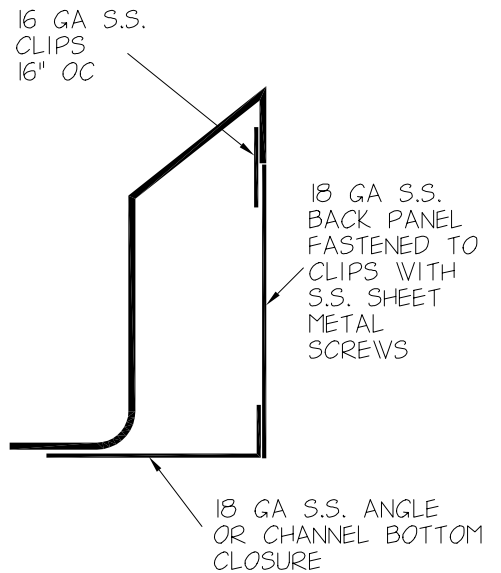


UP & SPLAYED  
ABUTTING BULKHEAD

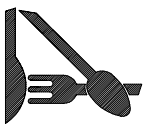
UP & BOXED  
ABUTTING BULKHEAD



UP & SPLAYED  
BACK TO BACK



UP & SPLAYED  
CLOSED BACK

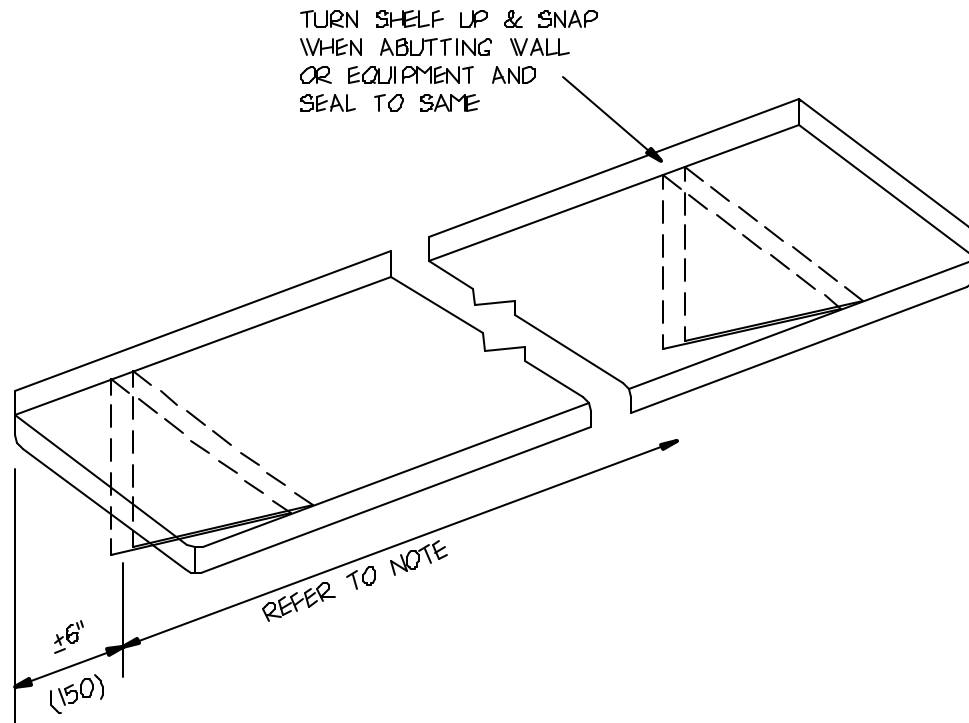


## **BACKSPLASH DETAILS** **WALL, CLOSED, ISLAND DETAILS**

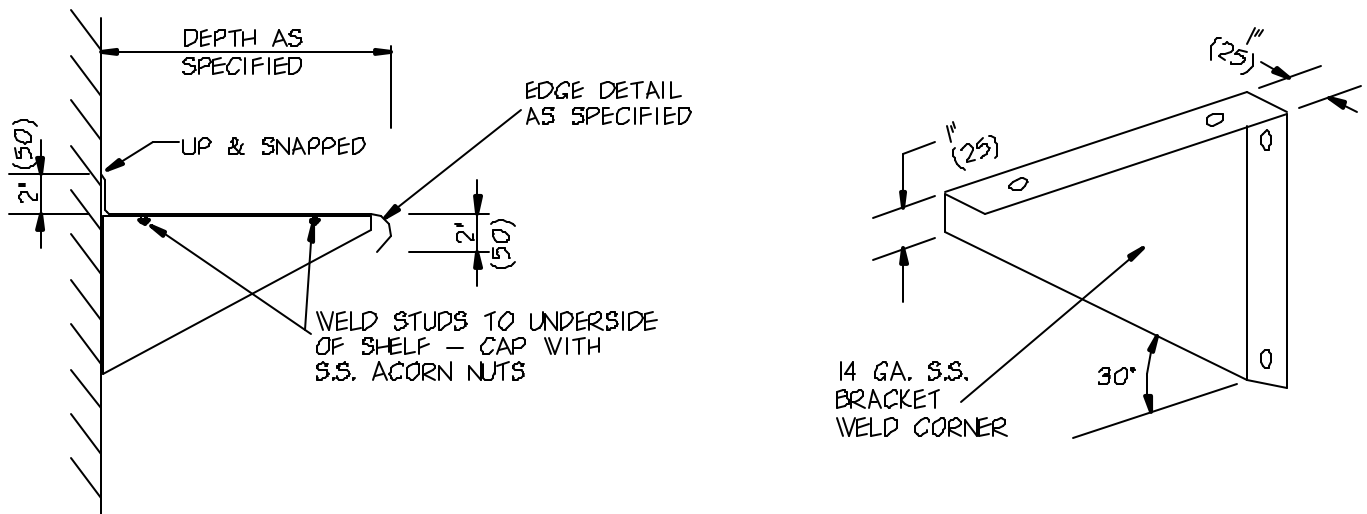
(DIMENSIONS IN BRACKETS ARE MILLIMETERS)







NOTE: MAXIMUM SPACING BETWEEN BRACKETS NOT TO EXCEED 42" (1065) - VERIFY WALL CONDITION AND SECURE BRACKETS TO WALL WITH MINIMUM OF 2 APPROPRIATE FASTENERS TO SUPPORT HEAVY LOADS.



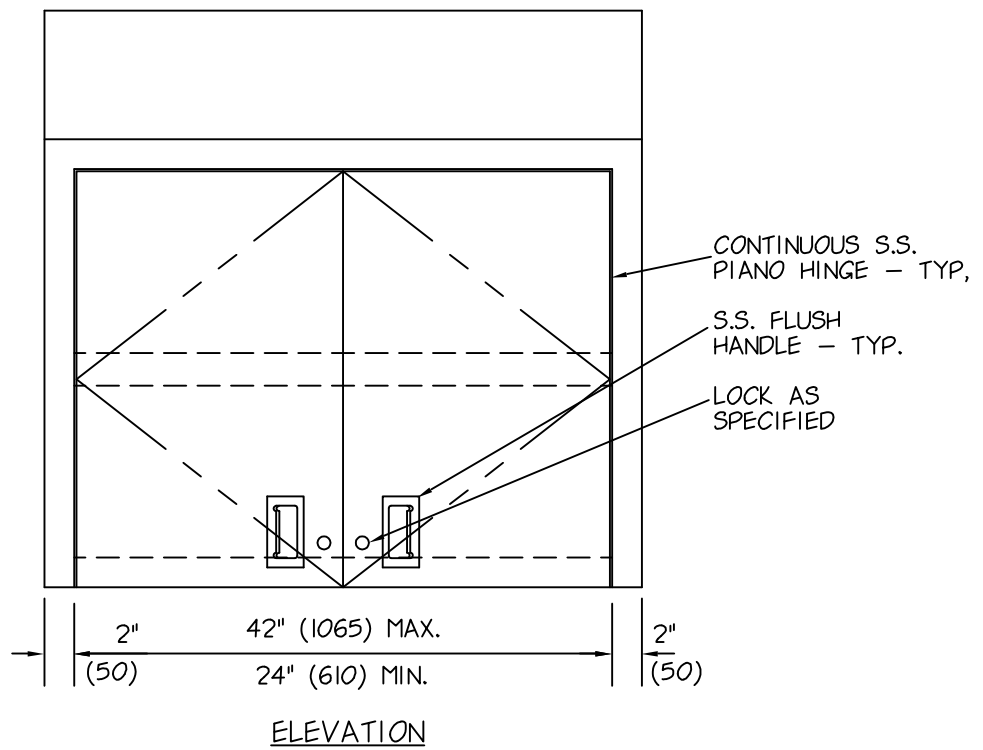
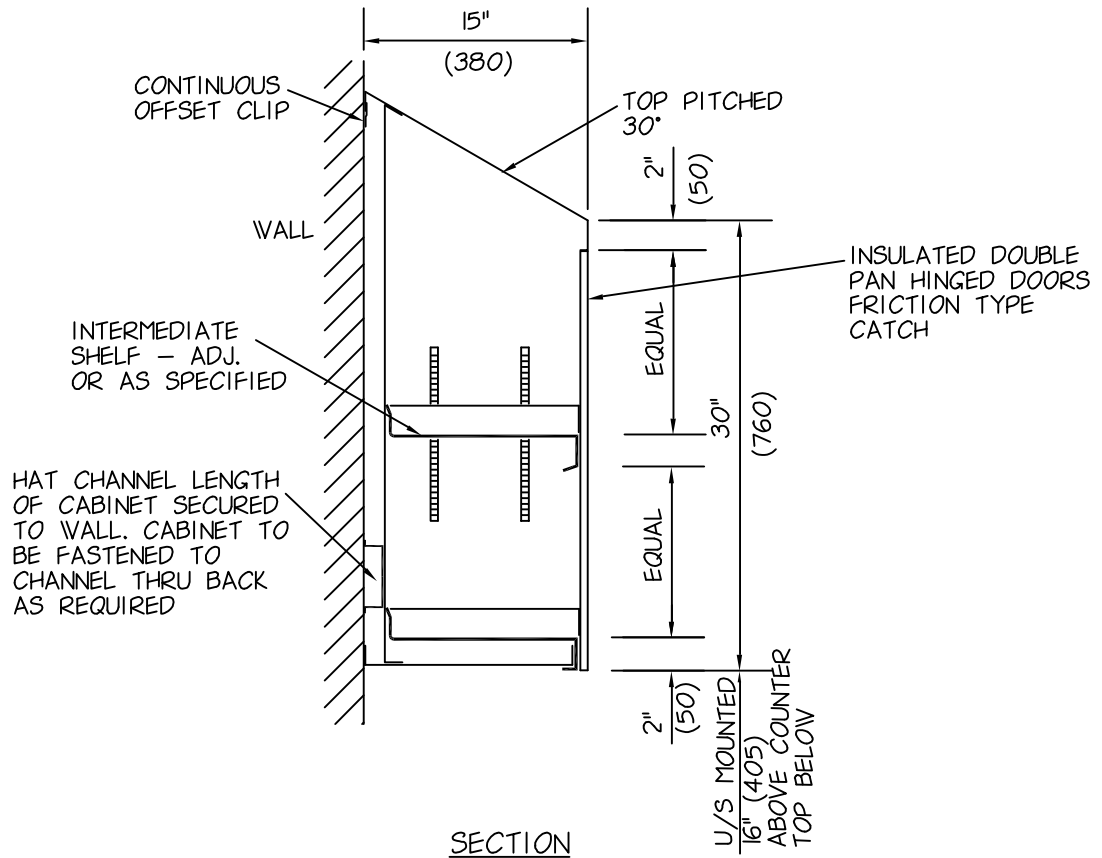
BRACKET DETAIL



**WALL MOUNTED OVERSHELF**  
**- EXPOSED BRACKETS**

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

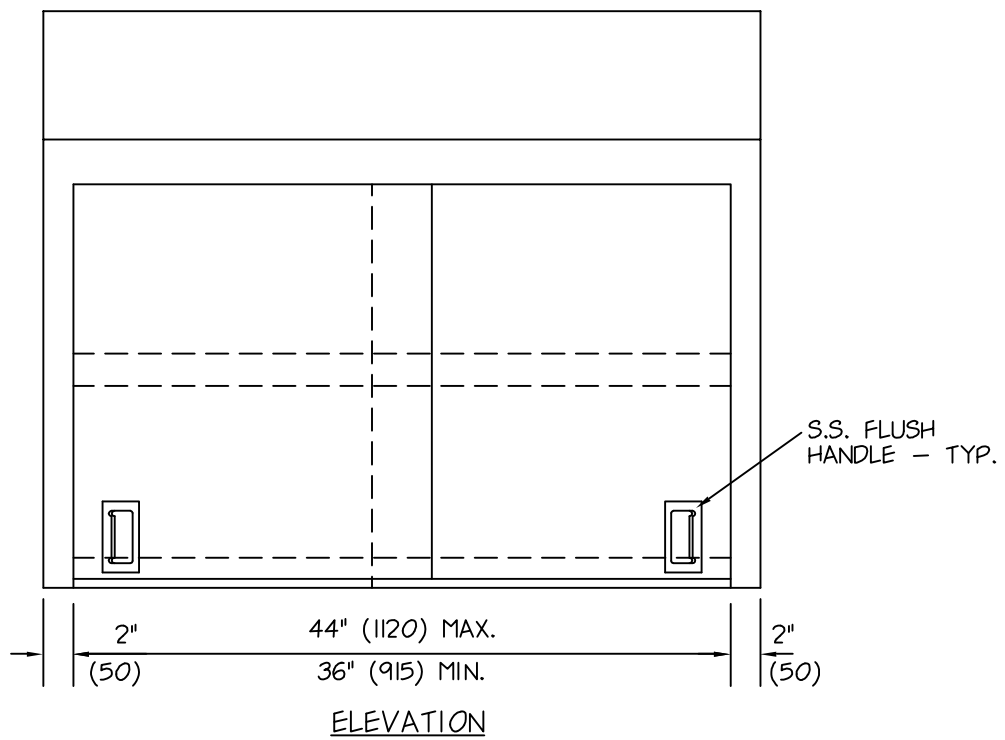
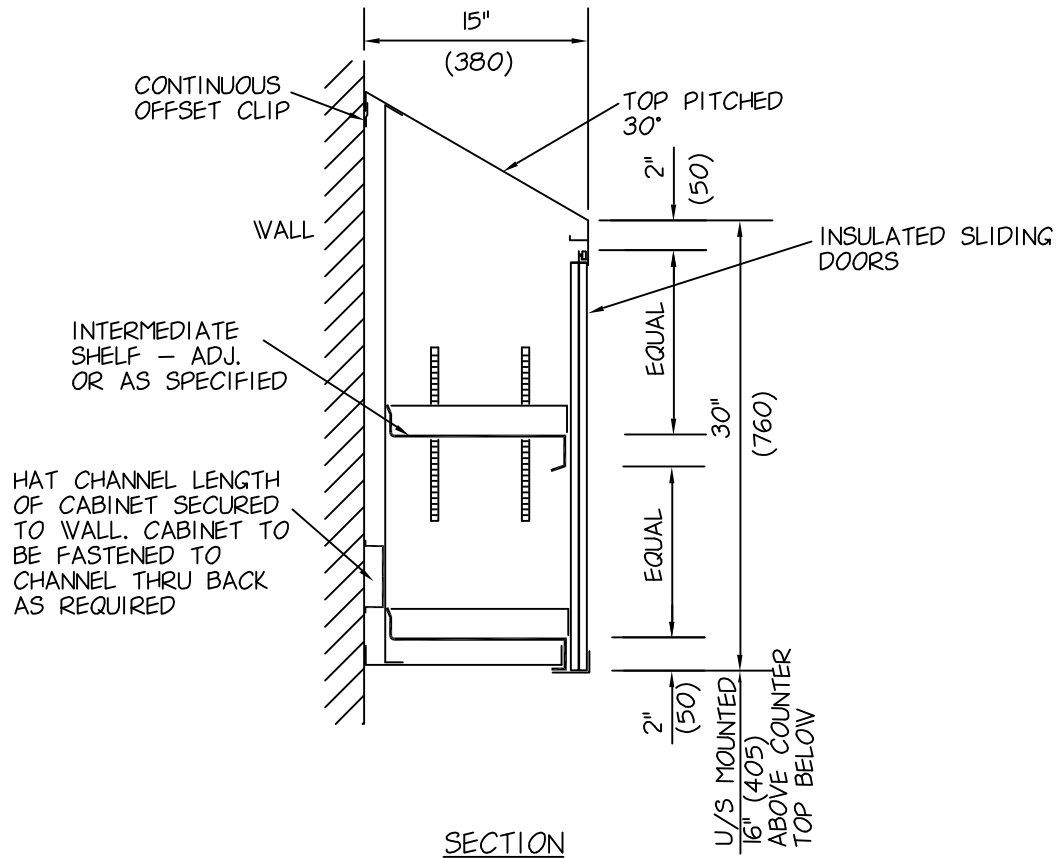
D-4.1



# **WALL MOUNTED CABINET** **with SWING DOORS**

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

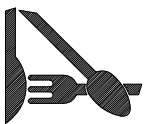
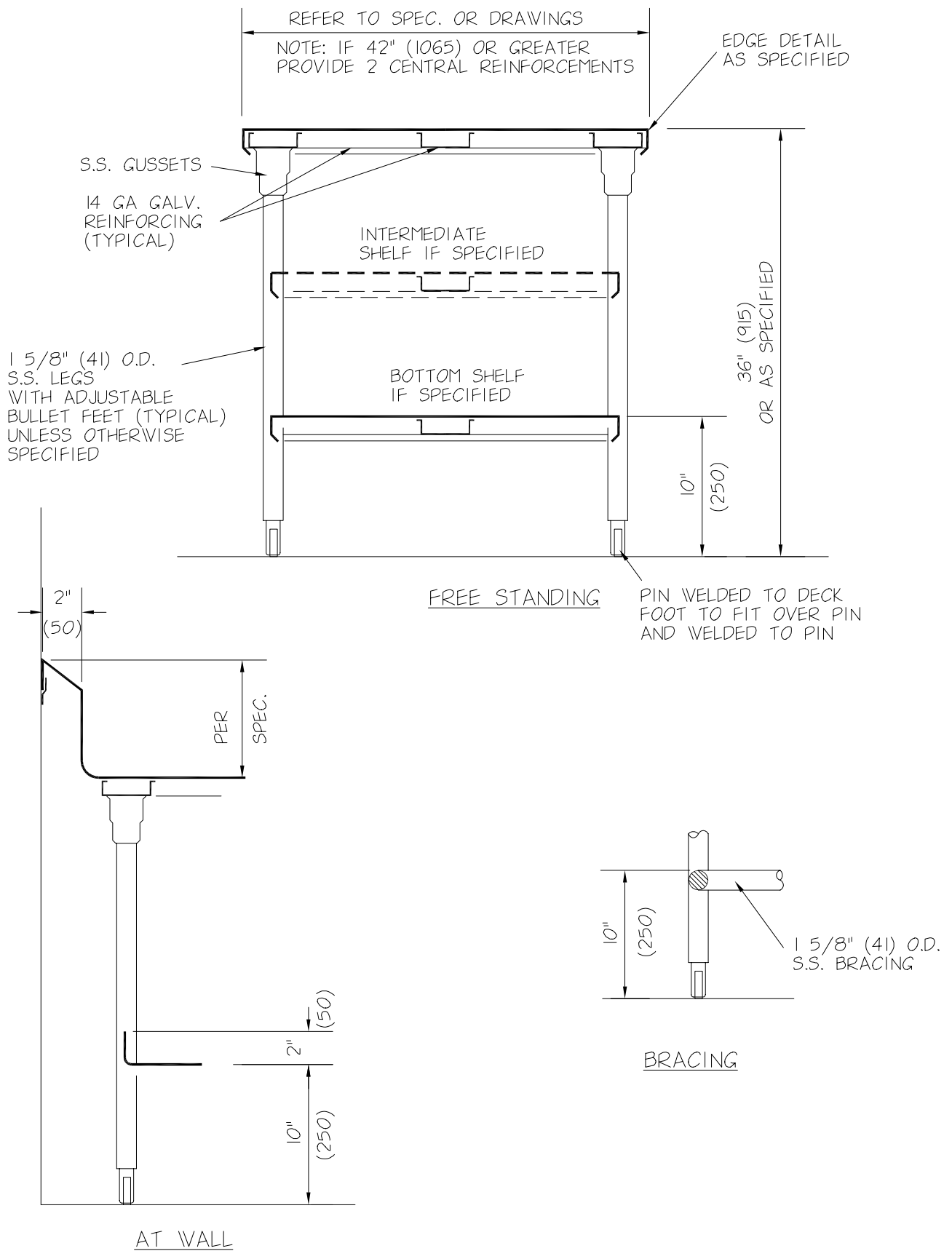
D-5.2



## WALL MOUNTED CABINET with SLIDING DOORS

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

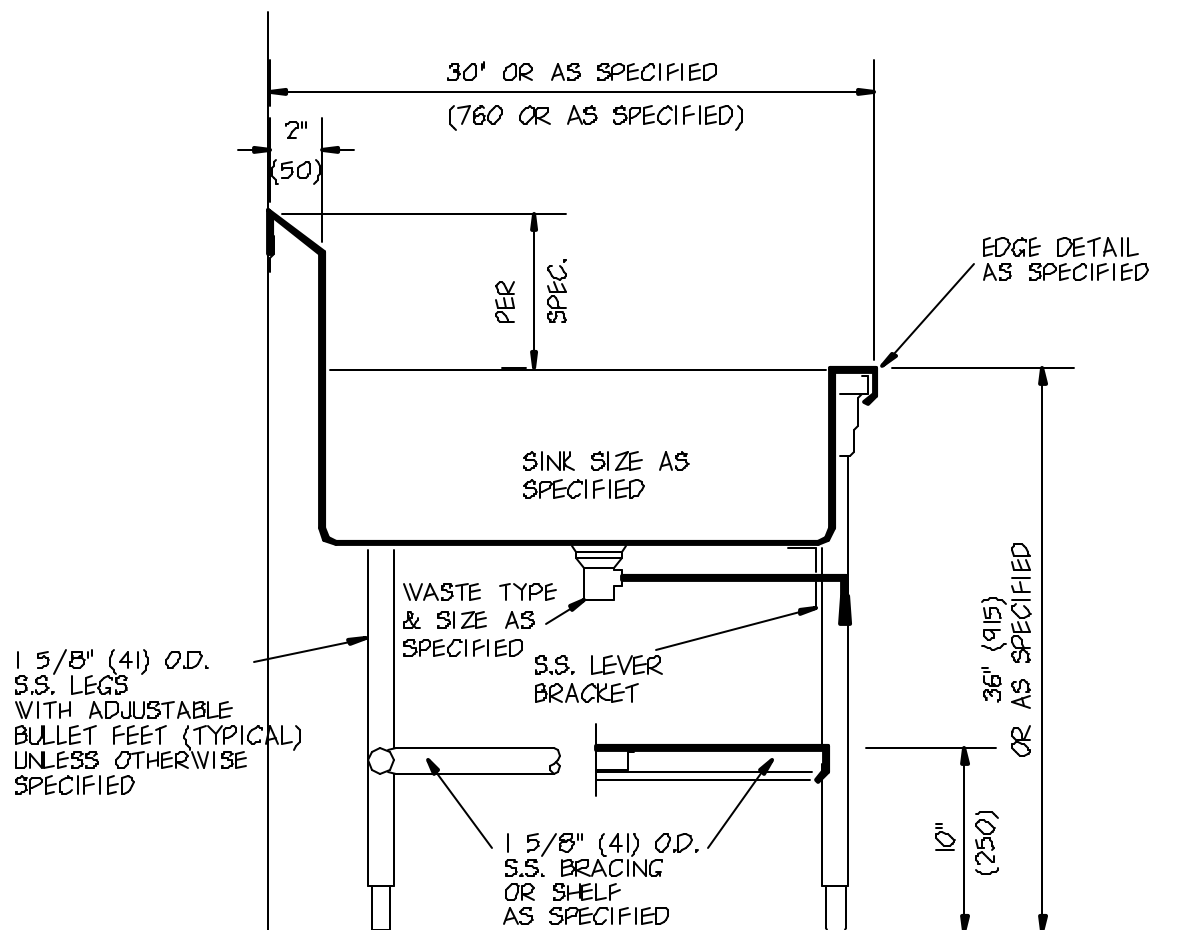
D-5.3



## TABLE - OPEN BASE

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

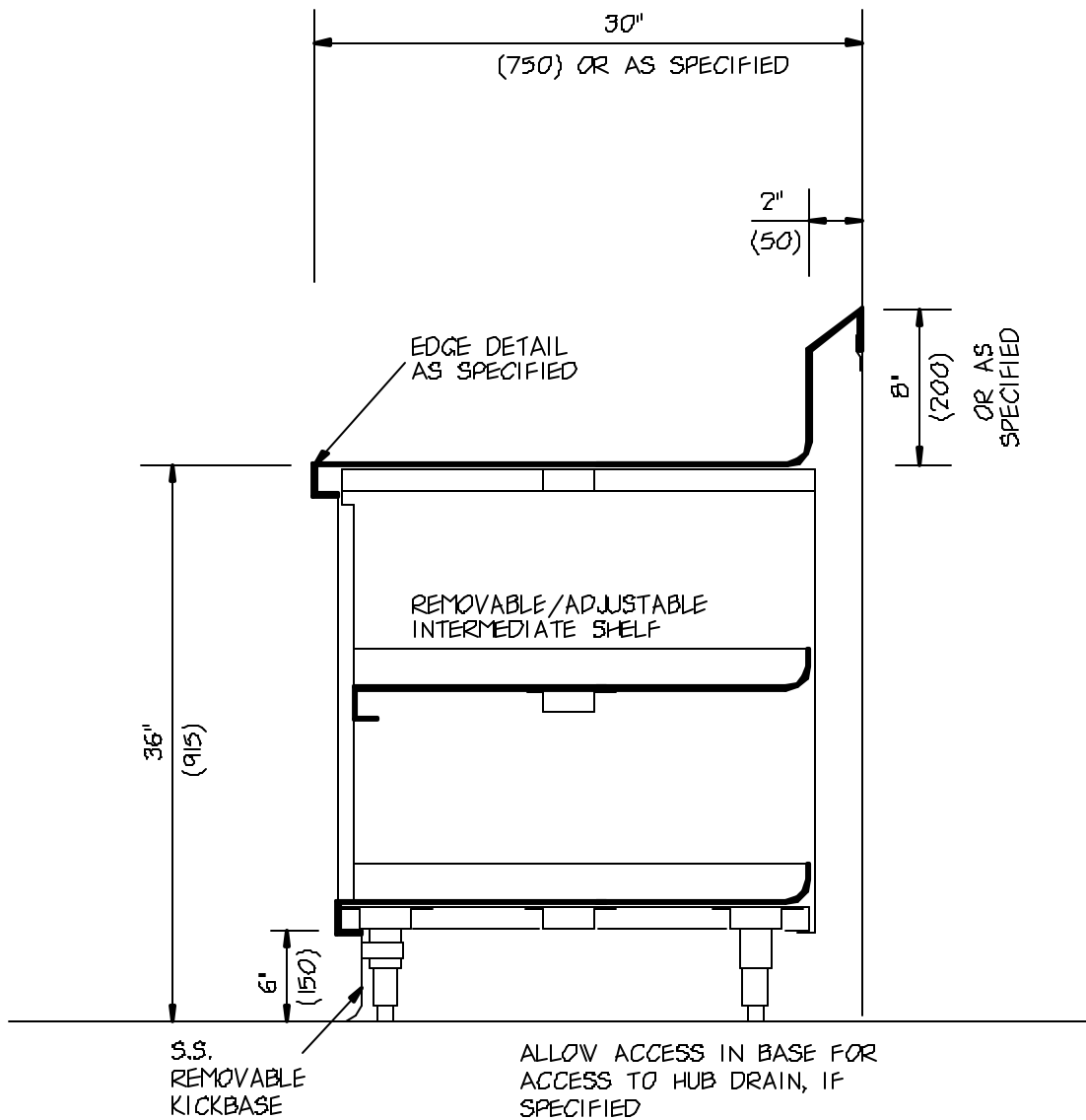
D-7.1



## WORKTABLE WITH SINK

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

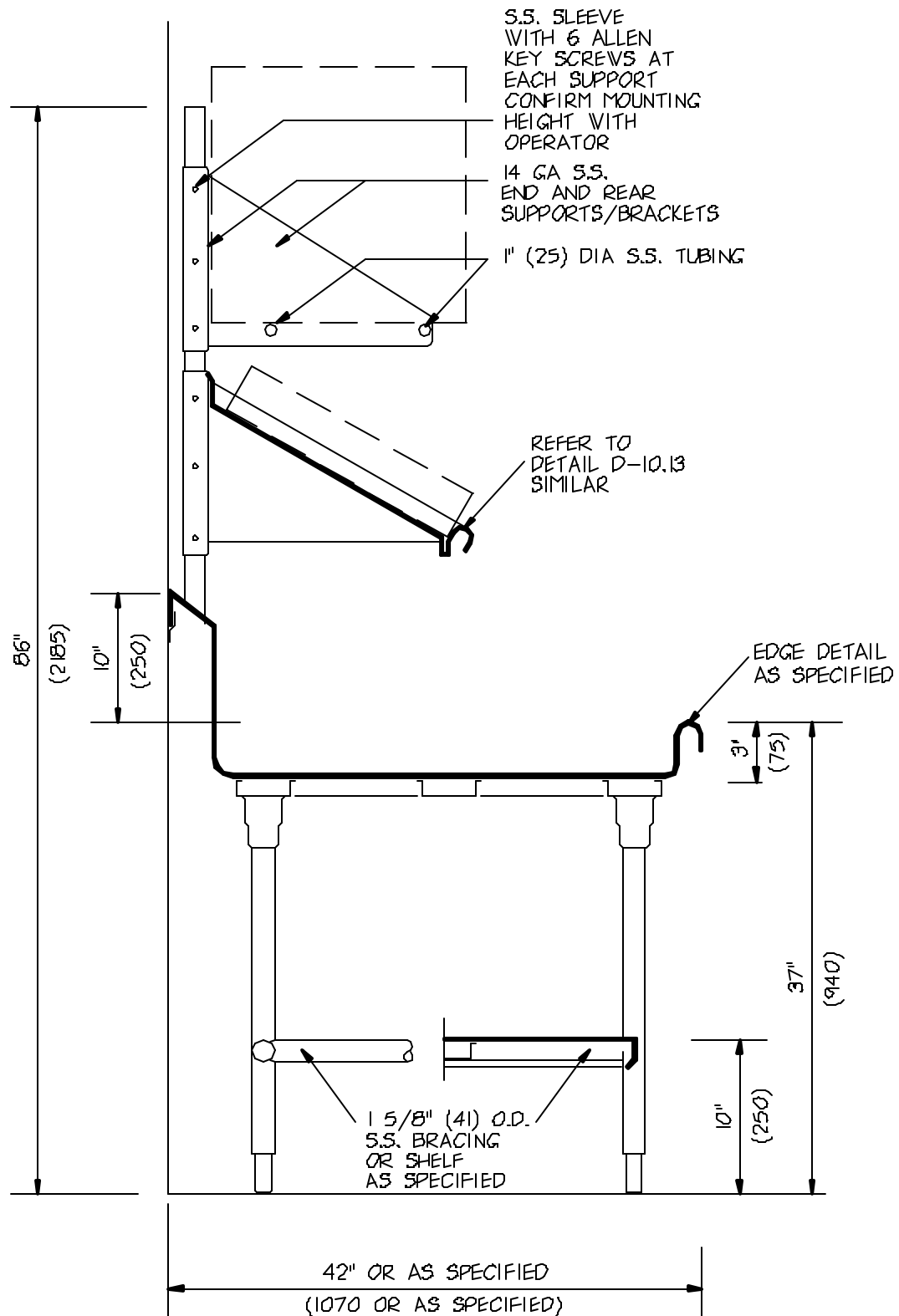
D-7.5



## WORK COUNTER

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

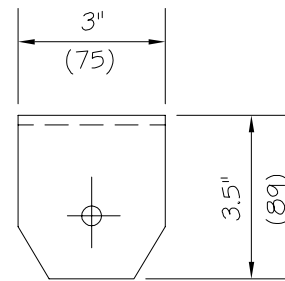
D-8.5



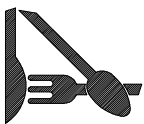
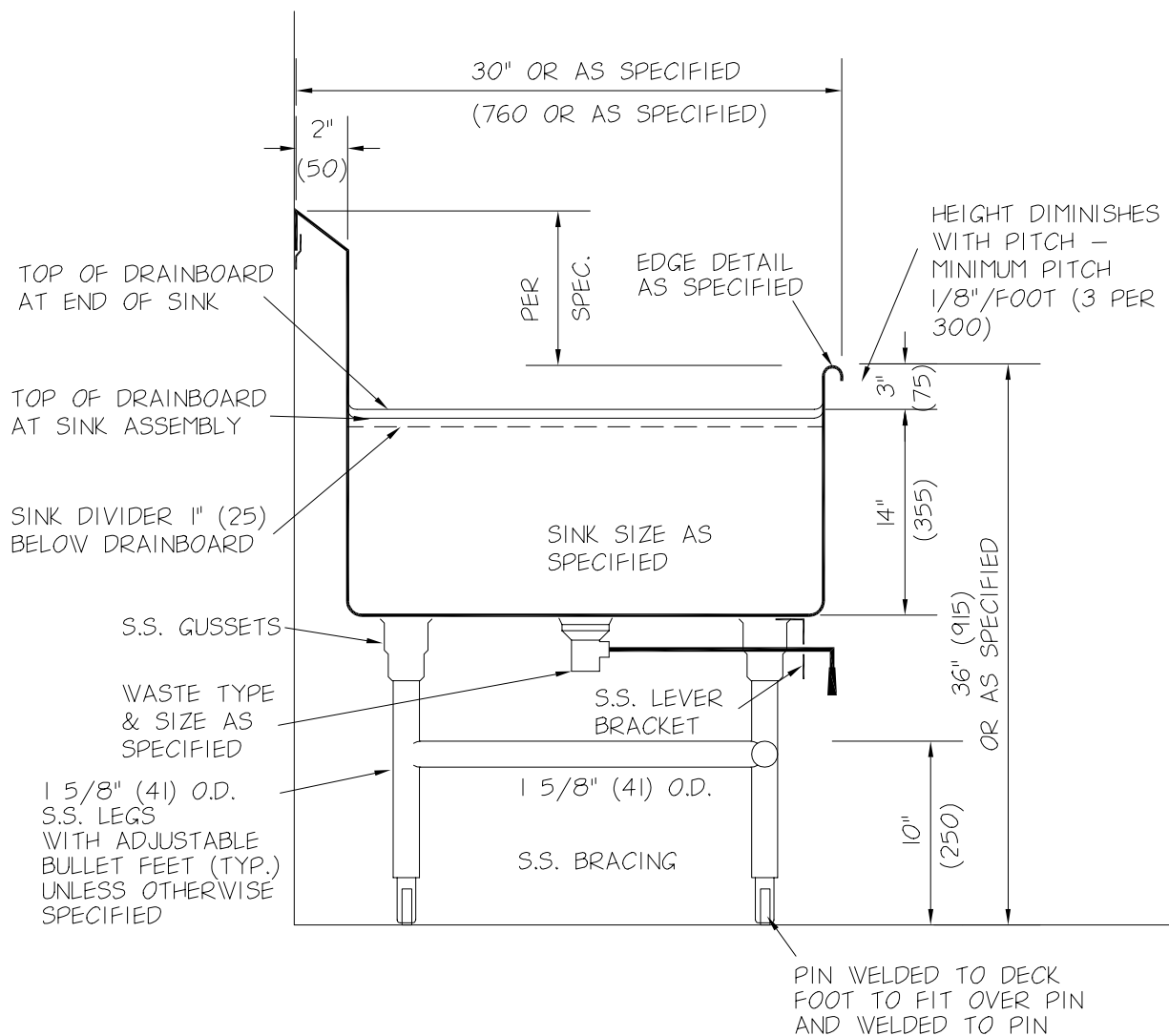
# **SOILED DISHTABLE**

D-10.5

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)



VALVE BRACKET



**POTSINK**

D-10.10

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)



TOP OF GUIDE RAILS  
TO BE FLUSH WITH  
WORK SURFACE

COVED FRONT  
AND BACK

SECTION

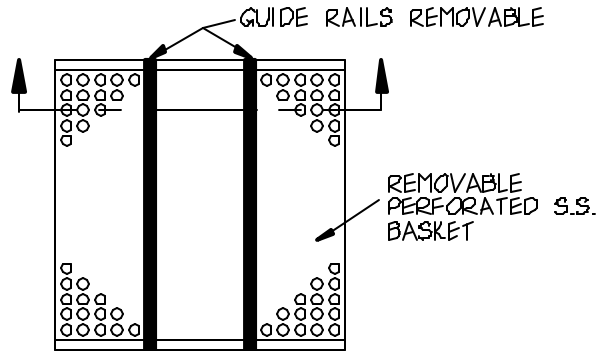
PERFORATED S.S. BASKET  
REMOVABLE

NOTE:

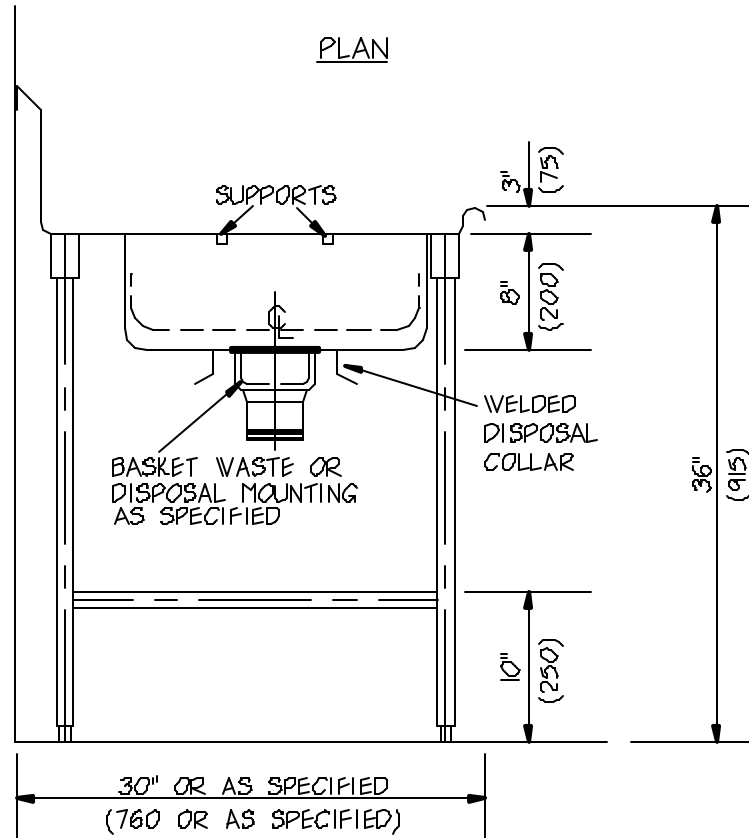
16" X 16" (400 X 400)  
FOR 16" (400) RACKS  
20" X 20" (500 X 500)  
FOR 20" (500) RACKS

NOTE:

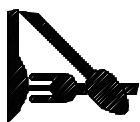
SINK WITH DISPOSAL  
MOUNTING DOES NOT REQUIRE  
PERFORATED BASKET -  
SUPPLY REMOVABLE  
RAILS ONLY



PLAN



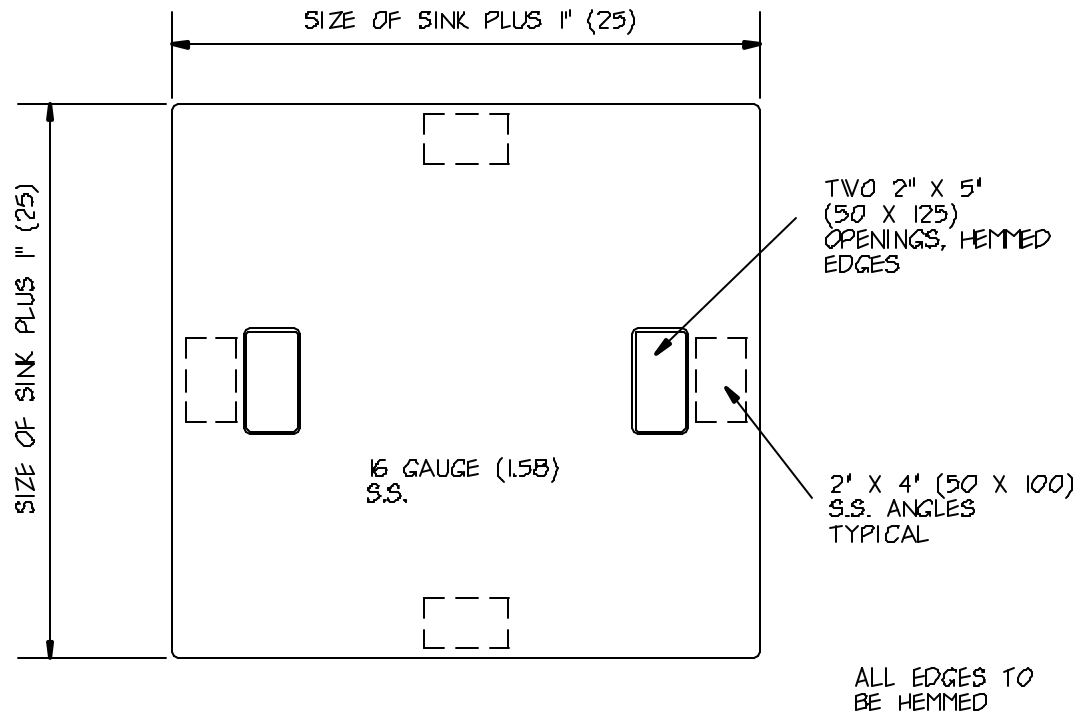
SECTION AT SINK



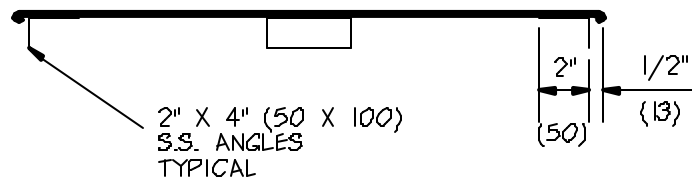
## DISHTABLE SINK

D-10.11

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)



PLAN



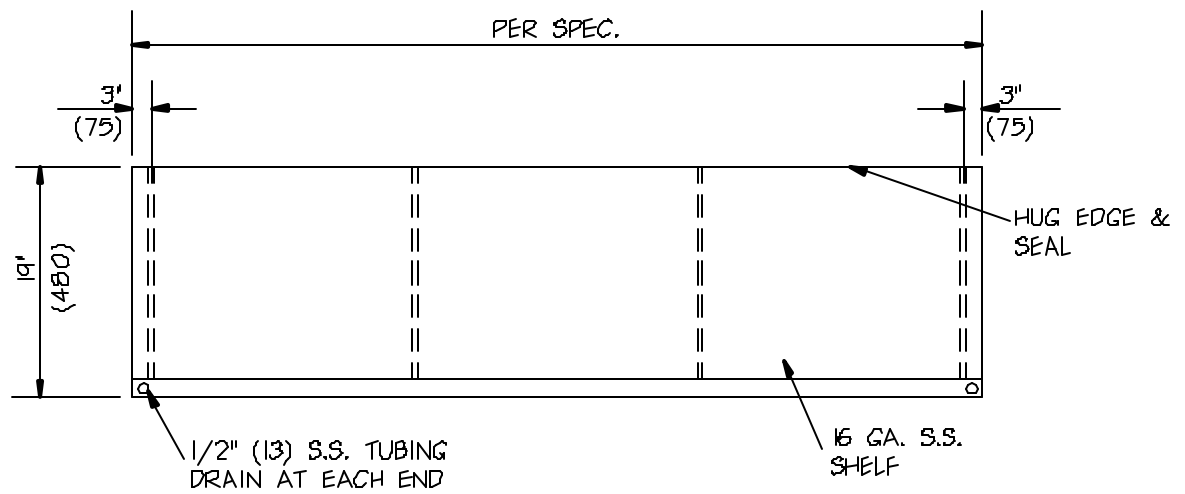
SECTION



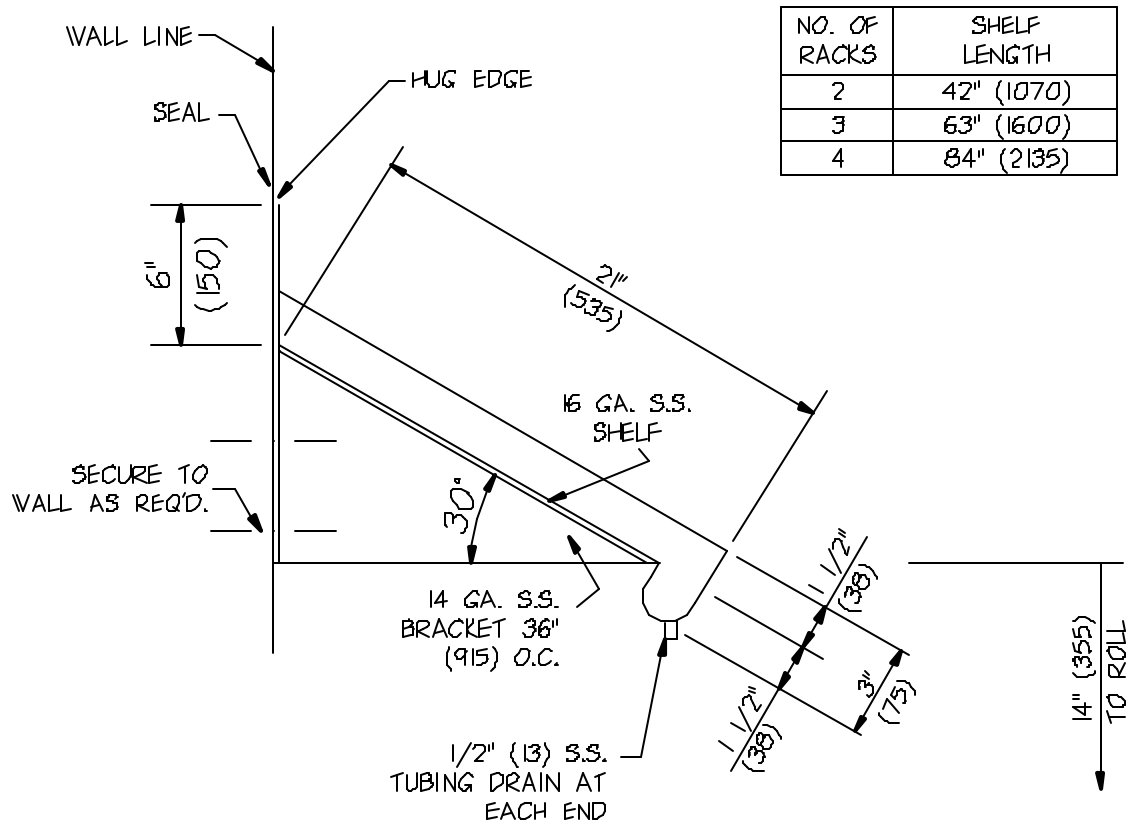
## REMOVABLE SINK COVER

D-10.12

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)



PLAN



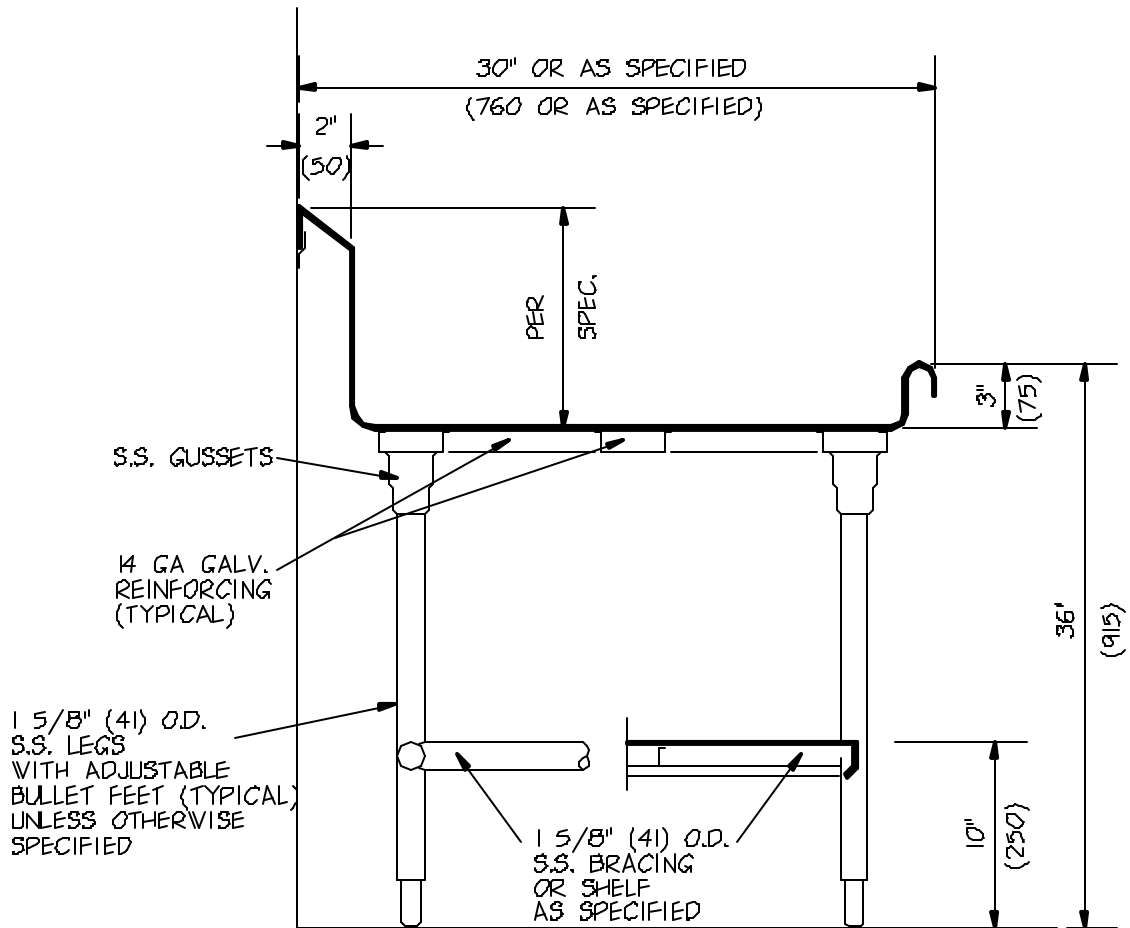
SECTION



## RACK SHELF - WALL MOUNTED

D-10.13

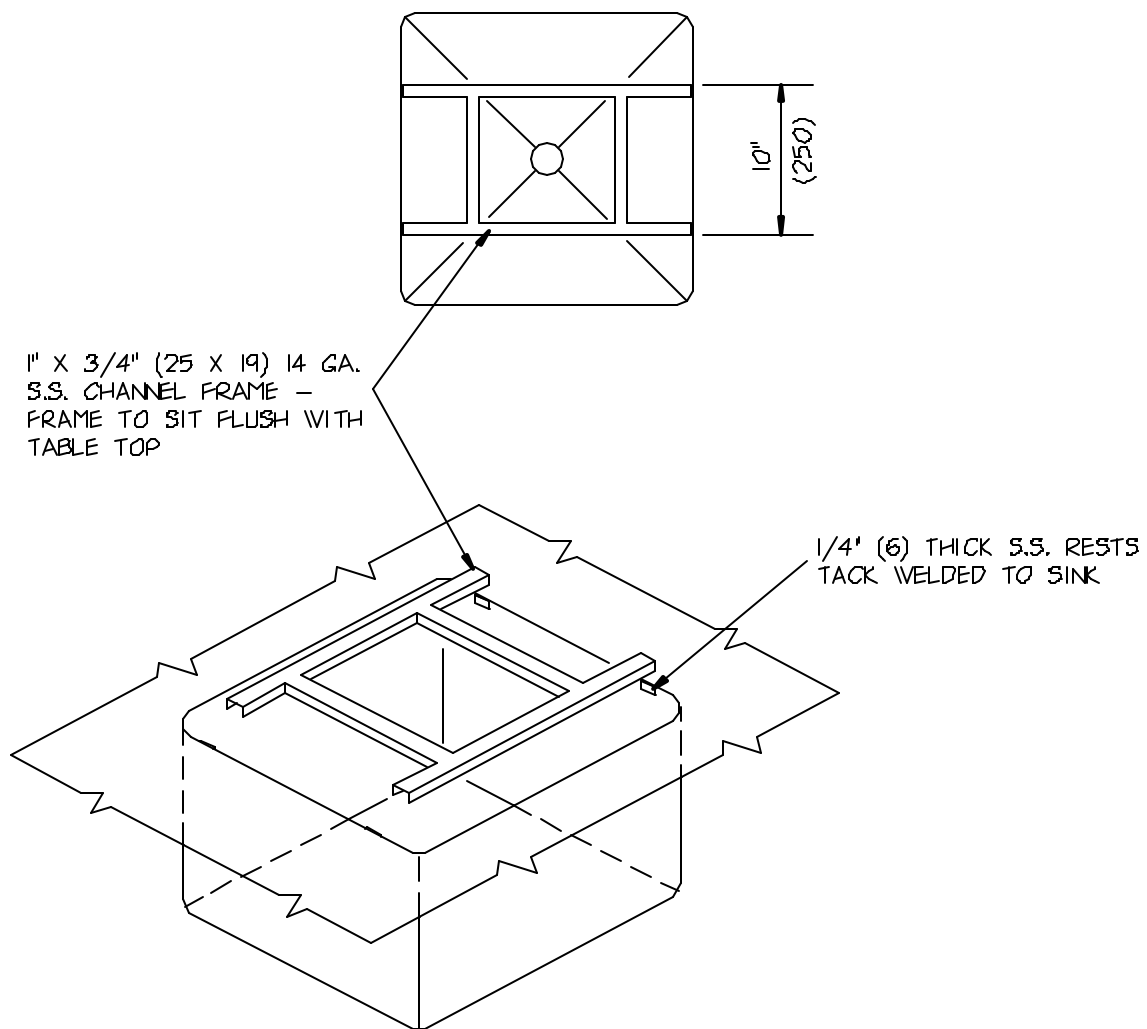
(DIMENSIONS IN BRACKETS ARE MILLIMETERS)



## CLEAN DISHTABLE

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

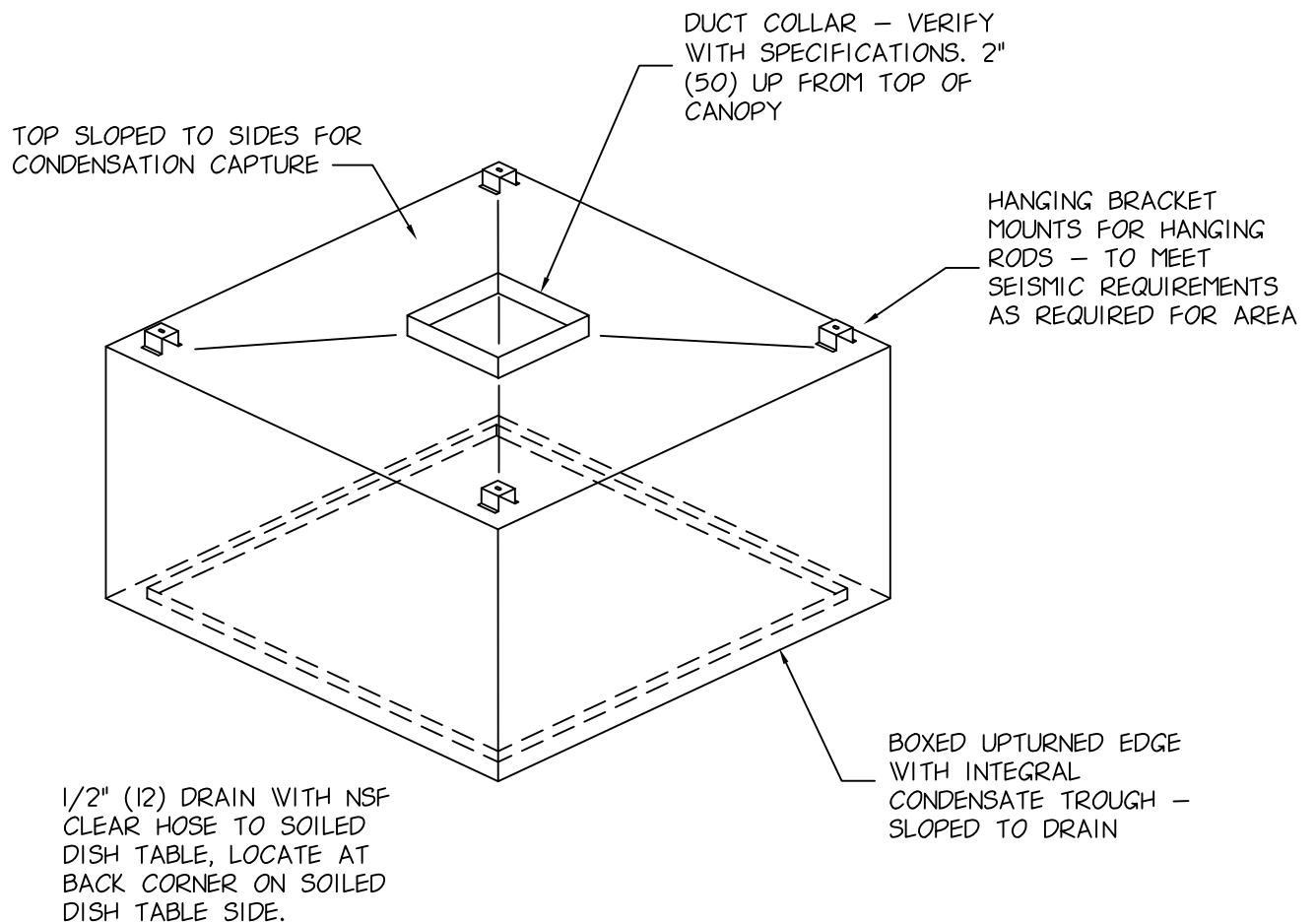
D-10.15



## REMOVABLE RACK GUIDE

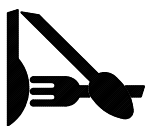
(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

D-10.16



16 GA. S.S. CONSTRUCTION,  
FULLY WELDED, LIQUID  
TIGHT

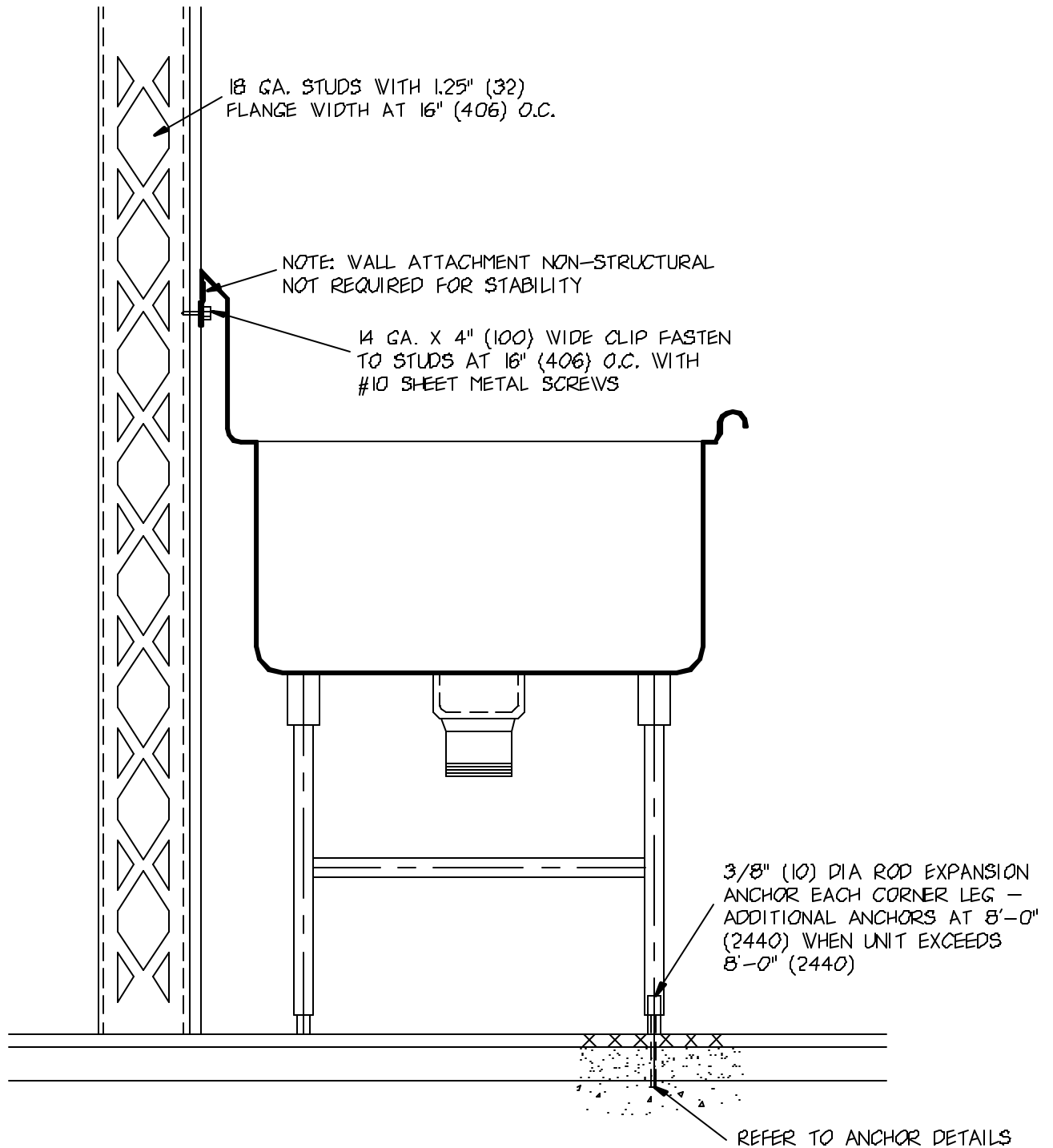
NOTE  
REFER TO ITEMIZED SPECIFICATIONS FOR SIZES  
REFER TO ITEMIZED SPECIFICATION & SCHEDULE TO  
VERIFY IF DUCT COLLAR IS REQUIRED



## CONDENSATE CANOPY

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

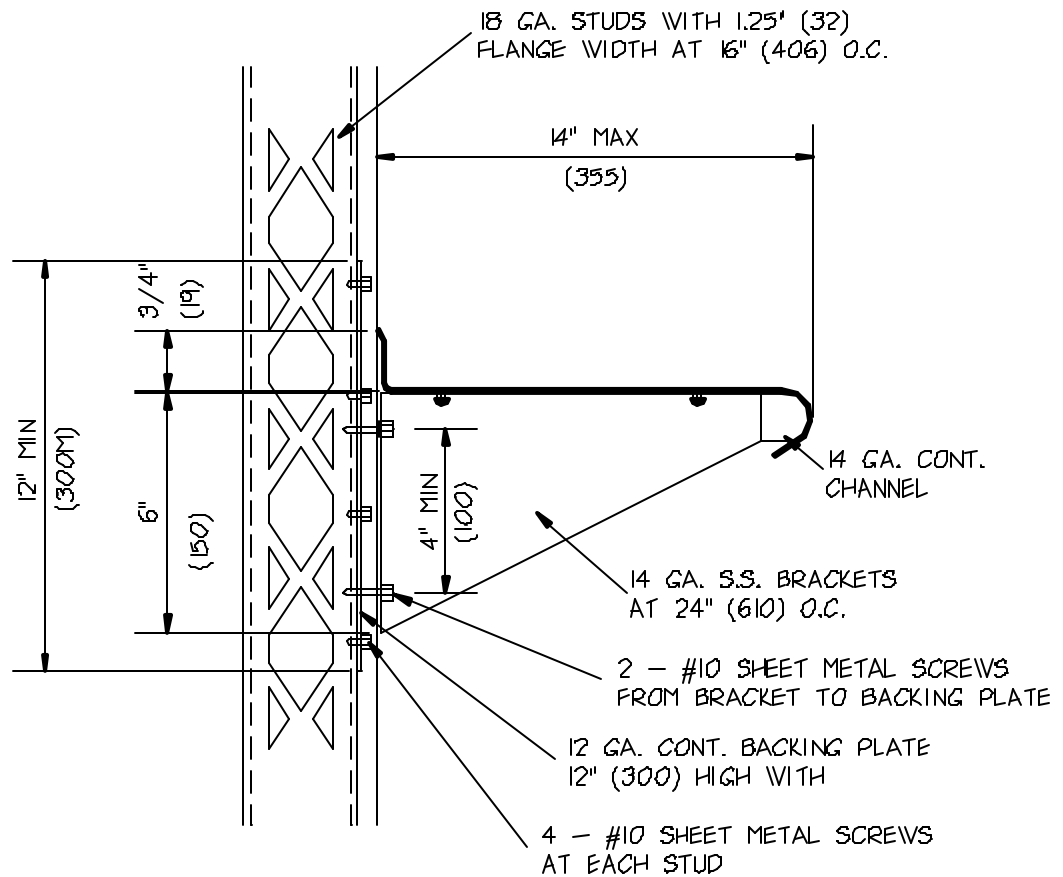
D-10.22



## **SMACNA GUIDELINES FOR SEISMIC RESTRAINTS** **SINKS/TABLES AGAINST WALLS**

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

D-13.1



NOTE: 24" (610) BRACKET SPACING BASED ON  
50 PSF LIVE LOAD. MAY INCREASE BRACKET  
SPACING IN INVERSE PROPORTION TO LOADING.  
EXAMPLE: 25 PSF LIVE LOAD AT 48" (1220) SPACING

REFER ALSO TO OVERSHELF DETAIL

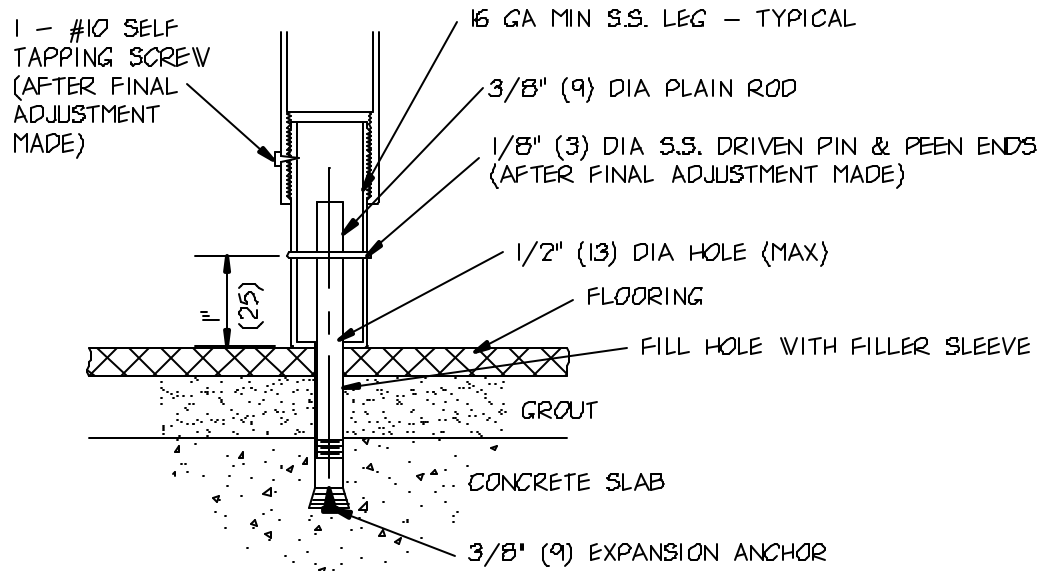


## SMACNA GUIDELINES FOR SEISMIC RESTRAINTS WALL MOUNTED OVERSHELVES

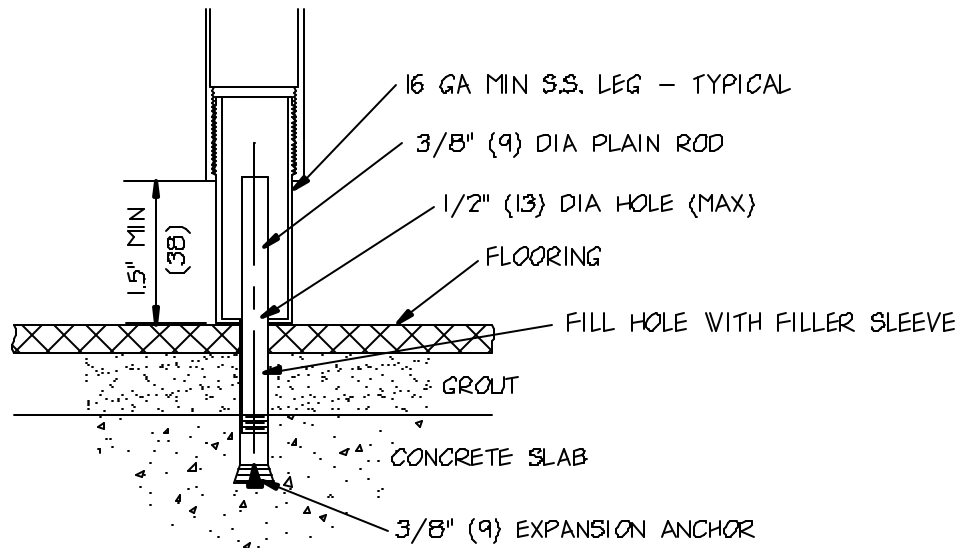
(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

D-18.2





BULLET LEG - SHEAR & UPLIFT



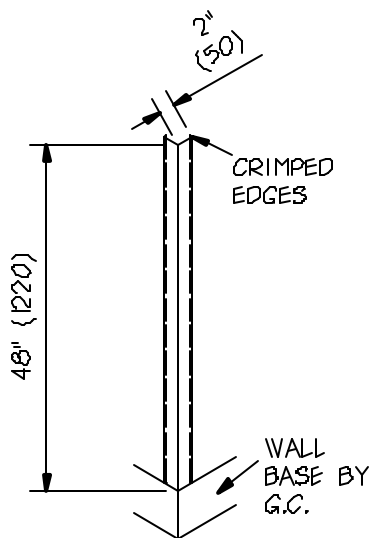
BULLET LEG - SHEAR



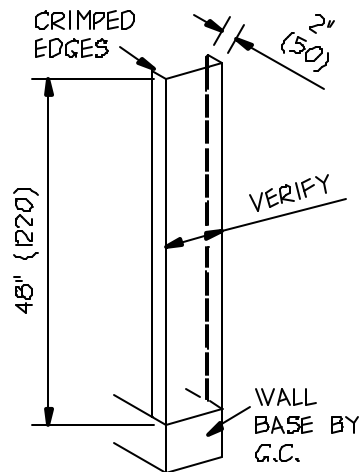
**SMACNA GUIDELINES FOR SEISMIC RESTRAINTS**  
**BULLET FEET**

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

D-13.4



CORNER  
GUARD

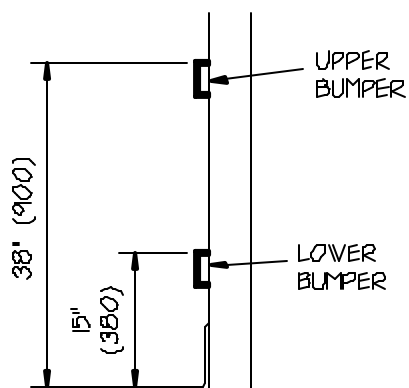


END WALL  
GUARD

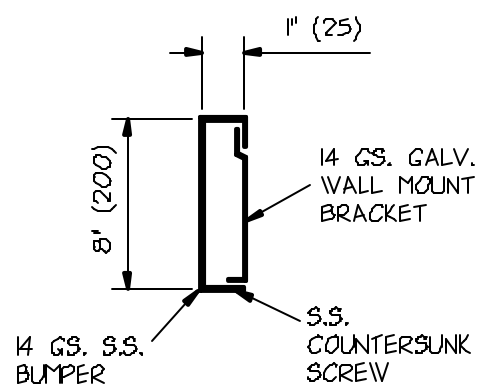


FLOOR

ELEVATION  
WALL BUMPER



END VIEW  
WALL BUMPER



SECTION WALL  
BUMPER

WALL BUMPER



# CORNER GUARD, END WALL GUARD WALL BUMPER

(DIMENSIONS IN BRACKETS ARE MILLIMETERS)

D-26.1

~~NOTE: The following brochures are for information only and are not to be used for shop drawing submittal.~~

~~It is the responsibility of the successful FEC to provide up to date and accurate brochures at submittal.~~

**NOTE: Refer to the supplied information/shop drawings from the Foodservice/Kitchen Contractor for accurate information per the equipment to be supplied**

**1 General**

**1.1 RELATED WORK**

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 08 44 00: Curtain Wall.
- .3 Section 09 21 16: Gypsum Board.
- .4 Section 09 91 00: Painting.

**1.2 REFERENCES**

- .1 ASTM D1784-81 Specification for Rigid PolyVinyl Chloride (PVC) Compounds and Chlorinated PolyVinyl Chloride (CPVC) Compounds.
- .2 NFPA-701 Vertical Burn Test for flame resistant fabric.
- .3 CAN/CGSB 4.2 Method 12.1, Tear Strength of fabric.

**1.3 SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 – Submittals.
- .2 Submit duplicate samples of manufacturer's standard fabric colours for selection by Consultant.
- .3 Submit product data sheets for review by Consultant, on roller assembly, controls and solar optical properties of shade fabrics.
- .4 Submit shop drawings in accordance with Section 01 33 00 – Submittals.
- .5 Indicate dimensions in relation to window jambs, operator details, head and sill anchorage details, hardware and accessories details.
- .6 Coordinate installation details with Sections 09 21 16 and 09 22 16.
- .7 Provide on site mock up of one window in selected shade cloth colour for approval by Owner prior to ordering shade cloth material.
- .8 Provide maintenance data on complete sunscreen roller shade assembly for inclusion in Maintenance Manual.

**1.4 QUALITY ASSURANCE**

- .1 Provide products of acceptable manufacturers with proven record of satisfactory use in similar service for a period of three years.
- .2 Use experienced installers approved by roller shade manufacturer.
- .3 Deliver, handle and store materials in accordance with manufacturer's written instructions.

**1.5 WARRANTY**

- .1 Provide manufacturer warranty stating that controls will be free from manufacturing defects for five (5) years from date of approved installation.

- .2 Provide manufacturer warranty stating that shade cloth will be free from manufacturing defects and will remain flat and free from distortion for a period of five (5) years from date of approved installation.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused vinyl, metal and wiring materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.

## **2 Products**

### **2.1 MATERIALS AND FABRICATION**

- .1 Roller Shade System:
  - .1 Manually operated roller shade system contained in a 73 mm cassette unit with frontal mount side channels. Acceptable product, Solarfective Model 4400T, MechoShade by MechoShade Systems Inc., or similar product by SunProject of Canada Ltd. or Nysan.
    - .1 Snap-lock tube and spline fabric mounting system.
    - .2 Self-lubricating drive with large diameter sprocket and overrunning clutch assembly.
    - .3 Stainless steel bead drive chain with upper and lower chain stops and child safe chain retainer.
    - .4 One piece square extruded clear anodized aluminum cassette box closed on all sides with PVC end caps. Standard wide bracket enclosure with snap-loc fascia.
    - .5 Internal self cleaning brush for fabric.
    - .6 Shadecloth guide.
    - .7 Location: as indicated on drawings.
  - .2 Sunscreen Fabric: Very dense shadecloth, with translucent weave, openness factor listed, suitable for clear low 'E' glazing, PVC free.
    - .1 Flame retardant treated.
    - .2 Weight: 608 g/m<sup>2</sup>.
    - .3 Roll Width: 1 829 mm.
    - .4 Polyester core yarn: PVC free; 79% polyester, 21% vinyl, 0.63 mm thickness.
    - .5 Heat Resistance: ASTM D794-82; 130°C, no effect.
    - .6 Colour: Beige/Pearl Grey.
    - .7 3% Openness factor.
    - .8 Acceptable material Sheerweave 2500.

- .3 Bottom rail: Extruded aluminum hembar with integral grooves to accommodate fabric guide carrier at ends. Soft vinyl welt on bottom of bar.
- .4 Installation brackets: Concealed type as required to support assembly.

### **3 Execution**

#### **3.1 INSTALLATION**

- .1 Install blinds at exterior windows as indicated.
- .2 Coordinate installation with Sections 08 11 16, 08 44 00, 09 21 16 and 09 22 16.
- .3 Include brackets where necessary to support roller shade contained in cassette box.
- .4 Install cassette box plumb and level.
- .5 Adjust to provide for operation without binding.
- .6 Use non-corrosive metal fasteners for installation, concealed in final assembly.
- .7 Mount shades on doors and provide hold downs for shade at the bottom.

#### **3.2 CLEAN UP**

- .1 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .2 Dispose of waste materials in conformance with Construction Waste Management Plan.

#### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 06 20 00: Finish Carpentry.
- .2 Section 06 40 00: Architectural Woodwork.
- .3 Section 09 21 16: Gypsum Board.

**1.2 DESCRIPTION**

- .1 This Section includes the supply, fabrication, delivery to the site and installation of quartz countertops as indicated on the drawings and as specified.

**1.3 REFERENCES**

- .1 American National Standards Institute (ANSI).
  - .1 A108.5, Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
  - .2 A118.4, Latex-Portland Cement Mortar.
- .2 ASTM International (ASTM):
  - .1 ASTM C97, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
  - .2 ASTM C99, Standard Test Method for Modulus of Rupture of Dimension Stone.
  - .3 ASTM C170, Standard Test Method for Compressive Strength of Dimension Stone.
  - .4 ASTM C241, Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic.
  - .5 ASTM C615: Standard Specification for Granite Dimension Stone.
  - .6 ASTM C531, Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes.
  - .7 ASTM C880, Standard Test Method for Flexural Strength of Dimension Stone.
  - .8 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

**1.4 SUBMITTALS**

- .1 Shop Drawings:
  - .1 Prepare and submit shop drawings for review by the Consultant in accordance with Section 01 33 00.
  - .2 Show construction details of all solid surfacing and general arrangements, typical and special installation conditions, materials being supplied and all connections, attachments, anchorage and location of exposed fastenings, as applicable.

- .3 Incorporate plans, elevations, sections and details. Include dimensions, materials, finishes, cutouts, and attachments.
- .4 Do not fabricate until the shop drawings and other related submittals are reviewed by the Consultant.
- .2 Samples:
  - .1 Submit duplicate 75 mm x 75 mm solid surfacing samples in specified colour to the Consultant for approval.
  - .2 Submit duplicate 75 mm long joint sealer sample to the Consultant for approval prior to fabrication.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle quartz countertops in accordance with manufacturer's recommendations.
- .2 The Consultant will reject damaged materials or materials which do not comply with the specifications. Replace damaged or unacceptable materials with acceptable materials.

#### **1.6 QUALITY ASSURANCE**

- .1 Fabricator and Installer Qualifications: Minimum two (2) years documented experience in work of this Section.

#### **1.7 WARRANTY**

- .1 Provide manufacturer's ten (10) year warranty against defects in materials and workmanship.

#### **1.8 ENVIRONMENTAL CONDITIONS**

- .1 Install materials only in areas with a constant and minimum temperature of 15°C and to materials with a maximum moisture content of 12%.

#### **1.9 COOPERATION**

- .1 Cooperate with other trades and do all cutting, trimming etc in order to accommodate the work of others.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal packaging material for recycling in accordance with Construction Waste Management Plan.



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**2 Products**

**2.1 MATERIALS**

- .1 SS1: Solid Surface:
  - .1 Supplier: Caesarstone
  - .2 Colours: Fresh Concrete 4001.
  - .3 Thickness:
    - .1 19 mm, eased edges, backsplash 6" high or as indicated on drawings.
    - .3 Bullnosed edge 25 x 38 mm with 10 mm radius.
  - .4 Finish: Polished face and edge, nosing depth indicated.
- .2 Adhesive: Structural grade silicone or epoxy recommended by stone sheet manufacturer.
- .3 Latex-Portland Cement Mortar: to ANSI A118.4.
- .4 Joint Sealer: Latisil Tile and Stone Sealant by Laticrete International Inc.
  - .1 Colour: To match solid surface sheet colour selected.

**2.2 FABRICATION**

- .1 Cut panels accurately to required shapes and dimensions. Cut and polish with water-cooled power tools.
- .2 Radius ease exposed edges.
- .3 Laminate layers of surfacing as required to create built-up edges and trims c/w reveals.
- .3 Fabricate with hairline joints.
- .4 Solid Surfacing:
  - .1 Laminate exposed edges to achieve indicated thickness. Allow seaming adhesive on laminated joints to cure prior to handling, fabrication and installation.
  - .2 Butt edge strips and stagger joints. Avoid joints at the centre of long tops.
  - .3 Reinforce seams with a 100 mm wide double chambered reinforcement strip of solid surfacing. Bond to underside of each seam with seaming adhesive.
  - .4 Radius inside corners of cutouts minimum 6 mm and reinforce with corner blocks.
  - .5 Profile exposed edges to profiles indicated using manufacturer's recommended procedures.
  - .6 Sand edges and corners smooth, free of chips or nicks.
  - .7 Polish solid surfacing according to manufacturer's recommendations.
  - .8 Install solid surfacing countertops to cabinets and supports with dabs of clear silicone adhesive on 250 mm centres.
  - .9 Support horizontal surfaces of solid surfacing on 450 mm centres.

- .10 When placing solid surfacing between end enclosing walls allow 3 mm space per 3 m for dimensional movement.

### **3 Execution**

#### **3.1 PREPARATION**

- .1 Clean surfaces to receive fabrications. Remove loose and foreign matter that could interfere with adhesion.
- .2 Ensure substrate is level and provides adequate support for fabricated countertops.

#### **3.2 INSTALLATION**

- .1 Install fabrications in accordance with manufacturer's written instructions and reviewed shop drawings.
- .2 Adhere countertop fabrications with continuous beads of adhesive.
- .3 Install to tolerance of 3 mm in 3 m variation from level and plumb.
- .4 Maximum variation in plane between adjacent pieces at joint, plus or minus 1 mm.
- .5 Set fabrications in thin set mortar bed in accordance with ANSI A108.5.
- .6 Set plumb and level. Align adjacent pieces in same plane.
- .7 Install with hairline joints.
- .8 Fill joints between fabrications and adjacent construction with joint sealer, finish smooth and flush.
- .9 Seal countertop according to sealer manufacturer's recommendations.

#### **3.4 CLEANING**

- .1 Clean fabrications in accordance with manufacturer's instructions.
- .2 As work proceeds and at the completion of the work clean up and remove from site all debris and left over materials resulting from the work of this Section.
- .3 Dispose of waste materials in conformance with Construction Waste Management Plan.

#### **3.5 PROTECTION**

- .1 Protect installed fabrications with non-staining sheet coverings.

### **END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 71 23: Field Engineering.
- .2 Section 32 13 13: Concrete Slabs.

**1.2 DEFINITIONS**

- .1 Subgrade: Natural load bearing ground, after removal of unsuitable material.
- .2 Earth Excavation: Removal of all materials that is not defined as rock.
- .3 Solid, Floater Rock or Boulders: Any solid rock material in excess of one cubic metre that cannot be removed by means of heavy duty excavating equipment.
- .4 Heavy Duty Excavating Equipment: C235 Excavator with ripper and D9 Cat with ripper or equivalent.

**1.3 BLASTING**

- .1 Not permitted.

**1.4 DESCRIPTION OF WORK**

- .1 Provide labour, materials, equipment and services required to complete the bulk excavation, as shown on the drawings and as specified, including but not necessarily limited to:
  - .1 Excavation of site to elevations indicated, all to within tolerances specified.
  - .2 Removal of existing concrete, paving, curbs, vegetation, topsoil, fill and other appurtenances.
  - .3 Removal of excavated materials and debris from the site and transportation to permitted landfill site.
  - .4 Providing and maintaining temporary roads and ramps within excavation and removal of temporary access ramps.
  - .5 Provide pumping equipment to keep excavation free of water, whatever its cause.
  - .6 Place imported clean engineered fill below slabs on grade and around building perimeter and compact as specified.
  - .7 Remove all unacceptable excavated materials and dispose of them in a legal manner.
  - .8 Perform finish grading and contouring of landscaped areas as detailed.
  - .9 Refer to Civil drawings for site services work and site roads and parking areas.

**1.5 SITE VISIT AND ACCEPTANCE**

- .1 Visit the site, examine the existing conditions, ensure that all work can be performed in accordance with the drawings and specifications. Notify the Consultant of any

discrepancies or errors. The start of work implies acceptance of site conditions by the Contractor.

#### **1.6 QUALITY ASSURANCE**

- .1 Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- .2 Soil Testing and Inspection Service: Owner will provide soil testing and inspection service for quality control testing during earthwork operation.
- .3 Compaction of fill according to Proctor Density Standards.
- .4 Gradations of granular materials to Tyler Standards.
- .5 Material testing to CSA and ASTM Standards.
- .6 Blasting, if required, to Worker's Compensation Board requirements.

#### **1.7 JOB CONDITIONS**

- .1 A Geotechnical Report for the site is included for information of Contractors. The Owner and Consultants assume no responsibility for any interpretation made there from.

#### **1.8 INSPECTION AND TESTING**

- .1 The Contractor is to coordinate his work with the required inspection and testing services provided during excavation to verify expected soils conditions, to monitor all work and to perform any compaction tests that may be required. Advise the Consultant forty-eight hours prior to performing any work. Cooperate with the Consultant in the performance of the work at all times.
- .2 The Consultant will inspect all foundations and floor subgrades prior to placement of any fill or concrete. Conduct density tests on each lift of fill. Submit test results to Consultant for review and approval prior to pouring foundations or floors. Structural fill materials are to be approved by the Consultant in advance of placement.
- .2 The Contractor will pay for the testing services.
- .3 Re-inspections of defective work will be paid by the Contractor.
- .4 Geotechnical Consultant will inspect the following:
  - .1 Review of stripping depth.
  - .2 Review of Engineered Fill materials and compaction degree.
  - .3 Review of foundation subgrade, under slab fill materials and compaction.

#### **1.9 SUBMITTALS**

- .1 Submit to Geotechnical Engineer the proposed excavation schedule, procedures and any subsequent changes for review of feasibility, prior to commencement of work on the site.
- .2 Submit to Owner confirmation that the bulk excavation will be done in accordance with WorkSafe BC Regulations.
- .3 Submit groundwater control dewatering plan to Geotechnical Engineer for review.

- .4 As-Built Drawings: Provide as-built drawings showing only the authorized deviation from contract drawings; such as, grades, lines, levels, buried utilities and any changes incorporated into the work.

#### **1.10 SITE EXAMINATION**

- .1 Visit and examine site and note all visible characteristics and features affecting the work of this Section.
- .2 Check all existing conditions. Report any unsatisfactory conditions to Consultant prior to commencing excavation.

#### **1.11 EXCAVATION FIELD REVIEW**

- .1 Geotechnical Engineer will conduct random field reviews to observe the performance of the work and the stability of the excavation faces as the work progresses.
- .2 Geotechnical Engineer has the authority to stop the progress of the work in an emergency whenever, in his opinion, such stoppage may be necessary to ensure the safety of life, on the work or neighbouring property. This included authority to make changes in the work.
- .3 Where actual soil conditions warrant additional shoring, addition or deletion of excavation, as determined by the Geotechnical Engineer, then such excavation shall be considered as an addition or deletion as applicable to the contract, and the Contract Price will be adjusted in accordance with approved unit prices.
- .4 The Geotechnical Engineer or his authorized representative shall be the sole judge and shall decide on questions arising on actual soil conditions encountered, on excavation procedures, on shoring or protection to be provided and any other matter concerning the excavation, or shoring. His decision on such matters shall be final.
- .5 Cooperate with the Geotechnical Engineer in all matters pertaining to excavation work and allow him free and unobstructed access to the site at all times.

#### **1.12 PROTECTION**

- .1 Barricade open excavations and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
- .2 Protect existing building, utilities, sidewalks, pavements and other facilities from damage caused by hazards created by excavation operations.
- .3 Protect all existing benchmarks, survey iron posts or pins from damage. Replace any disturbed survey markers by a registered Land Surveyor at no extra cost to the Contract Price.
- .4 Survey and monitor adjacent buildings for movement during excavation.
- .5 Provide adequate protection measures to protect workmen and occupants on and near the site. Fully protect streets and adjacent property throughout the entire construction period.
- .6 Provide shoring and bracing to prevent caving, erosion or gullyng of sides of excavation in accordance with the Worker's Compensation Board requirements. Shore and brace any excavation face exceeding 1.5 m in depth. Any damage done or settlement caused by inadequate measures taken by the Contractor to be made good immediately at no cost to the Owner.

- .7 Provide for surface drainage during the excavation period in a manner so as not to disturb or cause flooding of adjacent properties or streets. Keep all excavations free of water during the entire progress of the work, regardless of the cause, source, or nature of the water, provide pumping equipment if required.
- .8 Protect streets, existing site and property, do not drive heavy cleated or flanged equipment over curbs or sidewalks without protection.
- .9 Protect existing trees and shrubs indicated to remain. Do not disturb soil within branch spread of trees or shrubs. If excavating through roots, excavate by hand and cut roots with a sharp axe or saw. Seal cuts with approved tree wound paint.
- .10 Effect approved measures to minimize dust as a result of this work. Provide a wash-off area for trucks prior to their leaving the site to eliminate dirt and mud being tracked onto adjacent street.
- .11 Remove debris spilled on paved streets, parking areas and sidewalks at least once a day.

**1.13 STREET MAINTENANCE**

- .1 Effect approved measures to minimize dust as a result of this work. Provide a wash-off area for trucks prior to their leaving the site to eliminate dirt and mud being tracked onto adjacent street.
- .2 Remove debris spilled on paved streets, parking areas and sidewalks at least once a day to the satisfaction of City of Burns Lake.
- .3 Roads, curbs, parking lots or sidewalks damaged during the construction period by the contractor's equipment are to be repaired to the local standards and paid for by the Contractor.

**1.14 DUST CONTROL**

- .1 Provide adequate control of dust for the duration of this contract. Provide dust control as approved by Owner and adequate to avoid inconvenience and complaints from adjoining property holders.

**1.15 SITE ACCESS AND TRAFFIC**

- .1 Obtain approval from the local Engineering department for site access locations, in and out traffic from the excavation site and for proposed hauling routes to disposal areas. Comply with all requirements of the local Engineering Department for such access and routing.
- .2 Provide traffic control to vehicles and equipment entering and leaving the site.
- .3 Provide and maintain adequate warning signs, flashing lights, barricades, etc. as required by the authorities having jurisdiction.

**1.16 EXISTING UTILITIES**

- .1 Locate existing underground utilities in areas of work from existing records and provide adequate means of protection during earthwork operations. Mark utility locations on site to prevent accidental disturbance during the Work.
- .2 Cap off utilities at the property line and pay for all related fees. Remove abandoned utilities when so directed by the Consultant.

- .3 Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Consultant immediately for directions. Cooperate with the Consultant and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to approval of Utility Owner.
- .4 Do not interrupt existing utilities, except when permitted in writing by Consultant and utility Owner and then only after accepted temporary utility services have been provided.
- .5 Any damage done, settlement or collapse to services caused by inadequate measures being taken by the Contractor to prevent them are to be made good immediately at no additional cost to the contract.

## **2 Products**

### **2.1 MATERIALS**

- .1 Materials for temporary roads and ramp access to be as required to adequately carry intended truck loads and minimize ramp maintenance and street cleaning.
- .2 Provide suitable surfacing and granular base material for ramps and road surfaces within excavation.
- .3 Granular fill for over-excavation to be 75 mm minus pit run or crushed gravel with not more than five (5%) percent passing the No. 200 US Standard sieve and having no organic content.

### **2.2 GRANULAR FILL MATERIALS**

- .1 Granular aggregate to be composed of inert, clean, tough, durable particles of crushed rock, gravel, sand and fines capable of withstanding the deleterious effects of exposure to water, freeze thaw, handling, spreading and compacting. the aggregate particles to be uniform in quality and free from all organic material and an excess of flat or elongated particles.
- .2 Type 1: Crushed limerock - 75 mm crushed stone subbase - granular aggregate conforming to the gradation of Table 1 below.
- .3 Type 2: Structural fill - granular aggregate conforming to the gradation of Table 1 below for Select Clean Sand and Gravel.
- .4 Type 3: Base: crushed granular aggregate conforming to the gradation of Table 1 below. 60% of the material passing each sieve size must have one or more fractured faces.
- .5 Type 4: Drain rock - 25 mm - granular aggregate conforming to the gradation of Table 1 below.
- .6 Type 5: Torpedo - 10 mm - granular aggregate conforming to the gradation of Table 1 below.
- .7 Type 6: Sand - granular aggregate consisting of clean river sand or bank sand with fine gravel containing less than 5% passing the U.S.S. 200 sieve.

Table 1

Sieve sizes		Percent passing sieve size	
U.S. sieve size	Opening (mm)	Type 1	Type 2
6"	150	100	100
3"	75	100	100
2"	50	90 - 100	75 - 100
1 1/2"	38	86 - 92	62 - 100
1"	25.4	65 - 75	58 - 100
3/4"	19	55 - 70	45 - 100
1/2"	12.7	30 - 50	35 - 82
3/8"	9.5	30 - 40	30 - 75
#4	4.75	20 - 30	20 - 50
#8	2.36	10 - 16	15 - 37
#16	1.18	6 - 10	11 - 28
#30	600 um	4 - 8	9 - 21
#50	300 um	2 - 6	5 - 16
#100	150 um	2 - 6	0 - 11
#200	75 um	0 - 4	0 - 5

Sieve Sizes		Percent passing sieve size		
U.S. Sieve Size	Opening	Type 3	Type 4	Type 5
6"	150	100	100	100
3"	75	100	100	100
2"	50	100	100	100
1 1/2"	38	100	100	100
1"	25.4	100	90 - 100	100
3/4"	19	100	20 - 55	100
1/2"	12.7	70 - 100	0 - 10	100
3/8"	9.5	62 - 92	0 - 5	85 - 100
#4	4.75	35 - 85	0	10 - 30
#8	2.36	32 - 60	0	0 - 15



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#16	1.18	15 - 39	0	0
#30	600 um	9 - 25	0	0
#50	300 um	6 - 9	0	0
#100	150 um	2 - 12	0	0
#200	75 um	0 - 5	0	0

### **3 Execution**

#### **3.1 PREPARATION**

- .1 Engage a qualified land surveyor registered in British Columbia, acceptable to the Owner for survey requirements.
- .2 Set out all lines, points and levels for building. Establish the requirements as to extent of excavating and disposal.
- .3 Maintain all stakes and witness points during the Work.
- .4 Clear site of all debris.
- .5 Break-up and remove all existing asphalt paving, concrete paving, concrete walks and curbs within the site.
- .6 Remove abandoned [power poles, concrete bases, concrete foundations, walls and other concrete appurtenances within the site.

#### **3.2 SETTING-OUT WORK**

- .1 Set out all lines, elevations and levels for the concrete foundations, concrete slabs, sidewalks, patios, pads, parking areas and driveways. Establish the requirements as to extent of excavating, disposal, backfilling and compaction of native and imported fill materials.

#### **3.3 PROTECTION, SHORING AND DEWATERING**

- .1 Provide temporary shoring, poly protection and timber lagging to sides of excavations as may be required. Protect excavation and new construction as well as adjacent properties, streets and sidewalks from damage of any type.
- .2 If any excavation below the groundwater level will encounter significant amounts of ground water flow into the excavation, a groundwater control scheme will be required. Submit proposed groundwater control scheme to the Consultant for review prior to proceeding with dewatering.
- .3 Direct surface drainage away from excavated areas. Control grading in and adjacent to excavations to prevent water running into excavated areas or onto adjacent properties.
- .4 Provide pumping equipment as required to keep all excavations free of water, regardless of cause.
- .5 Take measures to avoid pumping silt into natural drainage courses or storm drainage systems.

- .6 Make allowances for draining the work site into the storm sewers and cleaning the sumps and gutters of dirt.

### **3.4 BULK EXCAVATION**

- .1 Prior to excavation, notify Geotechnical Engineer 48 hours before commencing bulk excavation.
- .2 Excavate to elevations, cross-sections and dimensions indicated on the drawings.
- .3 Final elevations to be within +/- 25 mm of required elevations.
- .4 Remove any existing abandoned underground service lines indicated or encountered during excavations.
- .5 Remove remaining foundations, footings, bases, slabs, building debris and all other obstructions below grade.
- .6 At the cut face phase operations so that a stable slope is maintained as the excavation progresses. The Geotechnical Engineer will examine the excavation as it progresses and will design any additional support work as may be required to maintain a stable excavation.
- .7 Remove all boulders encountered during excavation. Boulders 1.0 yd<sup>3</sup> and under in size are included in this contract. Removal of boulders over 1.0 yd<sup>3</sup> in size will be paid for at an approved unit price.
- .8 Level and clean excavation bottoms free from loose material and debris.
- .9 The final excavation will be inspected by the Geotechnical Engineer.
- .10 Correct over-excavation of bottom of bulk excavation, below elevations indicated, by replacing with granular material approved by Geotechnical Engineer.
- .11 No additional compensation will be paid for any changes due to deterioration or over-excavation caused by activities or neglect of the Contractor.

### **3.5 RAMPS AND ROAD SURFACES**

- .1 Provide and maintain temporary ramps and road surfaces within the excavation as required during bulk excavation.
- .2 Ramps to be an unexcavated ramp with gradient to suit. Use suitable gravel road base material for ramp and travel surfaces. Maintain ramp surface until completion of excavation.
- .3 Remove temporary ramp on completion of excavation. Allow in Contract Price for removal of equipment from excavation after completion of the work.

### **3.6 DETAIL EXCAVATION**

- .1 Remove all topsoil, fill, organics, water softened, loosened, disturbed or otherwise deleterious materials encountered to expose the natural existing ground surface for the building. Excavate to depths required for new pavement areas.
- .2 If excavation through roots is required, excavate by hand and cut roots with a sharp axe. If tree pruning is necessary, make cuts clean, smooth and slanted. Apply tree paint to all wounds.

- .3 Excavate to elevations and dimensions indicated or required by the Work, plus sufficient space to permit erection of forms, shoring, waterproofing, installation of footing drains and gravel and all other work required including inspection of foundations.
- .4 Remove all obstructions encountered in the course of excavation. Correct excavations to greater than required depth in manner as directed by Consultant. Protect unintentionally over-excavated bearing surfaces as necessary and leave unaltered until after inspection by the Consultant. Bring bearing surface elevations back to that shown on the drawings using methods approved by the Consultant.
- .5 Do not disturb native soils and bearing surfaces. Use a smooth clean-up bucket for excavations. When excavation is completed, have Consultant inspect excavations.
- .6 Do not permit construction traffic on exposed subgrade.
- .7 Use light weight equipment during excavation and placement of fills to prevent disturbance of subgrade.
- .8 Protect and keep stripped subgrade dry and free of ponded water prior to placement of sub-base or structural fill. Install a blinding layer of lean concrete or clear gravel over excavation area to protect bearing capacity of subgrade.
- .9 Remove any softened soils and replace with compacted engineered fill. Engineered fill to consist of clean sand or sand and gravel containing less than 5% fines by weight.
- .10 Compact engineered fill to minimum 95% Modified Proctor (ASTM D1557) dry density with a moisture content within 2% of optimum for compaction.

### **3.7 SLAB ON GRADE FILL**

- .1 The subgrade for slab and foundations is natural existing ground surface cleared and excavated to required depths. Over excavate any soft or loose fills and replace with engineered fill.
- .2 Place slab on minimum 10 mil polyethylene vapour barrier. Lap sides and ends of sheets a minimum of 300 mm and seal with tape or sealant. Lap sides of sheets in direction concrete will be spread.
- .3 Place minimum 150 mm of 19 mm clear crushed gravel fill below slabs on grade. Place engineered fill to achieve building grades. Compact to minimum 95% Modified Proctor maximum dry density (ASTM D1557) at a moisture content within 2% of optimum for compaction.
- .4 Connect the under slab fill hydraulically to the perimeter drainage.

### **3.8 PERIMETER BACKFILL**

- .1 Do not commence backfilling until concrete has attained design strength, forms have been removed, the excavation cleaned of debris, the underground services are installed, and dampproofing and waterproofing have been installed and inspected by authorities having jurisdiction and the Consultant.
- .2 Areas to be backfilled are to be free of debris, snow, ice, water or frozen ground. Backfill or fill material to be unfrozen and not contain ice, snow or debris.
- .3 Install specified perforated PVC drain pipe grid complete with all clean-outs and fittings at least 300 mm below slab on grade and around perimeter of foundations as detailed on plumbing drawings. Encase perimeter drainage in 200 mm of 19 mm clear crushed gravel and cover with 200 mm thick layer of birdseye gravel.

- .4 Place drainage consisting of Types 4 and 5 against exterior foundation. Compact backfill in accordance with applicable designed horizontal pressures. Slope ground surface around building away from building to drain water away. Cover the top 400 mm of backfill with silty soils to prevent water infiltration into perimeter backfill and drainage system.

### **3.9 SITE GRADING AND FILL**

- .1 Commence site grading after backfilling is completed. Site grading to ensure that surface water drains away from the building.
- .2 Coordinate work with catch basin, manhole and related pipe installation.
- .3 Establish subgrade parallel to the finished grades indicated on the drawings and to match existing grades. Rough graded surfaces to be dense, free from irregularities, with maximum variance of 38 mm above or below required grades.
- .4 Refer to site drawings for top of paving and top of grade elevations and perform rough grading accordingly.
- .5 If tests indicate fills do not meet specified requirements, remove defective fills, replace and retest as instructed by Consultant.

### **3.10 SITE SERVICES**

- .1 Refer to Civil drawings and specifications.

### **3.11 PAVED AREAS GRADING AND FILL**

- .1 Refer to Civil Drawings.

### **3.12 DISPOSAL**

- .1 Remove all excavated materials from the site and the property. Remove all debris, rubbish and vegetation from the site and property and dispose of them in a legal manner.
- .2 Transport all excavated materials and debris to a permitted landfill site or disposal area. Do not leave excavated materials or debris on the site or adjoining property.

### **3.13 CLEAN UP**

- .1 As the work proceeds and on completion promptly clean up and remove from the site any debris and waste material or rubbish resulting from the work.
- .2 On completion of the bulk excavation work remove all rubble and dirt and leave subgrades clean for later operations.

**END OF SECTION**

**1 General**

**1.1 RELATED SECTIONS**

- .1 Structural Drawings: Cast-In-Place Concrete.
- .2 Section 01 71 23: Field Engineering.
- .3 Section 32 13 13: Concrete Slabs.

**1.2 REFERENCES**

- .1 Canadian Standards Association
  - .1 CAN/CSA A23.1, Concrete Materials and Methods of Construction, Section 5.3.2.
- .2 American Society for Testing and Materials
  - .1 ASTM C33, Specification for Concrete Aggregates.
- .3 Master Municipal Construction Documents Association (MMCD) Platinum Edition Specifications.

**1.3 PROTECTION**

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage.
- .2 Provide access to building at all times. Coordinate paving schedule to minimize interference with normal use of premises.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Do not dispose of unused sealant materials into landfill. Divert materials to municipal hazardous materials depot.
- .3 Divert unused materials from landfill to recycling facility.
- .4 Collect and separate for disposal material for recycling in accordance with Construction Waste Management Plan.

**2 Products**

**2.1 MATERIALS**

- .1 Granular Base: in accordance with drawings.
- .2 Concrete Materials: in accordance with Structural drawings.
- .3 Joint fillers: preformed non-extruding resilient bituminous type, to ASTM D1751, 20 mm wide x lengths required.
- .4 Form Release Agent: Non-staining mineral type, chemically active release agents containing compounds that react with free lime to provide water soluble soap.
- .5 Curing compound: ASTM C309, type 1-D or 2.

- .6 Sheet material for curing: ASTM C171, waterproof paper or plastic sheets.
- .7 Joint sealant, hot poured: ASTM D3405.
- .8 Dowels and tie bars: CSA G30.12-M77. Dowels clean, straight and free from flattened or burred ends. Tie bars, deformed steel bars.
- .9 Metal preformed keyway: 0.8 mm thick wiped zinc coated steel or galvanized, copper clad or similar rust resistant material of sufficient stiffness to support upper keyway.

## **2.2 MIX DESIGNS**

- .1 In accordance with structural drawings General Notes.
- .2 Standard Concrete:
  - .1 Minimum 28 day compressive strength: 32 MPa.
  - .2 Aggregate size: Maximum 20 mm.
  - .3 Slump: 80 mm, unless stated otherwise on structural drawings or general notes.
  - .4 Exposure class: C2.
  - .5 Air content: 5% to 8%.
  - .6 Water/cement ratio: maximum 0.45.
  - .7 Portland Cement Type 10.
  - .8 Chloride: maximum 0.1%, including admixtures, by mass of cement.

## **3 Execution**

### **3.1 SUBBASE INSPECTION**

- .1 In Accordance with Geotechnical report.
- .2 Ensure that subgrade preparation conforms to levels and compaction required to allow for installation of granular base.
- .3 Complete all drainage and underground services in conjunction with subgrade preparation before commencement of subbase construction.
- .4 Extend subgrade preparation to rear face of all edge restraints.
- .5 Compact subgrade to 100% of AASHTO maximum density.
- .6 Trim subgrade to +/- 25 mm of design levels.

### **3.2 BASE COURSE PLACEMENT**

- .1 Place and compact to minimum 95 % Modified Proctor density, in accordance with ASTM D1557, to achieve compacted thickness indicated.

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**3.3 FORMWORK**

- .1 Use wood forms of select dressed lumber, straight, free from defects and thoroughly cleaned.
- .2 Use flexible forms for all curves less than 60 m radius.
- .3 Set forms free from waves and irregularities in line or grade on approved compacted base to line and grade indicated on Contract Drawings.
- .4 Tolerances:
  - .1 Maximum horizontal and vertical deviation – 6 mm.
  - .2 Maximum deflection from horizontal and vertical alignment – 6 mm in 3 m.
- .5 Adequately brace forms to maintain specified tolerance after concrete is placed.
- .6 Treat forms lightly with form release agent. Remove surplus form release agent.

**3.4 TIE BARS AND DOWELS**

- .1 Paint portion of dowel intended to move within hardened concrete with bond breaking compound such as oil or a form release agent, or enclose in tight-fitting plastic sheath.
- .2 Provide sufficient number of joint dowel assemblies in advance of paver to avoid delay in concrete placement.
- .3 Remove oil, grease, dirt and deleterious material before placing concrete.

**3.5 CONCRETE PLACEMENT**

- .1 Do concrete work in accordance with CAN/CSA-A23.1. Place concrete to lines, grades and depths shown on Contract Drawings.
- .2 Make walks and slabs 100 mm thick with 150 mm thickened edges, unless indicated otherwise.
- .3 Do not install vapour barriers under exterior slabs.
- .4 Install reinforcing where required by structural drawings, in accordance with structural drawing general notes.
- .5 Place concrete on dampened subgrade or base as close to final position as possible to minimize handling.
- .6 Discharge concrete into forms as soon as practical after mixing.
- .7 Place concrete using specified equipment. Use hand placing when machine spreading is not feasible.
- .8 Spread uniformly to thickness sufficient to allow for proper consolidation and finishing.
- .9 Operate with a near a continuous forward movement as possible. Schedule concrete supply to keep interruption to a minimum.
- .10 Insert tie bars as specified.
- .11 When completing concrete placement for day, carry placement to scheduled control or contraction joint location.

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- .12 Where concrete placement is stopped for more than 30 minutes, construct extra bulkhead and construction joint between concrete placements.
  - .13 Stop pavement operations if rain is sufficiently intense to separate cement from surface of mixture or hinder finishing operations.
  - .14 Protect freshly laid concrete from damage by rain. Provide approved covering to protect concrete surface, extend coverings over edges of concrete and arrange so as not to bear on unprotected edges.
  - .15 Equipment – fixed form paving:
    - .1 Scratch template for checking contours of base to operate from side forms and provided with adjustable rods projecting down to base course at maximum 300 mm intervals.
    - .2 Hand operated transverse screeds spanning side forms.
    - .3 Mechanically powered vibrating beam spanning side forms.
    - .4 Mechanical self-propelled spreader capable of moving concrete forward and laterally and of correcting segregated areas.
    - .5 Vibrators mounted at rear of spreader or independent self-propelled unit at front of finisher.
    - .6 Mechanical, self-propelled finisher with two independently operated transverse screeds.
    - .7 Float, wood or metal, straight, smooth, sufficiently light to avoid sinking into concrete surface, operated mechanically or manually from edge to edge while advancing longitudinally.
  - .16 Miscellaneous equipment:
    - .1 Hand operated floats, highway straight edges and fluting tools used by skilled workmen.
    - .2 Edging tool.
    - .3 Water truck equipped with pump, hose line and fine spray nozzle.
  - .17 Hand-held, manually operated sprayer for applying membrane curing compound.
  - .18 Consolidation: Sequence of operations; strike off and consolidation, floating, straight edging and final surface finishing.
    - .1 For slab depths up to 250 mm mount vibrators parallel to base at mid-depth.
    - .2 Maintain minimum 150 mm surcharge of concrete above vibrators during placing and consolidation.
    - .3 Operate at between 9000 and 12000 vpm at minimum amplitude of 1 mm.
    - .4 Surface vibrators:
      - .1 Synchronize units on each individual screed or pan.
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- .2 Operate at minimum 3500 vpm and minimum amplitude of 0.4 mm.
- .3 Treat each pavement section to at least one pass but not more than two passes of vibratory equipment.
- .5 Stop vibrators when paver stops.
- .6 Use hand operated vibrator on odd shaped slabs inaccessible to frame mounted units. Do not operate vibrator in one location longer than 5 s.
- .7 Ensure concrete adjacent to edge forms or previously constructed slabs is thoroughly vibrated.

### **3.6 EXPANSION AND CONTRACTION JOINTS**

- .1 Install joint filler between differing pavements and at following spacings.
  - .1 Transverse Joints: 1500 mm centres.
- .2 Install joint filler to separate concrete from curbs, features that project through into or against pavement and wherever concrete abuts building and/or foundation insulation.
- .3 Confirm location of expansion joints and transverse joints with Consultant prior to placing concrete.
- .4 Ensure transverse control joints extend to minimum depth of one-fourth thickness of slab. Locate at a spacing of maximum 25 times thickness of slab with a maximum distance of 4.5 m between joints. Joints may be sawed in hardened concrete or formed by installing a parting strip in plastic concrete.
- .5 Sawn joints:
  - .1 Mark straight alignment with chalk line. Install end stakes to ensure straight joint alignment across paved areas.
  - .2 Saw joints using approved equipment and methods to produce joint dimensions indicated.
  - .3 Schedule sawing operations within 24 h of concrete placement.
  - .4 Make initial saw cuts in a progressive manner and as soon as possible without excessive raveling.
  - .5 Flush joints with water immediately to remove laitance.
  - .6 do not allow vehicular traffic on joints until they are sealed.
- .6 Sealing:
  - .1 Prior to sealing clean joints with compressed air to remove loose and foreign material.
  - .2 Insert approved filler and bond breaking material in joint prior to applying sealant. Fill joint from bottom up with sealant to avoid trapping air.
  - .3 On completion of sealant application, return and top up any under filled areas.
  - .4 replace sealant that fails to bond to concrete or fails to cure properly.

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**3.7 CONCRETE FINISHING**

- .1 Finish floated and broomed surfaces to produce smooth, uniform surfaces free of open texturing and exposed aggregate. Do not work more mortar into surface than required; do not use neat cement as drier to facilitate finishing.
- .2 Walks, slabs:
  - .1 Wood float followed by broom texture to produce non-slip uniform finish.
  - .2 Round edges and panel joints using 10 mm radius edging tool.
  - .3 Exposed aggregate finish on concrete slabs near Entrance.
- .3 Curbs: as extruded finish.
- .4 Finish surfaces level to within 3 mm over 3000 mm measured with straight edge placed anywhere on surface. Slope to drain away wherever adjacent to building.
- .5 When striking off concrete surface, maintain uniform roll of concrete ahead of first screed for its full length when finishing machine is on first pass.
- .6 Hand finish areas inaccessible to finishing machines to same quality and surface characteristics as machine finished surfaces.
- .7 Finish concrete with float at proper time. Operate from edge to edge with a wiping motion while advancing with each succeeding pass overlapping previous one.
- .8 Check surface with 3 m long straightedge. Correct irregularities exceeding 6 mm before concrete takes initial set.
- .9 Finish edges of slabs with edging tool to form a smooth squared surface. Do not patch with cement paste.
- .10 Commence texturing immediately after float finishing.
- .11 Use stiff bristled broom to produce non-slip surface finish with fine granular or sandy texture free from disfigurations.
- .12 Texturing to be straight, precise and not damaging to pavement edges.

**3.8 CURING**

- .1 Cure concrete using water and protect in accordance with CAN/CSA-A23.1 for minimum 3 days.
- .2 Curing compound:
  - .1 Apply two coats with spray equipment to form complete and unbroken film on surface of concrete.
  - .2 Apply as soon as excess water has evaporated from surface. Apply second spray within 24 h of first.
  - .3 Spray slab edges within 1 h of removal of forms.
  - .4 Protect formed or sawed joints from evaporation during curing period.

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- .5      Respray areas where membrane is damaged during curing period.
  - .3      Burlap curing:
    - .1      When concrete surface can bear weight without marking cover with burlap or cotton mats.
    - .2      Place mats to overlap each other by 150 mm or more and to overlap concrete slab by 300 mm or more on sides.
    - .3      Cover sides and ends of slab with burlap mats as soon as forms are removed.
    - .4      Thoroughly wet mats before placing them on concrete and keep saturated during curing period with a water spray sufficiently fine to avoid damaging concrete surface.
  - .4      Sheet curing:
    - .1      Cover slab with waterproof sheet material as soon as concrete has set sufficiently to bear weight without marking.
    - .2      Place material minimum 1 m wider than slab on leading slabs and after removal of side form fold down edges of sheet and bank with soil, sand or gravel to prevent air circulation.
    - .3      Batten down sheet to prevent free access of air.
    - .4      Keep sheet in place during curing period and promptly repair tears and pinholes.

### **3.9      ADJUSTMENT AND CLEAN UP**

- .1      Remove defective concrete, blemishes and embedded debris; repair as required and directed by Consultant.
- .2      Remove any excess or waste material created by the work of this Section.
- .3      Dispose of waste materials in conformance with Construction Waste Management Plan.

### **END OF SECTION**

## **Appendix I**

### **Geotechnical Investigation**

**Preliminary Geotechnical Report, Proposed Cafeteria Addition  
Pines Seniors Centre, 800 Centre Street, Burns Lake, B.C.**

**Prepared By: GeoNorth Engineering Ltd.  
Date: May 17, 2018  
File: K-4842**

# **GEO NORTH ENGINEERING LTD.**

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May 17, 2018

Mr. Paul Rudecki, P.Eng.  
Northern Health Authority  
300 - 299 Victoria Street  
Prince George BC V2L 5B8

File No. K-4842

Dear Mr. Rudecki:

**Re: Preliminary Geotechnical Report, Proposed Cafeteria Addition  
Pines Seniors Centre, 800 Centre Street, Burns Lake, B.C.**

## **1.0 Introduction**

Northern Health (NH) plans to construct an addition on the northeast side of the Pines Seniors Centre at the address noted above. The proposed addition will be offset from the main building by about 3.3 m and connected by a walkway. A new paved driveway and parking area, paved pathways and concrete aprons in front of the doorways are also planned for the project. NH commissioned GeoNorth Engineering Ltd. to provide preliminary geotechnical recommendations for site preparation and foundation design and construction. You authorized us to proceed with the work in NH Contract Number CI182558, based on the scope of work outlined in our proposal dated March 9, 2018 to L&M Engineering Limited (L&M), civil engineering design consultants for the project.

Foundation plans dated April 2018 by DGBK Architects, show the proposed addition will be a single-story structure with a footprint measuring about 17.5 by 24.9 m (57 by 82 ft) supported on spread footings, and will have a grade supported concrete floor slab. The walkway between the main building and addition will also be supported on spread footings. A plan showing the site location and layout of the proposed addition is on Drawing 4842-A1, attached.

Structural drawings dated May 1991, show the existing building has below-grade crawl spaces and a basement and is supported on spread footing foundations. The footing are about 2.4 m below grade opposite the southeast corner to about midway along the south wall of the proposed addition, and extends to about 4.2 m below grade near the southwest corner of the proposed addition.

This report provides preliminary geotechnical recommendations for site preparation, and design and construction of the foundations for the proposed addition. Site conditions will be reviewed and recommendations to address conditions will be provided during construction.

## **2.0     Background Information**

To obtain background information for the site we reviewed surficial geological maps, low resolution aerial photographs and images available on Google Earth, and the results of several previous investigations for nearby buildings.

Geological Survey of Canada Open File 3184<sup>1</sup> identifies the proposed building site as being covered by a veneer of glacial till deposited over bedrock. Veneer deposits are defined as being relatively thin, less than 3 m thick. Glacial till typically consists of a heterogenous mixture of sand to boulder size particles in a silt and clay matrix deposited from and below glacial ice.

Drill holes for a geotechnical investigation in 2010 for the Lakes District Hospital about 150 m southwest of the site, encountered topsoil or asphalt and a thin layer of fill at the surface, over dense gravel and silt with varying amounts of sand and clay, interpreted to be a glacial till deposit. One of the deeper drill holes encountered weak siltstone bedrock at 11.5 m depth to 14.9 m depth, over a medium strong conglomerate. Test pits for an investigation in 2017 for a new building at Centre Street and Sus Avenue about 100 m north of the site, encountered similar conditions. The sand, gravel, silt and clay content of the till deposit is variable with depth and hole location, and the deposit has occasional to frequent cobbles and boulders. During the investigations, we estimated the cobbles and boulders ranged in size from 100 to 900 mm in diameter. Light seepage was observed below 2.5 m depth in the drill holes for the 2010 investigation. No seepage or bedrock was encountered in the test pits for the 2017 investigation.

Aerial photographs dated prior to 1994 show the site is undeveloped, flat and mostly covered in grass. Photos dated between 1994 and 2018 show the existing facility on the site.

## **3.0     Discussion and Recommendations**

The natural, dense gravel and silt till will provide good foundation support for the proposed addition. The gravel and silt is likely a basal till, deposited below and overridden by advancing glacial ice. This type of deposit typically has properties of high shear strength, low compressibility and low permeability, and is susceptible to the development of ice lenses if it is

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<sup>1</sup>Plouffe, A. 1996. Surficial Geology, Burns Lake, British Columbia (93K/SE); Geological Survey of Canada, Open File 3184, scale 1:100,000.

allowed to freeze. Ice lenses can cause frost heave below concrete footings and slabs. We expect excavation conditions to be difficult due to the hard ground conditions and presence of large diameter boulders in the natural till. Over-excavation might be required to create a flat working surface in the bottom of footing excavations.

Existing fill is not suitable for support of the proposed addition foundations. The depth and extent of fill across the site is unknown. Existing fill with unknown composition and compaction characteristics will likely be associated with the existing building foundations.

The following recommendations are based on the necessary assumption that soil conditions encountered in previous investigations on nearby properties are representative of soil conditions at the site. Please contact our office to review conditions at the time of construction to verify the following recommendations.

### **3.1 Spread Footing Foundations**

We recommend the footings for the proposed addition be supported on the undisturbed, natural gravel and silt till or on compacted structural fill or lean mix concrete placed on the undisturbed natural soil. Design spread footings placed on the natural gravel and silt till, or on compacted structural fill or lean mix concrete placed on the natural soil using a factored bearing resistance of 450 kPa (limit states design) and an allowable bearing pressure of 300 kPa (working stress design).

Use a minimum footing width of 450 mm for strip footings and 600 mm for square pad footings. Provide at least 300 mm of cover over heated, interior footings for confinement, measured from the top of the slab to the base of the footing, and at least 1.2 m of cover over heated perimeter footings to protect against frost heave. Locate proposed foundations adjacent to the existing building at the same elevation as the existing foundations as is proposed for the walkway foundations.

We recommend that unheated footings, such as for canopies, or unheated areas of the building, be protected against frost heave by providing 2.4 m of soil cover. Alternatives to using soil cover for frost protection are to place non-frost-susceptible structural fill below the footings to 2.4 m depth below finished grade, or to protect the bearings soil from freezing using rigid board insulation. A typical detail for using rigid board insulation for frost protection of an isolated footing is on Drawing 4842-D1, attached.

Place vertical insulation, if it is used, against the outside face of the foundation wall to allow building heat to warm the foundations. If it is placed against the inside face, do not extend vertical insulation more than 600 mm below the slab elevation, or provide additional frost

protection as though the footing is unheated. Similarly, do not use horizontal insulation below the slab, or provide sufficient frost protection as if the footing was unheated.

Use slopes no steeper than 2 horizontal to 1 vertical (2H:1V) between footings at different elevations, unless site specific analysis indicates that steeper angles are appropriate. Step strip footings that cross areas of different elevations using a maximum vertical rise of 600 mm between horizontal steps. Construct the steps at an overall slope no steeper than 2H:1V. If buried utilities are installed parallel to building foundations, place the footings or the utility so that the utility is above a line drawn down at a slope of 2H:1V from the edge of the footing.

To prepare foundation areas, remove all existing fill and all organic, softened, wet and disturbed soil to expose the natural gravel and silt till. If required, bring foundation areas to grade using clean, granular fill that meets the gradation specifications for Select Granular Subbase (SGSB), defined in Table 1 below. Place the fill out beyond the edges of the footings a horizontal distance equal to the depth of fill below the footings to allow for a 1H:1V load distribution through the compacted structural fill. Place the fill in thin, uniform layers, and compact each layer to at least 100% Standard Proctor Density (SPD) (ASTM D698). Layer thickness will depend on several factors, including size and weight of compactor, and the moisture content and temperature of the soil, but do not exceed a layer thickness of 300 mm. Alternatives to using compacted granular fill are to either bring the foundation areas to grade using lean mix concrete (10 MPa at 28 days) or to increase the depth of the footing accordingly. If using lean concrete it can be formed or cast neat to the soil. Construct the lean concrete so that is at least 150 mm wider than the footing. It can be formed with vertical sides. Keep foundation areas dry prior to placing fill or pouring concrete.

### **3.2 Grade-Supported Floor Slabs and Concrete Aprons**

Prepare grade-supported floor slab areas using the following procedures to reduce the potential for cracking from settlement:

- Remove organic material, existing fill and disturbed soil from below the building area and to at least 300 mm below the underside of the slab.
- Bring slab areas to grade using compacted granular fill that meets our specification for SGSB.
- Place the fill in layers no thicker than 300 mm and compact each layer to at least 100% SPD.
- Directly below the slab, place a minimum 100 mm thick layer of WGB, as defined in Table 1 below, and compact to at least 100% SPD.



Where concrete aprons will be located at entrances, and must be prevented from lifting to avoid jamming doorways, we recommend placing a minimum of 100 mm of WGB, over 500 mm of SGSB, over 50 mm thick rigid board insulation, such as Styrofoam HI40 or equivalent, placed on the natural gravel and silt till. Extend the insulation at least 1.8 m out from the wall and 1.8 m laterally on each side of the doorway. Slope the insulation away from the building.

Use granular fill that meets the following specifications:

**Table 1 - Specified Gradation for Granular Fill**

Sieve Size (mm)	Percentage Passing	
	Well Graded Base	Select Granular Subbase
100	-	100
75	-	95-100
25	100	-
19	80-100	35-100
9.5	50-85	-
4.75	35-70	15-60
2.36	25-50	-
1.18	15-35	-
0.300	5-20	3-15
0.075	0-5	0-5

For WGB use crushed and screened material that meets the above noted gradation. The Select Granular Subbase can be a pit run material that meets the above gradation. Use durable aggregate that will not degrade from exposure to water, freeze-thaw cycles or handling, spreading or compacting. It must not contain organic materials or an excess of flat or elongate stones. Do not place fill that is frozen and do not place fill on frozen ground.

### **3.3 Perimeter Drains**

We understand that there are no crawl spaces, basements or mechanical equipment or ducts installed below the level of the surrounding grade, and therefore recommend against installing a perimeter foundation drainage system for the addition.

Foundation excavations adjacent to the existing building will likely encounter a perimeter drainage system around the outside edge of the existing foundations. We recommend the existing perimeter drains be maintained, and that an experienced geotechnical engineer review conditions at the time of construction to provide recommendations as required.

#### **4.0     Construction Review**

We recommend, and the B.C. Building Code specifies, that an experienced engineer or his designate carry out the following:

- Review all foundation excavations prior to placing compacted structural fill, formwork or concrete to confirm that the exposed soil conditions are as expected and to provide additional recommendations if conditions are different.
- Review the placement and compaction of all structural fill, starting with the first layer to confirm the materials being used meet the project specifications and that they are being compacted to the specified density.

Prior to us being able to complete Schedule C-B of the Code, which is a form titled “Assurance of Professional Field Review and Compliance”, we will need to carry out the necessary field reviews. The Schedule C-B form is often required by Building Inspection Officials prior to an Occupancy Permit being issued.

#### **5.0     Closure**

This report was prepared by GeoNorth Engineering Ltd. for the use of the Northern Health and their consultants. The material in it reflects GeoNorth Engineering’s judgement in light of the information available to us at the time of preparation. Any use which Third Parties make of this report, or any reliance on decisions to be made based on it, are the responsibility of such Third Parties. GeoNorth Engineering Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Please contact us if any part of this report needs to be clarified or if you need additional information.

Yours truly,  
GeoNorth Engineering Ltd.



Per: Josh Hurrell, EIT

Reviewed by,  
GeoNorth Engineering Ltd.



Per: D.J. McDougall, M.Eng., P.Eng.

Enclosures:

Site Plan Showing Site Location and Addition Layout, Drawing 4842-A1  
Typical Insulation Foundation Detail, Drawing 4842-D1



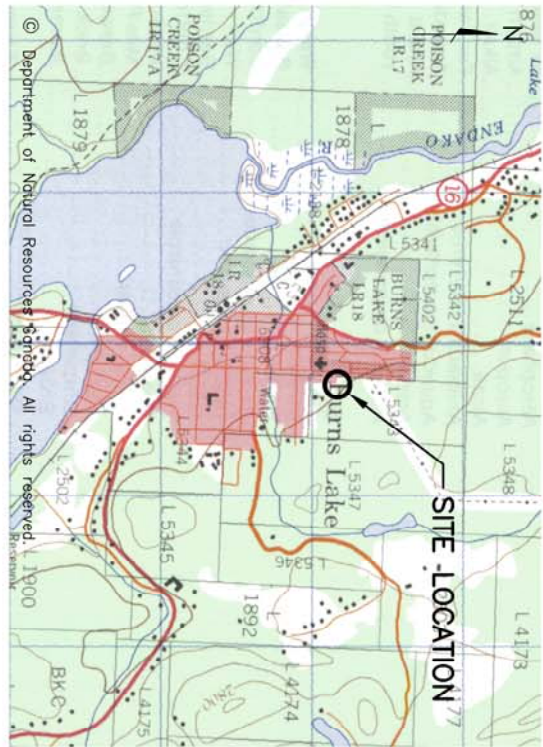


NOTES:

1. SITE PLAN BASED ON DIGITAL INFORMATION PROVIDED BY L&M ENGINEERING LIMITED.
2. ORTHOPHOTO BASED ON DIGITAL INFORMATION TAKEN FROM Google earth, © 2018 Google, Imge© 2018 DigitalGlobe.

Scale – 1:500

0 5 10 15



KEY MAP

NTS Map – 93 K/04

Scale – 1:50,000

NORTHERN HEALTH AUTHORITY  
PROPOSED CAFETERIA ADDITION  
PINES SENIORS CENTRE  
800 CENTRE STREET, BURNS LAKE, B.C.  
SITE PLAN SHOWING PROPOSED ADDITION

**GEO NORTH  
ENGINEERING LTD.**  
3975 18th Avenue  
Prince George, B.C. V2N 1B2  
Tel. 250-564-4304 Fax 250-564-9323

SCALE: 1:500

DATE: 2018/05/17

DWN BY: LU

MAP REF: –

DWG NO.  
4842-A1

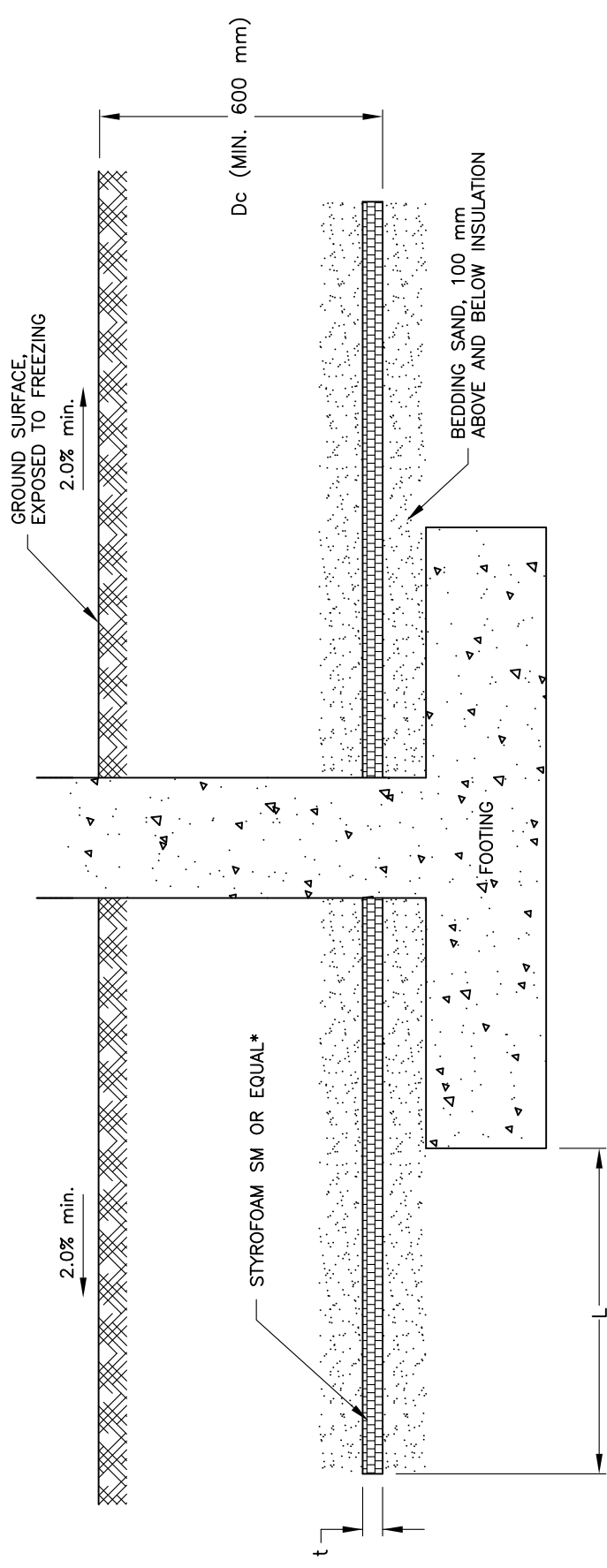
APPROVED:

REV.

–

PROJECT NO:  
K-4842





EXTEND INSULATION PAST EDGE OF FOOTING  
BY DISTANCE:  $L = 2.4 \text{ m} - D_c$  ON UNHEATED SIDE

- if  $D_c = 600 \text{ mm}$ ;  $t = 100 \text{ mm}$
- if  $D_c = 900 \text{ mm}$ ;  $t = 75 \text{ mm}$
- if  $D_c = 1.2 \text{ m}$ ;  $t = 65 \text{ mm}$
- if  $D_c = 1.5 \text{ m}$ ;  $t = 50 \text{ mm}$

\* USE STYROFOAM SM, OR EQUIVALENT IN AREAS OF NO TRAFFIC. USE STYROFOAM HL 60, OR EQUIVALENT UNDER AREAS SUBJECTED TO VEHICLE TRAFFIC.

<b>GEO NORTH ENGINEERING LTD.</b> 3975 18th Avenue Prince George, B.C. V2N 1B2 Tel. 250-564-4304 Fax 250-564-9323	<b>NORTHERN HEALTH AUTHORITY</b> PROPOSED CAFETERIA ADDITION PINES SENIORS CENTRE 800 CENTRE STREET, BURNS LAKE, B.C. TYPICAL INSULATED FOUNDATION DETAIL FOR AN ISOLATED FOOTING		SCALE: N.T.S.	DATE: 2018/05/17
	PROJECT NO: K-4842	DRAWING NO. 4842-D1		

## **Appendix II**

**Asbestos Containing Building  
Materials Assessment Report**

**Lakes District Hospital  
Burns Lake, BC**

**District Hospital  
Nurses Residence  
The Pines Long Term Care Facility**

**Prepared By: Peak Earth and Environmental Consulting Inc.  
Date: 12/28/2008**

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Kelowna, BC V1Z 3G7  
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Fax: (250) 769-0884  
Toll Free: 877-518-PEAK

# ASBESTOS CONTAINING BUILDING MATERIALS ASSESSMENT REPORT

## *LAKES DISTRICT HOSPITAL* *BURNS LAKE, BC*

*DISTRICT HOSPITAL*  
*NURSES RESIDENCE*  
*THE PINES LONG TERM CARE FACILITY*

**Prepared for:**

***NORTHERN HEALTH***  
700-299 Victoria Street  
Prince George, BC  
V2L-5B8

**Prepared by:**

***Peak Earth and Environmental Consulting Inc.***  
951 Pinewood Place  
Kelowna, BC V1Z 3G7  
Stephen Ferguson, ASCT. *President*  
*File: 1080 Lakes District Hospital Site Asbestos R01*

The site survey for this December 29, 2008 report was completed on: November 6, 2008 All observation and conditions herein are respective to these dates.

## 1.0 EXECUTIVE SUMMARY

Peak Earth and Environmental Consulting Inc. were retained by Northern Health to perform an assessment and review of the Lakes District Hospital Site for asbestos-containing building materials. The purpose of this survey was to collect samples of building finishes to determine their asbestos content, provide quantities, locations, remediation cost estimates and associated building occupant risk regarding asbestos-containing materials located within each building included on the site.

**Asbestos-containing building materials identified within various facilities are noted on the attached summary sheets, spreadsheets and drawings for each facility. These documents should be reviewed to ascertain the exact location of asbestos applications within this building or buildings on this site.**

Contractors performing work within this facility must review these documents prior to performing their work duties to ensure that asbestos applications are not inadvertently disturbed, resulting in the possible release of asbestos fibres into the ambient air.

Contractors working on this site must also complete the sign-off sheet attached to these documents, stating that they have reviewed the spreadsheets and drawings and are aware of the asbestos applications located within this facility.

## 2.0 METHODOLOGY

Samples of suspect asbestos-containing building materials were collected from areas to minimize damage to finished surfaces and were sent to an accredited laboratory for analysis. Samples were analyzed in accordance with NIOSH 9002 methodologies with a detection limit of 1% to determine their asbestos content. As outlined in the Workers' Compensation Board of BC Regulation, all materials containing one percent (1%) or greater of asbestos are considered to be asbestos containing.

Representative samples of drywall fillers were collected from each building and from each visible renovation area within the building. Samples of vinyl flooring and ceiling tiles were collected based on visible size, color and pattern. Flooring and ceiling tile applications with the same surface coloring and patterns were considered a homogeneous application throughout the building. Representative samples of each separate application were collected and analyzed for asbestos content.

Where multiple drywall samples were collected and a mix of asbestos and non-asbestos drywall was found, all drywall applications in that facility were considered to be asbestos containing. Additional samples of drywall filler should be collected prior to any work, which may impact finished drywall applications, resulting in the possible release of asbestos fibres into the ambient air.

Concrete block walls were inspected for the presence of vermiculite insulation and where present they have been identified in the spreadsheets included in this report and are to be considered contaminated with asbestos fibers.

Visual identification of some materials was performed. Materials such as pre 1978 insulating cements, corrugated paper pipe insulation and cement boards are known to contain asbestos. If these materials were identified, they were noted as being asbestos-containing and no verification samples were collected. Similarly, new application ceiling tiles and vinyl flooring applications, identified as being circa 1990 applications, were considered to be non-asbestos with no verification samples collected.

No sampling of building finishes or membranes was performed where sample collection would cause or create a leak or irreversible damage to the building or building finishes or systems.



### 3.0 BUILDING OCCUPANT RISK OF EXPOSURE AND WORKER PROTECTION REQUIREMENTS

Friable asbestos-containing materials, such as insulating cements, ceiling textures, mechanical insulation and asbestos paper products pose the greatest risk of exposure to building occupants as they are easily crumbled by hand releasing airborne asbestos fibres when damaged or exposed. Non-friable materials, such as vinyl flooring and cement asbestos board pose a lesser risk as they are not easily crumbled by hand and must be broken or mechanically abraded to release asbestos fibres.

There is an increased risk of asbestos fibre release if asbestos applications are disturbed through renovation or maintenance activities that will abrade the material, releasing asbestos fibres to the ambient air. There would also be an elevated risk of asbestos exposure through dry burnishing of vinyl floor tile applications. Dry burnishing activities should not be performed on asbestos floor tile applications.

Currently there is no risk of exposure to airborne asbestos from asbestos applications located in this facility provided they remain intact and un-damaged.

Friable asbestos applications located in un-controlled locations such as corridors or washrooms, or where located adjacent to air movement equipment or found to be in poor or damaged condition, have been prioritized for abatement. Friable applications located in areas where control and access is limited are scheduled for phased removal.

All remaining non-friable asbestos applications have been scheduled for removal in conjunction with planned building renovation or maintenance work or abatement prior to work, which may impact and damage the asbestos applications.

All asbestos applications identified in this report should be routinely inspected to ensure their condition has not deteriorated, resulting in the exposure of the asbestos application. Damaged and exposed asbestos application should be immediately removed by a qualified asbestos abatement contract.

### 4.0 AREAS OF RESTRICTED ENTRY DUE TO POOR CONDITION ASBESTOS APPLICATIONS

No areas of poor condition asbestos or areas, which would require special entry procedures, were noted in this facility.

Asbestos containing insulating cement materials located on mechanical pipe fittings in the crawlspace areas of the Main Hospital Building and Nurse Residence were found to be in poor and deteriorated condition. Entry to these spaces must be performed utilizing appropriate personal protective equipment and moderate risk work procedures to prevent worker or building occupant exposure to asbestos fibers released from these asbestos applications.

Areas with poor or deteriorated condition asbestos insulation were also observed within various areas of the Main Hospital Building and Nurse Residence. Removal or repair of damaged asbestos insulating materials is required to prevent potential exposure to airborne asbestos fibers released from damaged applications if disturbed.

## 5.0 REMEDIAL WORK

### PHASED REMOVAL WORK

- All friable asbestos-containing applications located in un-controlled areas (corridors and washroom areas) should be scheduled for abatement. Due to the fact that these applications can be damaged without the knowledge of the maintenance department these applications should be routinely inspected for damage and delamination. Any damaged, delaminating or exposed asbestos materials should be removed, repaired or enclosed to prevent the possible release of asbestos fibres.
- All Friable asbestos-containing materials should be removed in conjunction with planned building maintenance, abatement or renovation activities.

### MANAGEMENT

- All friable and non-friable materials remaining within this building should be managed in-place, prior to abatement, with a bi-annual or quarterly inspections to ensure their condition has not deteriorated, resulting in the possible release of asbestos fibres. Any materials showing signs of damage, delamination or exposed asbestos should be repaired or abatement.
- Vinyl asbestos flooring should be inspected for delamination, cracking or wearing that has exposed the asbestos paper backing. Sections of flooring with exposed paper backing should be removed to prevent the release of asbestos fibres into the ambient air.
- Asbestos-containing materials identified within this report should be identified as containing asbestos and maintenance and custodial staff should be trained in the safe handling of asbestos in accordance with WCB regulations.

All materials identified in this report must be removed prior to any work that may impact asbestos applications resulting in the release of asbestos fibres.

## 6.0 LIMITATIONS

This report is for the purpose of asbestos identification only. All observations were recorded at the time of the initial site inspection. Instances may occur where changes in condition and resultant building occupant risk have occurred from the time of the initial inspection to the production of this report. Peak Earth and Environmental Consulting Inc. accept no liability for such changes and resultant change in exposure risk to building occupants.

Site conditions and building construction may have not permitted the complete inspection of some void spaces. These spaces may contain asbestos applications not identified by this report. Any suspect materials, located within void spaces should be inspected and/or tested to determine if they containing asbestos.

Where possible, inspection of sub-flooring applications located beneath carpeting and vinyl flooring materials was performed. Where a second layer of vinyl flooring material was discovered, samples were collected to determine their asbestos content. No inspection of sub-flooring applications was performed once a structural member was discovered (i.e. wood or concrete). There is a possibility that subsequent asbestos flooring applications, not identified in this report, may be located beneath carpeting, false floors or a covering layer of non-asbestos flooring. Any suspect materials sandwiched between multiple flooring layers should be inspected or tested to determine if they containing asbestos.

**ASBESTOS LOCATION SUMMARY  
AND  
CONTRACTOR SIGN OFF SHEET**

# **NORTHERN HEALTH**

## **ASBESTOS EXPOSURE AND CONTROL PLAN ASBESTOS CONTAINING BUILDING MATERIALS SUMMARY**

### **LAKES DISTRICT HOSPITAL SITE Burns Lake, BC**

The following asbestos applications have been identified within the above noted facility. The attached asbestos location drawings and spreadsheets should be reviewed for the exact location of all known asbestos applications within this facility.

#### **MAIN HOSPITAL BUILDING**

##### ***FRIABLE ASBESTOS APPLICATIONS***

- Asbestos insulating cement is located on hot water pipe fittings located randomly throughout the building.
- Asbestos insulating cement is located on domestic hot water tanks and heat exchangers in the basement Boiler Room and Fan Room areas of the building.
- Asbestos paper insulating pads are located on randomly incandescent lighting located randomly throughout the building.

##### ***NON-FRIABLE ASBESTOS APPLICATIONS***

- Cement asbestos board is located in the main floor Pantry Room wall.
- Vinyl asbestos floor tiles are located randomly throughout the building.

#### **NURSES RESIDENCE BUILDING**

##### ***FRIABLE ASBESTOS APPLICATIONS***

- Asbestos insulating cement is located on hot water pipe fittings located randomly throughout the building.
- Asbestos paper insulating pads are located on randomly incandescent lighting located randomly throughout the building.
- Asbestos paper backed vinyl Corlon floor sheeting is located in various areas throughout the building.

##### ***NON-FRIABLE ASBESTOS APPLICATIONS***

- No non-friable asbestos applications were identified in this building.

#### **THE PINES LONG TERM CARE FACILITY**

No asbestos containing building materials were identified or suspected within this building.

By signing below, you have been informed as to the location of all known and suspected asbestos applications located within the facilities on this site. You the contractor will make all efforts to direct your work duties so as to NOT disturb known asbestos or suspect asbestos applications. IF, through your work, asbestos applications are to be disturbed or have been inadvertently disturbed, it is your responsibility to inform the maintenance staff who will direct the clean-up or removal of asbestos applications in way of your proposed renovation work.

DATE \_\_\_\_\_

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

**MAIN HOSPITAL BUILDING**

**ASBESTOS LOCATION DRAWINGS**  
**AND**  
**LOCATION SPREADSHEETS**



PEAK EARTH AND  
ENVIRONMENTAL CONSULTING INC.  
951 Pinewood Place  
Kelowna, BC V1Z 3G7  
Ph 250-862-0971  
Project No.: 1080

Drawing:

ASBESTOS  
CONTAINING  
BUILDING  
MATERIALS  
LOCATIONS

Title:  
LAKE DISTRICT  
HOSPITAL  
BASEMENT FLOOR

741 Centre Street  
Burns Lake, BC  
Owner:



northern health

Legend:

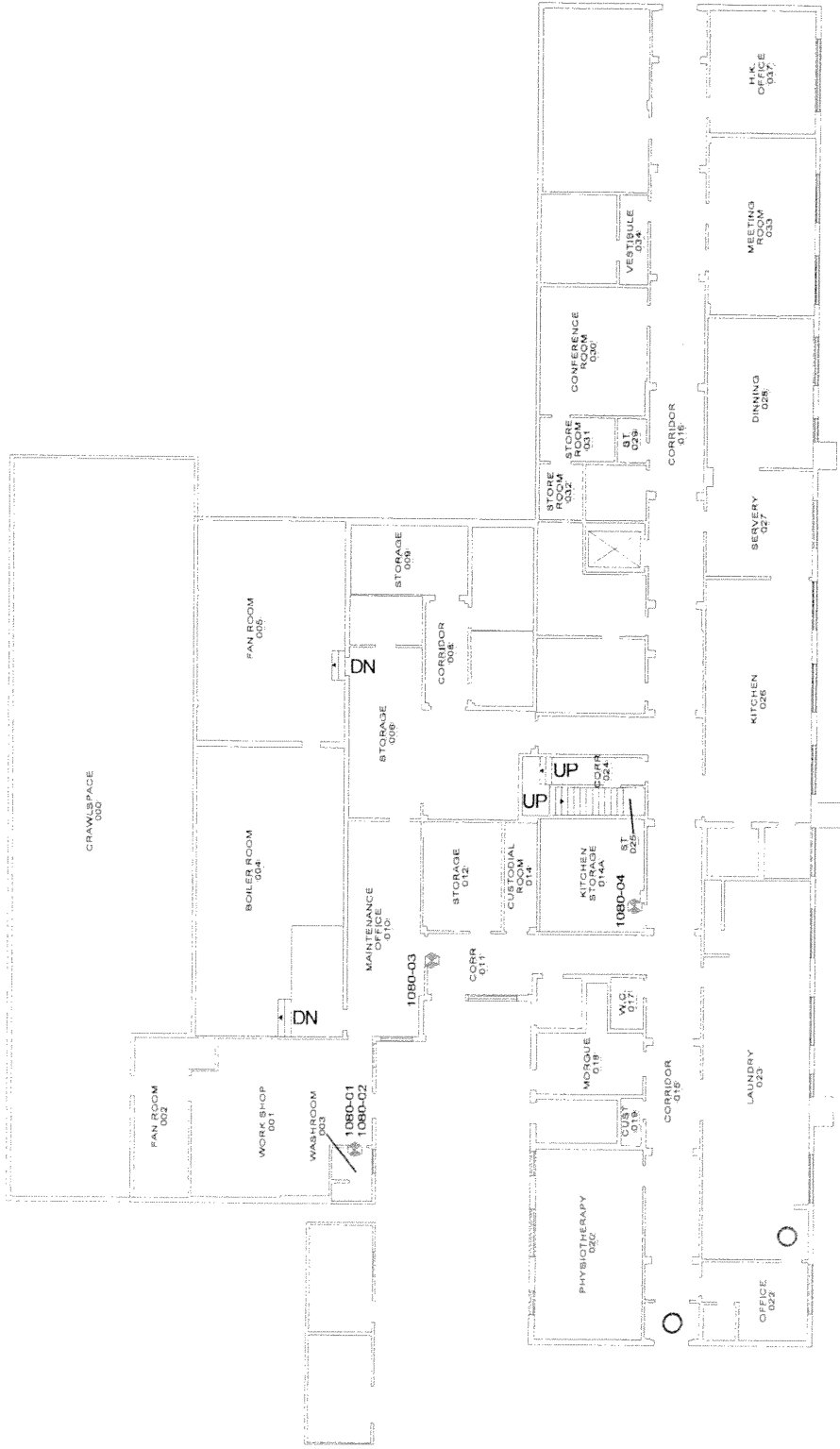
☐ VINYL ASBESTOS  
FLOORING

☐ INCANDESCENT  
LIGHTING ASBESTOS  
INSULATING PAD

☐ BULK SAMPLE  
LOCATION AND  
SAMPLE NUMBER

Date: 12.28.2009  
Revision: 1: 300  
Drawn by: S. Ferguson

DRAWING NUMBER  
**1080 ASB 1.2**



NOTE:  
ASBESTOS PIPE INSULATION LOCATED IN THE CRAWLSPACE AREA IS  
IN POOR CONDITION. MODERATE RISK PERSONAL PROTECTIVE  
EQUIPMENT AND WORK PROCEDURES ARE REQUIRED FOR ENTRY  
INTO THIS SPACE.

ASBESTOS APPLICATIONS NOT SHOWN ON DRAWING

ASBESTOS PIPE INSULATION LOCATED ON PIPE FITTINGS IN VARIOUS  
EXPOSED AND CONCEALED AREAS THROUGHOUT THE BASEMENT  
AREA OF THE BUILDING.

ASBESTOS INSULATION IS LOCATED ON DOMESTIC HOT WATER  
TANKS IN THE BOILER ROOM.



PEAK ENVIRONMENTAL CONSULTING INC.  
951 Pinewood Place  
Kamloops BC V2C 1G7  
Ph: 250-862-0971

Project No.: 1080  
Drawing

ASBESTOS  
CONTAINING  
BUILDING  
MATERIALS  
LOCATIONS

Title:

LAKE DISTRICT  
HOSPITAL  
UPPER FLOOR

741 Centre Street  
Burns Lake, BC

Owner:



northern health

Legend:

VINYL ASBESTOS  
FLOORING

INCANDESCENT  
LIGHTING ASBESTOS  
INSULATING PAD

CEMENT ASBESTOS  
BOARD ON WALLS

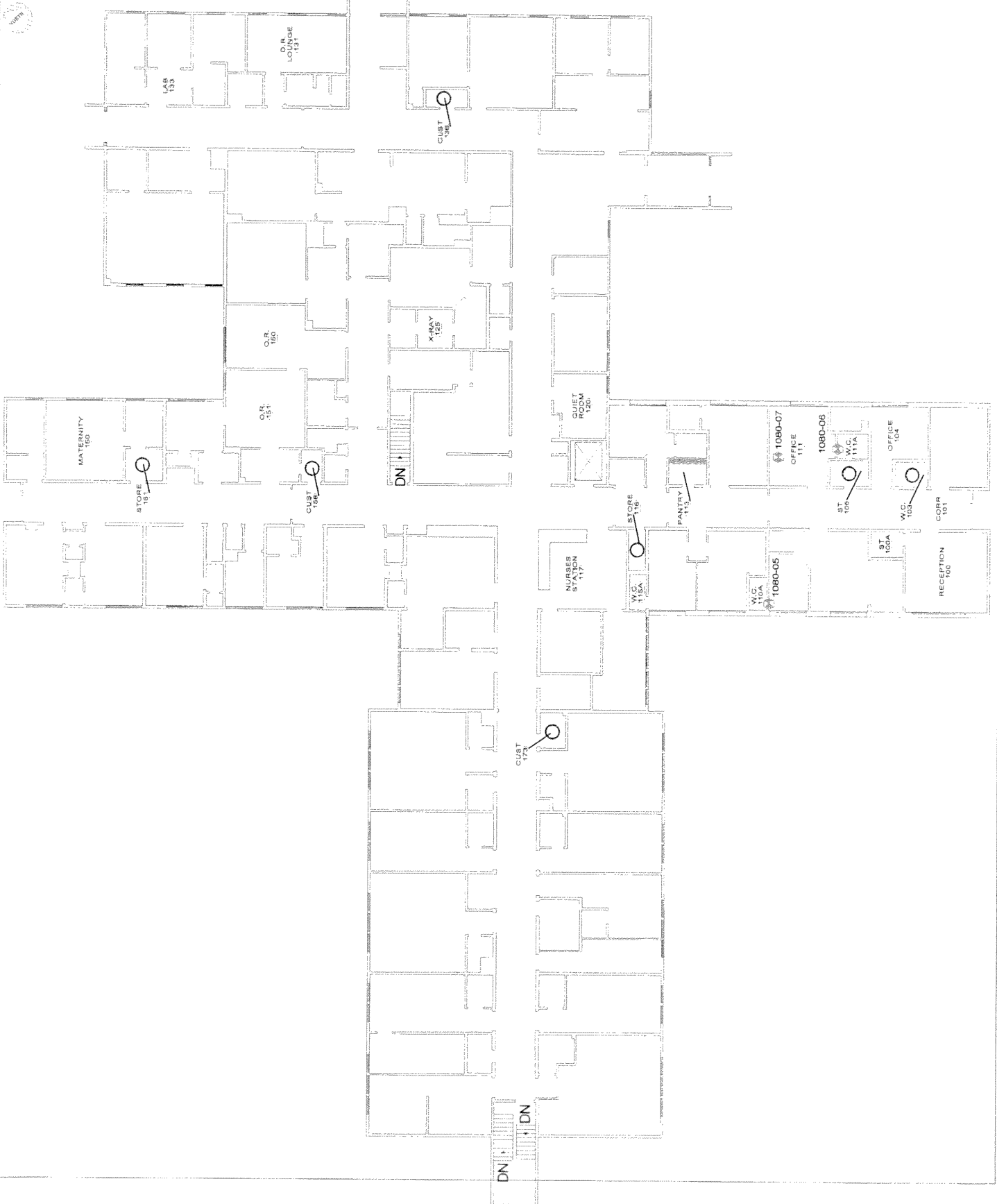
BULK SAMPLE  
LOCATION AND  
SAMPLE NUMBER

Date: 12.28.2008

Revision: 1 : 300

Drawn by: S Ferguson

DRAWING NUMBER  
**1080 ASB 2.2**





BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIB	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	FOOT NOTES
<b>LAKE DISTRICT HOSPITAL</b>								
<b>BASEMENT FLOOR</b>								
000 Crawlspace	C1 - Insulating Cement	L	Fair	High	High	250	FTG	/
001 Work Shop	C1 - Insulating Cement	L	Good	High	High	30	FTG	
002 Fan Room	C1 - Insulating Cement	L	Good	High	High	50	FTG	
003 Washroom	C1 - Insulating Cement	L	Good	High	High	8	FTG	
003 Washroom	H1- Floor Tile		Good	High	Low	45	SF	
004 Boiler Room	D1 - Tank Insulation	L	Good	High	High	2	Unit	
004 Boiler Room	C1 - Insulating Cement	L	Good	High	High	165	FTG	
004 Boiler Room	C1 - Insulating Cement	L	Poor	High	High	60	FTG	
005 Fan Room	C1 - Insulating Cement	L	Good	High	High	125	FTG	
005 Fan Room	C1 - Insulating Cement	L	Poor	High	High	25	FTG	
005 Fan Room	D2 - Tank Insulation	L	Fair	High	High	2	Unit	
006 Store Room	C1 - Insulating Cement	L	Good	High	High	40	FTG	
008 Corridor	C1 - Insulating Cement		Good	High	High	6	FTG	
009 Store Room	C1 - Insulating Cement		Good	High	High	13	FTG	
010 Maintenance Office	C1 - Insulating Cement		Good	High	High	20	FTG	
011 Corridor	C1 - Insulating Cement	AF	Good	High	Low	25	FTG	
011 Corridor	H2- Floor Tile		Good	High	Low	240	SF	
012 Store Room	C1 - Insulating Cement	L	Good	High	High	5	FTG	
014 Custodial Room	C1 - Insulating Cement	L	Good	High	High	6	FTG	
014 Custodial Room	C1 - Insulating Cement	L	Poor	High	High	2	FTG	
014A Kitchen Store room	C1 - Insulating Cement	L	Good	High	High	24	FTG	
015 Corridor	C1 - Insulating Cement	AF	Good	High	Low	40	FTG	
015 Corridor	H2- Floor Tile		Good	High	Low	460	SF	
015 Corridor	L1 - Insulating Pad		Poor	Mod	High	1	Unit	
016 Corridor	C1 - Insulating Cement	AF	Good	High	Low	30	FTG	
016 Corridor	H1- Floor Tile		Good	High	Low	510	SF	
016 Corridor	H2- Floor Tile		Good	High	Low	560	SF	
016 Corridor	C1 - Insulating Cement	AF	Good	High	Low	50	FTG	
017 Washroom	H2- Floor Tile		Good	High	Low	40	SF	
018 Morgue	H2- Floor Tile		Good	High	Low	145	SF	
019 Custodial Room	H2- Floor Tile		Good	High	Low	20	SF	
020 Physiotherapy	C1 - Insulating Cement	AF	Good	High	Low	25	FTG	//
020 Physiotherapy	H2- Floor Tile		Good	High	Low	440	SF	
023 Laundry Room	C1 - Insulating Cement	AF	Good	High	Low	20	FTG	
023 Laundry Room	C1 - Insulating Cement	L	Good	High	High	12	FTG	
023 Laundry	H1- Floor Tile		Good	High	Low	125	SF	
023 Laundry	H2- Floor Tile		Good	High	Low	175	SF	
023 Laundry	L1 - Insulating Pad		Poor	Mod	High	1	Unit	
024 Stairwell Corridor	H2- Floor Tile		Good	High	Low	60	SF	
025 Under Stair Storage	H2- Floor Tile		Good	High	Low	15	SF	
026 Kitchen	C1 - Insulating Cement	AF	Good	High	Low	20	FTG	
027 Servery	C1 - Insulating Cement	AF	Good	High	Low	10	FTG	
027 Servery	H1- Floor Tile		Good	High	Low	240	SF	
028 Dinning Area	C1 - Insulating Cement	AF	Good	High	Low	15	FTG	
028 Dinning Area	H1- Floor Tile		Good	High	Low	345	SF	
029 Store Room	H1- Floor Tile		Good	High	Low	30	SF	
030 Conference Room	H1- Floor Tile		Good	High	Low	300	SF	
030 Conference Room	C1 - Insulating Cement	AF	Good	High	Low	5	FTG	
031 Store Room	H1- Floor Tile		Good	High	Low	75	SF	
032 Store Room	H1- Floor Tile		Good	High	Low	55	SF	
032 Store Room	C1 - Insulating Cement	AF	Good	High	Low	1	FTG	
033 Meeting Room	C1 - Insulating Cement	AF	Good	High	Low	8	FTG	
034 Vestibule	H1- Floor Tile		Good	High	Low	60	SF	
034 Vestibule	C1 - Insulating Cement	AF	Good	High	Low	6	FTG	
036 Meeting Room	C1 - Insulating Cement	AF	Good	High	Low	6	FTG	
037 Housekeeping Office	H1 / H2 - Floor Tile		Good	High	Low	280	SF	
037 Housekeeping Office	C1 - Insulating Cement	AF	Good	High	Low	12	FTG	

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	FOOT NOTES
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**LAKE DISTRICT HOSPITAL****UPPER FLOOR**

100A Store Room	H1- Floor Tile		Good		High	Low	35	SF
103 Washroom	L1 - Insulating Pad		Fair		Mod		1	Unit
106 Store Room	L1 - Insulating Pad		Fair		Mod		1	Unit
113 Pantry	J1 - Cement Board		Good		High	Low	50	SF
116 Store Room	L1 - Insulating Pad		Poor		Mod		1	Unit
136 Custodial Room	L1 - Insulating Pad		Poor		Mod		1	Unit
158 Custodial Room	L1 - Insulating Pad		Poor		Mod		1	Unit
161 Maternity Store Room	L1 - Insulating Pad		Poor		Mod		1	Unit
173 Custodial Room	L1 - Insulating Pad		Poor		Mod		1	Unit

**PENTHOUSE**

200 Penthouse Fan Room	C1 - Insulating Cement		Good		High		High	75	FTG
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**FOOT NOTES:**

- I Asbestos insulating cement in this location is in poor condition. Entry to this space must be performed utilizing appropriate personal protective equipment and moderate risk work procedures.
- II Assumed asbestos application, no access to this room was possible during our assessment of the facility.

**GENERAL NOTES:**

- Abatement and re-application costs are based on individual applications. Prices will vary dependent upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.
- Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.
- Only known and visible asbestos materials are listed. There is a distinct possibility that asbestos materials may be present in wall, ceiling and floor void spaces not identified in this report. Any materials located in void spaces should be sampled for asbestos content prior to disturbance.
- This is an occupied building assessment for asbestos containing materials. No sampling of building membrane materials was conducted there such sampling could breach the water tightness of the building. Additionally, applications routinely sampled prior to building demolition were not assessed through this inspection, concealed flooring applications beneath covering flooring and sub-flooring materials, where coring would be required to identified concealed materials, was not performed. A pre-demolition assessment should be performed prior to building demolition.

<b>FRIABILITY</b>	<b>CONDITION</b>
HIGH (easily crumbled by hand)	GOOD (no visible signs of disturbance)
MED (not easily crumbled by hand)	FAIR (visible signs of disturbance, no debris noted on ground)
LOW (tool or implement required to disturb)	POOR (delamination/deterioration evident/imminent, may have debris on ground)
<b>ACCESSIBILITY</b>	<b>VIS (VISIBILITY)</b>
LOW (material concealed or enclosed)	Applications are exposed unless otherwise noted
MED (material exposed but out of hand reach)	AF - Application concealed above fixed ceilings
HIGH (material exposed and within hand reach)	L - Low application height <8'

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	FOOT NOTES
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**LAKES DISTRICT HOSPITAL**

SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS		
ID CODE AND VISUAL DESCRIPTION	SAMPLE No.	ASBESTOS CONTENT
A1 Soft Stipple Ceiling Texture - Nurses Office 111	1080-07	Non-Asbestos
C1 Grey Fibrous Pipe Fitting Insulating Cement - Penthouse Fan Room 300	Not Sampled	Known Asbestos Application
D1 Domestic Hot Water Tank Insulating Cement - Basement Boiler Room 003	Not Sampled	Known Asbestos Application
D2 Heat Exchanger Tank - Basement Fan Room 005	Not Sampled	Known Asbestos Application
G1 1x1' Donna Conna Compresses Cellulose Ceiling Tile - Basement Corridor 011	Not Sampled	Known Non-Asbestos Application
G2 1x1' Large and Small Holed Donna Conna Compresses Cellulose Ceiling Tile - Basement Laundry Room 023	Not Sampled	Known Non-Asbestos Application
G3 2x4' Textured Finish Compresses Cellulose Ceiling Tile - Basement Dinning Room 028	Not Sampled	Known Non-Asbestos Application
G4 1x1' Holed and Textured Finish Donna Conna Compresses Cellulose Ceiling Tile - Nurses Station 117	Not Sampled	Known Non-Asbestos Application
G5 2x4' Short Omni-Directional Fissures with Large and Small Pinhole Ceiling Tile - Lab 133	Not Sampled	Known Non-Asbestos Application
H1 12x12" Beige with Minimal Thin Brown Streaked Vinyl Floor Tile - Basement Washroom 003	1080-01	3% Chrysotile Asbestos
H2 9x9" Brown with Brown and White Streaked Vinyl Floor Tile - Basement Corridor 011	1080-03	3% Chrysotile Asbestos
H3 12x12" Marble Pattern New Vinyl Floor Tile - Quite Room 120	Not Sampled	Known Non-Asbestos Application
H4 12x12" White with Large and Small Grey and Brown Splotched Composite Floor Tile - Operating Room 150	Not Sampled	Known Non-Asbestos Application
H5 12x12" Dark Brown with Small Black Splotched Composite Floor Tile - Operating Room 151	Not Sampled	Known Non-Asbestos Application
I1 Beige with Small Cream and Brown Splotched Pattern Tarkett Vinyl Floor Sheeting - Basement Office 022	Not Sampled	Known Non-Asbestos Application
I10 White 10" Square Pattern Paper Backed New Corlon Vinyl Floor Sheeting - Dr. Lounge 131	Not Sampled	Known Non-Asbestos Application
I11 Beige, Brown and Dark Brown Swirl Pattern Jute Backed Marmoleum Floor Sheeting - Maternity 160	Not Sampled	Known Non-Asbestos Application
I2 Brown with Brown and Cream Splotched Pattern Jute Backed Marmoleum Floor Sheeting - Reception 100	Not Sampled	Known Non-Asbestos Application
I3 Beige with Brown and Cream Swirl Pattern Jute Backed Marmoleum Floor Sheeting - Corridor 101	Not Sampled	Known Non-Asbestos Application
I4 Beige with Short Brown Streaked New Foam Core Vinyl Floor Sheeting - Washroom 103	Not Sampled	Known Non-Asbestos Application
I5 Grey with Dark Grey and Cream Splotched Pattern Jute Backed Marmoleum Floor Sheeting - Public Health Nurse Office 104	Not Sampled	Known Non-Asbestos Application
I6 Beige with Long Brown Streaked Foam Core Vinyl Floor Sheeting - Washroom 110A	1080-05	Non-Asbestos
I7 Beige, Brown and Cream Random Size Stone Pattern Paper Backed Corlon Vinyl Floor Sheeting - Public Health Nurse Washroom 111A	1080-06	Non-Asbestos
I8 White with Random Sized Blue and Cream Splotched Paper Backed New Corlon Vinyl Floor Sheeting - Washroom 115A	Not Sampled	Known Non-Asbestos Application
I9 Blue with Blue and Cream Streaked New Foam Core Vinyl Floor Sheeting - X-Ray 125	Not Sampled	Known Non-Asbestos Application
J1 Terrazzo Pattern Cement Asbestos Board - Pantry 113	Not Sampled	Known Asbestos Application
L1 Incandescent Lighting Gray Paper Insulating Pad - Basement Corridor 015	Not Sampled	Known Asbestos Application
P1 Drywall Filler - Basement Washroom 003	1080-02	Non-Asbestos
P2 Finished Plaster - Basement Kitchen Stores 014A	1080-04	Non-Asbestos
S1 Exterior Acrylic Stucco - Exterior	Not Sampled	Known Non-Asbestos Application

**NURSES RESIDENCE BUILDING  
ASBESTOS LOCATION DRAWINGS  
AND  
LOCATION SPREADSHEETS**



PEAK EARTH AND  
ENVIRONMENTAL CONSULTING INC.  
951 Pinewood Place  
Kelowna, BC V1Z 3G7  
Ph 250-862-0971  
Project No.: 1080  
Drawing

ASBESTOS  
CONTAINING  
BUILDING  
MATERIALS  
LOCATIONS

Title:  
LAKE DISTRICT  
HOSPITAL  
NURSES  
RESIDENCE  
741 Centre Street  
Burns Lake, BC  
Owner:

northern health

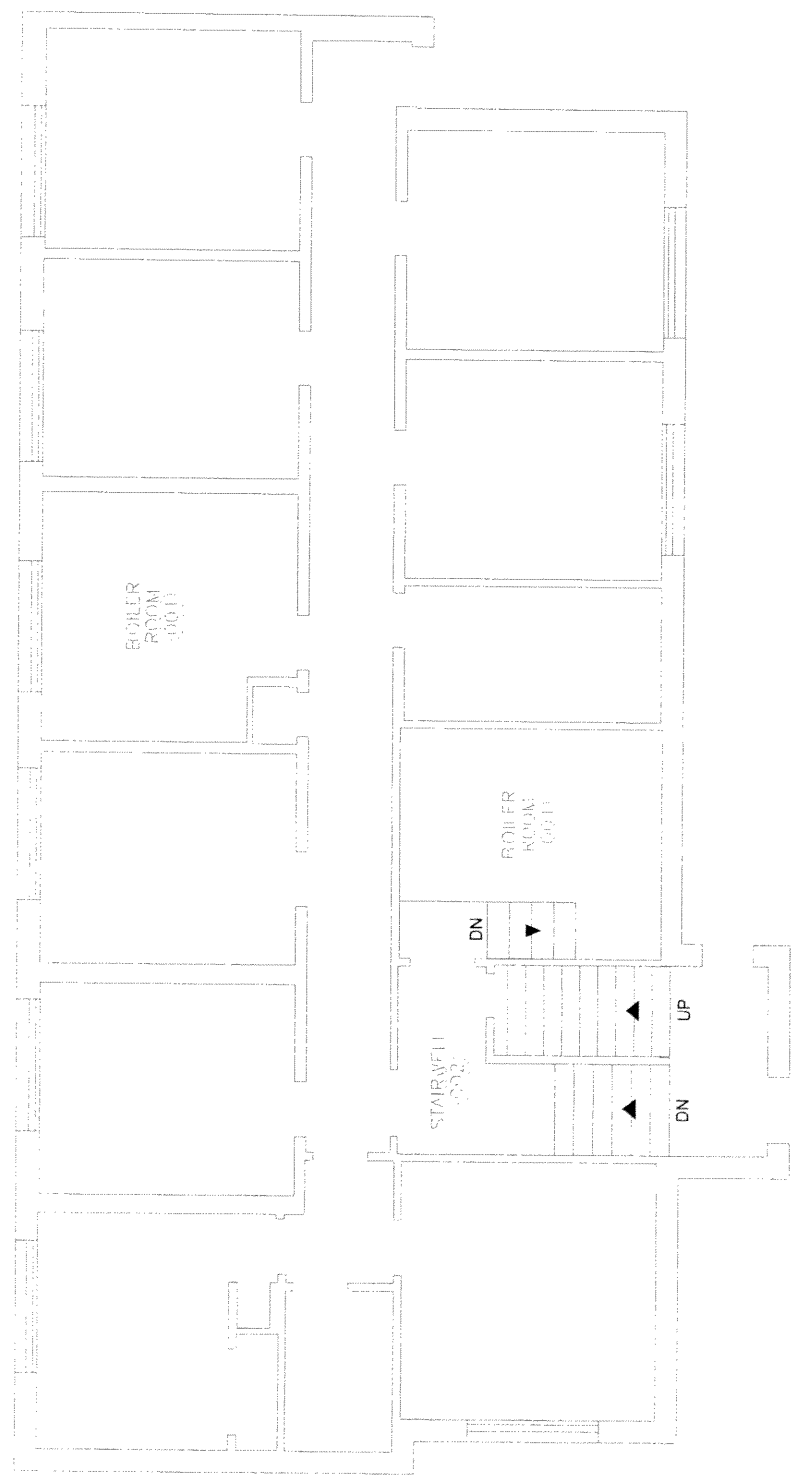
Legend:

- ☐ VINYL ASBESTOS FLOORING
- ☐ INCANDESCENT LIGHTING ASBESTOS INSULATING PAD
- ☐ BULK SAMPLE LOCATION AND SAMPLE NUMBER

Date: 12.28.2008  
Revision: 1: 100  
Scale: 1: 100  
Drawn by: S. Ferguson

DRAWING NUMBER  
**1080 ASB 1.2**

BASEMENT FLOOR PLAN



NOTE:  
ASBESTOS PIPE INSULATION LOCATED IN THE CRAWLSPACE AREA IS  
IN POOR CONDITION. REPAIRS TO THE INSULATION ARE REQUIRED FOR ENTRY  
EQUIPMENT AND WORK PROCEDURES ARE REQUIRED FOR ENTRY  
IN TO THIS SPACE.

ASBESTOS APPLICATIONS NOT SHOWN ON DRAWING  
ASBESTOS PIPE INSULATION LOCATED ABOVE FIXED CEILINGS  
THROUGHOUT THE BASEMENT AREA.



PEAK EARTH AND  
ENVIRONMENTAL CONSULTING INC.  
951 Pinewood Place  
Kelowna, BC V1Z 3G7  
Ph 250-862-0971  
Project No.: 1080  
Drawing:

ASBESTOS  
CONTAINING  
BUILDING  
MATERIALS  
LOCATIONS

Title:  
LAKE DISTRICT  
HOSPITAL  
NURSES  
RESIDENCE  
741 Centre Street  
Burns Lake, BC

Owner:



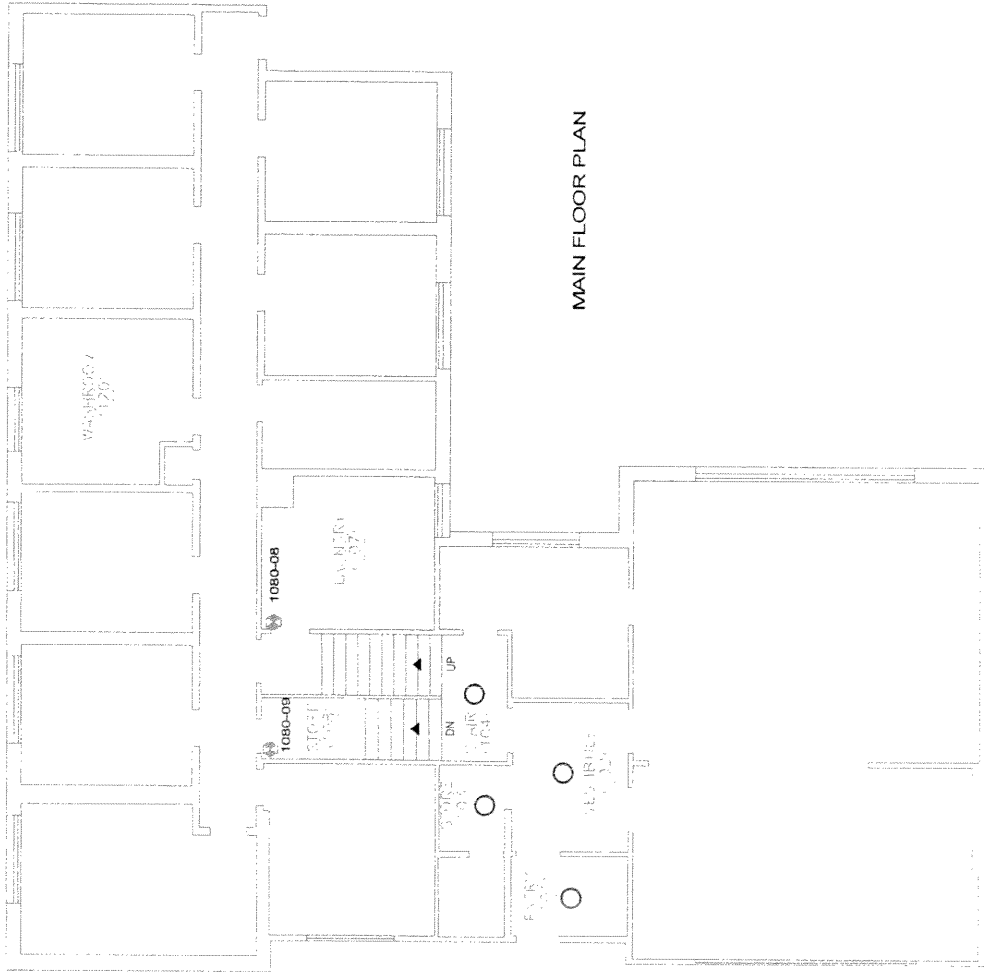
northern health

Legend:

- ☐ VINYL ASBESTOS  
FLOORING
- ☐ INCANDESCENT  
LIGHTING ASBESTOS  
INSULATING PAD
- ☐ BULK SAMPLE  
LOCATION AND  
SAMPLE NUMBER

Date: 12.28.2008  
Revision: 1: 150  
Scale:  
Drawn by: S. Ferguson

DRAWING NUMBER  
**1080 ASB 2.2**



NOTE:  
ASBESTOS PIPE INSULATION LOCATED IN THE CRAWLSPACE AREA IS  
IN POOR CONDITION. MODERATE RISK PERSONAL PROTECTIVE  
EQUIPMENT AND WORK PROCEDURES ARE REQUIRED FOR ENTRY  
IN TO THIS SPACE.

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	FOOT NOTES
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**LAKES DISTRICT HOSPITAL - NURSES RESIDENCE BUILDING****BASEMENT FLOOR**

001 Boiler Rom	C1 - Insulating Cement	L	Good		High	High	50	FTG
001 Boiler Rom	C1 - Insulating Cement	L	Poor		High	High	2	FTG
002 Stairwell	I2 - Floor Sheeting		Good	Mod		High	90	SF
003 Basement	C1 - Insulating Cement	AF	Good		High	High	100	FTG
004 Crawlspace	C1 - Insulating Cement	L	Poor		High	High	150	FTG
010 Basement Washroom	I2 - Floor Sheeting		Good	Mod		High	130	SF

**UPPER FLOOR**

101 Entry	L1 - Insulating Pad		Fair	Mod		High	1	Unit
102 Vestibule	L1 - Insulating Pad		Fair	Mod		High	1	Unit
103 Store Room	L1 - Insulating Pad		Fair	Mod		High	1	Unit
104 Stairwell	L1 - Insulating Pad		Fair	Mod		High	1	Unit
107 Laundry Room	I2 - Floor Sheeting		Good	Mod		High	125	SF
120 Washroom	I2 - Floor Sheeting		Good	Mod		High	130	SF

**FOOT NOTES:**

- / Asbestos insulating cement in this location is in poor condition. Entry to this space must be performed utilizing appropriate personal protective equipment and moderate risk work procedures.

**GENERAL NOTES:**

- Abatement and re-application costs are based on individual applications. Prices will vary dependent upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.
- Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.
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**FRIABILITY**

HIGH (easily crumbled by hand)  
 MED (not easily crumbled by hand)  
 LOW (tool or implement required to disturb)

**CONDITION**

GOOD (no visible signs of disturbance)  
 FAIR (visible signs of disturbance, no debris noted on ground)  
 POOR (delamination/deterioration evident/imminent, may have debris on ground)

**ACCESSIBILITY**

LOW (material concealed or enclosed)  
 MED (material exposed but out of hand reach)  
 HIGH (material exposed and within hand reach)

**VIS (VISIBILITY)**

Applications are exposed unless otherwise noted  
 AF - Application concealed above fixed ceilings  
 L - Low application height >8'

**SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS**

ID CODE AND VISUAL DESCRIPTION	SAMPLE No.	ASBESTOS CONTENT
C1 Grey Fibrous Pipe Fitting Insulating Cement - Boiler Room 001	Not Sampled	Known Asbestos Application
G1 1x1' Donna Conna Compresses Cellulose Ceiling Tile - Dining Room 103	Not Sampled	Known Non-Asbestos Application
H1 9x9" Cream with Light Brown Spotted and Tar Paper Backed Vinyl Floor Tile - Store Room 108	1080-09	Non-Asbestos
I1 Oak Strip Pattern Vinyl Floor Sheeting - Dining 103	Not Sampled	Known Non-Asbestos Application
I2 Beige, Brown and Cream Square Mosaic Pattern Paper Backed Corlon Vinyl Floor Sheeting - Laundry 107	1080-08	35% Chrysotile Asbestos
L1 Incandescent Lighting Gray Paper Insulating Pad - Entry 101	Not Sampled	Known Asbestos Application

**THE PINES LONG TERM CARE FACILITY**

**ASBESTOS LOCATION DRAWINGS**  
**AND**  
**LOCATION SPREADSHEETS**



BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	FOOT NOTES
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**THE PINES LONG TERM CARE FACILITY**

No asbestos containing applications were observed in this facility

**GENERAL NOTES:**

- 1 Abatement and re-application costs are based on individual applications. Prices will vary dependent upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.
- 2 Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.
- 3 Only known and visible asbestos materials are listed. There is a distinct possibility that asbestos materials may be present in wall, ceiling and floor void spaces not identified in this report. Any materials located in void spaces should be sampled for asbestos content prior to disturbance.
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**FRIABILITY**

HIGH (easily crumbled by hand)  
 MED (not easily crumbled by hand)  
 LOW (tool or implement required to disturb)

**CONDITION**

GOOD (no visible signs of disturbance)  
 FAIR (visible signs of disturbance, no debris noted on ground)  
 POOR (delamination/deterioration evident/imminent, may have debris on ground)

**ACCESSIBILITY**

LOW (material concealed or enclosed)  
 MED (material exposed but out of hand reach)  
 HIGH (material exposed and within hand reach)

**VIS (VISIBILITY)**

Applications are exposed unless otherwise noted

**SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS**

ID CODE AND VISUAL DESCRIPTION	SAMPLE No.	ASBESTOS CONTENT
C1 Beige Non-Fibrous Pipe Fitting Insulating Cement - Basement Mechanical Room	1080-12	Non-Asbestos
G1 2x4' Cross-Directional Fissures with Large and Small Pinholed Ceiling Tile - North Wing Corridor	Not Sampled	Known Non-Asbestos Application
I1 Cream with Small Brown Splotched Tarkett Vinyl Floor Sheeting - Dining Area	Not Sampled	Known Non-Asbestos Application
I2 Oak Strip Pattern Vinyl Floor Sheeting - Nurses Station	Not Sampled	Known Non-Asbestos Application
I3 Beige, Brown and Cream Ransom Sized Stone Pattern Paper Backed New Corlon Vinyl Floor Sheeting - Washroom 25	Not Sampled	Known Non-Asbestos Application
I4 Beige Textured Rubber Non-Slip Floor Sheeting - North Bath Room	Not Sampled	Known Non-Asbestos Application
I5 Pink with Cream and Dark Pink Splotched Tarkett Vinyl Floor Sheeting - Washroom 20	Not Sampled	Known Non-Asbestos Application
M1 Brown Duct Mastic - Basement Mechanical Room	1080-10	Non-Asbestos
P1 Drywall Filler - Basement Store Room	1080-11	Non-Asbestos

## **ANALYTICAL BULK SAMPLE RESULTS**



# SURE Hazmat and Testing

9912 Loughheed Highway,  
Burnaby, B.C.  
Tel: 604 444 0204

## Bulk Asbestos Results

Client: 1063 - Peak Earth and Environmental Consulting Inc.

Location: Northern Health - Lake District Hospital, Project 1080

Client Sample #	Date Analyzed	Analyst	Sample No.	Sample Location	Material Type	Other Materials	Asbestos Type & Amount
1063-143	14-Nov-08	DAC	1	Washroom 003	VAT - H1	Non-Fibrous 90% Other Fibres >5%	Chrysotile 3%
1063-144	14-Nov-08	DAC	2	Washroom 003	Drywall Filler - P1	Non-Fibrous 90% Other Fibres >5%	Not Detected
1063-145	14-Nov-08	DAC	3	Corridor 011	VAT - H2	Non-Fibrous 90% Other Fibres >5%	Chrysotile 3%
1063-146	14-Nov-08	DAC	4	Kitchen Stores 014	Finished Plaster - P2	Non-Fibrous 90% Other Fibres >5%	Not Detected
1063-147	14-Nov-08	DAC	5	Washroom 110A	Foam Core - I6	Non-Fibrous 30% Other Fibres >65%	Not Detected
1063-148	14-Nov-08	DAC	6	Washroom 111A	Corlon - I7	Non-Fibrous 50% Other Fibres >45%	Not Detected
1063-149	14-Nov-08	DAC	7	Laundry Room 107	Stipple Texture - A1	Non-Fibrous 90% Other Fibres >5%	Not Detected
1063-150	14-Nov-08	DAC	8	Nurses Residence Laundry Room 107	Corlon - I2	Non-Fibrous 40% Other Fibres >20%	Chrysotile 35%
1063-151	14-Nov-08	DAC	9	Nurses Residence Storage 108	VCT- H1	Non-Fibrous 90% Other Fibres >5%	Not Detected
1063-152	14-Nov-08	DAC	10	LDH The Pines Basement Mechanical	Duct Mastic - M1	Non-Fibrous 90% Other Fibres >5%	Not Detected
1063-153	14-Nov-08	DAC	11	LDH The Pines Basement Storage	Drywall Filler - P1	Non-Fibrous 90% Other Fibres >5%	Not Detected
1063-154	14-Nov-08	DAC	12	LDH The Pines Basement Mechanical	Insulating Cement - C1	Non-Fibrous 90% Other Fibres >5%	Not Detected

Note\* Chrysotile is part of the Serpentine Asbestos Mineral Group

\*Samples analyzed in accordance with NIOSH 9002 PLM Bulk Sampling Method

**MAIN HOSPITAL BUILDING**

**PRIORITIZE ASBESTOS ABATEMENT SCHEDULE  
AND ABATEMENT BUDGET ESTIMATES (2008)**

ASBESTOS CONTAINING MATERIAL LOCATIONS  
AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (room # and description)		ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	RATE	ABATEMENT COST	REAPPLICATION RATE	COST	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
<b>LAKE DISTRICT HOSPITAL</b>															
<b>BASEMENT FLOOR</b>															
000 Crawlspace		C1 - Insulating Cement	L	Fair	High	High	250	FTG	\$	95.00	\$	23,750.00	\$	1	/
001 Work Shop		C1 - Insulating Cement	L	Good	High	High	30	FTG	\$	95.00	\$	2,850.00	\$	2	
002 Fan Room		C1 - Insulating Cement	L	Good	High	High	50	FTG	\$	95.00	\$	4,750.00	\$	2	
003 Washroom		C1 - Insulating Cement	L	Good	High	High	8	FTG	\$	95.00	\$	760.00	\$	2	
003 Washroom		H1- Floor Tile		Good	High	Low	45	SF	\$	3.50	\$	157.50	\$	3	
004 Boiler Room		D1 - Tank Insulation	L	Good	High	High	2	Unit	\$	6,000.00	\$	12,000.00	\$	2	
004 Boiler Room		C1 - Insulating Cement	L	Good	High	High	165	FTG	\$	95.00	\$	15,675.00	\$	2	
004 Boiler Room		C1 - Insulating Cement	L	Good	High	High	60	FTG	\$	95.00	\$	5,700.00	\$	2	
005 Fan Room		C1 - Insulating Cement	L	Good	High	High	125	FTG	\$	95.00	\$	11,875.00	\$	2	
005 Fan Room		C1 - Insulating Cement	L	Good	High	High	25	FTG	\$	95.00	\$	2,375.00	\$	2	
005 Fan Room		D2 - Tank Insulation	L	Fair	High	High	2	Unit	\$	2,500.00	\$	5,000.00	\$	1	
006 Store Room		C1 - Insulating Cement	L	Good	High	High	40	FTG	\$	95.00	\$	3,800.00	\$	1	
008 Corridor		C1 - Insulating Cement	L	Good	High	High	6	FTG	\$	95.00	\$	570.00	\$	2	
009 Store Room		C1 - Insulating Cement	L	Good	High	High	13	FTG	\$	95.00	\$	1,235.00	\$	2	
010 Maintenance Office		C1 - Insulating Cement	L	Good	High	High	20	FTG	\$	95.00	\$	1,900.00	\$	2	
011 Corridor		C1 - Insulating Cement	AF	Good	High	Low	25	FTG	\$	95.00	\$	2,375.00	\$	3	
011 Corridor		H2- Floor Tile		Good	High	Low	240	SF	\$	3.50	\$	840.00	\$	3	
012 Store Room		C1 - Insulating Cement	L	Good	High	High	5	FTG	\$	95.00	\$	475.00	\$	1	
014 Custodial Room		C1 - Insulating Cement	L	Good	High	High	6	FTG	\$	95.00	\$	570.00	\$	1	
014 Custodial Room		C1 - Insulating Cement	L	Poor	High	High	2	FTG	\$	95.00	\$	190.00	\$	1	
014A Kitchen Store room		C1 - Insulating Cement	L	Good	High	High	24	FTG	\$	95.00	\$	2,280.00	\$	1	
015 Corridor		C1 - Insulating Cement	AF	Good	High	Low	40	FTG	\$	95.00	\$	3,800.00	\$	3	
015 Corridor		H2- Floor Tile		Good	High	Low	460	SF	\$	3.50	\$	1,610.00	\$	3	
015 Corridor		L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$	50.00	\$	50.00	\$	1	
016 Corridor		C1 - Insulating Cement	AF	Good	High	Low	30	FTG	\$	95.00	\$	2,850.00	\$	3	
016 Corridor		H1- Floor Tile		Good	High	Low	510	SF	\$	3.50	\$	1,785.00	\$	3	
016 Corridor		H2- Floor Tile		Good	High	Low	560	SF	\$	3.50	\$	1,960.00	\$	3	
016 Corridor		C1 - Insulating Cement	AF	Good	High	Low	50	FTG	\$	95.00	\$	4,750.00	\$	3	
017 Washroom		H2- Floor Tile		Good	High	Low	40	SF	\$	3.50	\$	140.00	\$	3	
018 Morgue		H2- Floor Tile		Good	High	Low	145	SF	\$	3.50	\$	507.50	\$	3	
019 Custodial Room		H2- Floor Tile		Good	High	Low	20	SF	\$	3.50	\$	70.00	\$	3	
020 Physiotherapy		C1 - Insulating Cement	AF	Good	High	Low	25	FTG	\$	95.00	\$	2,375.00	\$	3	
020 Physiotherapy		H2- Floor Tile		Good	High	Low	440	SF	\$	3.50	\$	1,540.00	\$	3	
023 Laundry Room		C1 - Insulating Cement	AF	Good	High	Low	20	FTG	\$	95.00	\$	1,900.00	\$	3	
023 Laundry Room		C1 - Insulating Cement	L	Good	High	Low	12	FTG	\$	95.00	\$	1,140.00	\$	1	
023 Laundry		H1- Floor Tile		Good	High	Low	125	SF	\$	3.50	\$	437.50	\$	3	
023 Laundry		H2- Floor Tile		Good	High	Low	175	SF	\$	3.50	\$	612.50	\$	3	
023 Laundry		L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$	50.00	\$	50.00	\$	1	
024 Stairwell Corridor		H2- Floor Tile		Good	High	Low	60	SF	\$	3.50	\$	210.00	\$	3	
025 Under Stair Storage		H2- Floor Tile		Good	High	Low	15	SF	\$	3.50	\$	52.50	\$	3	

ASBESTOS CONTAINING MATERIAL LOCATIONS  
AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	RATE	ABATEMENT COST	REAPPLICATION RATE	COST	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
<b>LAKE DISTRICT HOSPITAL</b>														
<b>BASEMENT FLOOR Con't</b>														
026 Kitchen	C1 - Insulating Cement	AF	Good	High	Low	20	FTG	\$ 95.00	\$ 1,900.00	\$ 45.00	\$ 900.00	\$ 2,800.00	3	
027 Servery	C1 - Insulating Cement	AF	Good	High	Low	10	FTG	\$ 95.00	\$ 950.00	\$ 45.00	\$ 450.00	\$ 1,400.00	3	
027 Servery	H1- Floor Tile		Good	High	Low	240	SF	\$ 3.50	\$ 840.00	\$ 7.00	\$ 1,680.00	\$ 2,520.00	3	
028 Dinning Area	C1 - Insulating Cement	AF	Good	High	Low	15	FTG	\$ 95.00	\$ 1,425.00	\$ 45.00	\$ 675.00	\$ 2,100.00	3	
028 Dinning Area	H1- Floor Tile		Good	High	Low	345	SF	\$ 3.50	\$ 1,207.50	\$ 7.00	\$ 2,415.00	\$ 3,622.50	3	
029 Store Room	H1- Floor Tile		Good	High	Low	30	SF	\$ 3.50	\$ 105.00	\$ 7.00	\$ 210.00	\$ 315.00	3	
030 Conference Room	H1- Floor Tile		Good	High	Low	300	SF	\$ 3.50	\$ 1,050.00	\$ 7.00	\$ 2,100.00	\$ 3,150.00	3	
030 Conference Room	C1 - Insulating Cement	AF	Good	High	Low	5	FTG	\$ 95.00	\$ 475.00	\$ 45.00	\$ 225.00	\$ 700.00	3	
031 Store Room	H1- Floor Tile		Good	High	Low	75	SF	\$ 3.50	\$ 262.50	\$ 7.00	\$ 525.00	\$ 787.50	3	
032 Store Room	H1- Floor Tile		Good	High	Low	55	SF	\$ 3.50	\$ 192.50	\$ 7.00	\$ 385.00	\$ 577.50	3	
032 Store Room	C1 - Insulating Cement	AF	Good	High	Low	1	FTG	\$ 95.00	\$ 95.00	\$ 45.00	\$ 45.00	\$ 140.00	3	
033 Meeting Room	C1 - Insulating Cement	AF	Good	High	Low	8	FTG	\$ 95.00	\$ 760.00	\$ 45.00	\$ 360.00	\$ 1,120.00	3	
034 Vestibule	H1- Floor Tile		Good	High	Low	60	SF	\$ 3.50	\$ 210.00	\$ 7.00	\$ 420.00	\$ 630.00	3	
034 Vestibule	C1 - Insulating Cement	AF	Good	High	Low	6	FTG	\$ 95.00	\$ 570.00	\$ 45.00	\$ 270.00	\$ 840.00	3	
036 Meeting Room	C1 - Insulating Cement	AF	Good	High	Low	6	FTG	\$ 95.00	\$ 570.00	\$ 45.00	\$ 270.00	\$ 840.00	3	
037 Housekeeping Office	H1 / H2 - Floor Tile		Good	High	Low	280	SF	\$ 3.50	\$ 980.00	\$ 7.00	\$ 1,960.00	\$ 2,940.00	3	
037 Housekeeping Office	C1 - Insulating Cement	AF	Good	High	Low	12	FTG	\$ 95.00	\$ 1,140.00	\$ 45.00	\$ 540.00	\$ 1,680.00	3	
<b>UPPER FLOOR</b>														
100A Store Room	H1- Floor Tile		Good	High	Low	35	SF	\$ 3.50	\$ 122.50	\$ 7.00	\$ 245.00	\$ 367.50	3	
103 Washroom	L1 - Insulating Pad		Fair	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	1	
106 Store Room	L1 - Insulating Pad		Fair	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	1	
113 Pantry	J1 - Cement Board		Good	High	Low	50	SF	\$ 10.00	\$ 500.00	-	-	\$ 500.00	3	
116 Store Room	L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	IMM	
136 Custodial Room	L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	IMM	
158 Custodial Room	L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	IMM	
161 Maternity Store Room	L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	IMM	
173 Custodial Room	L1 - Insulating Pad		Poor	Mod	High	1	Unit	\$ 50.00	\$ 50.00	-	-	\$ 50.00	IMM	
<b>PENTHOUSE</b>														
200 Penthouse Fan Room	C1 - Insulating Cement		Good	High	High	75	FTG	\$ 110.00	\$ 8,250.00	\$ 45.00	\$ 3,375.00	\$ 11,625.00	2	
<b>IMMEDIATE ABATEMENT AND RE-APPLICATION COSTS \$</b>									<b>12,530.00</b>					
<b>PRIORITY 1 RECOMMENDED ABATEMENT AND RE-APPLICATION COSTS \$</b>									<b>53,280.00</b>					
<b>PRIORITY 2 RECOMMENDED ABATEMENT AND RE-APPLICATION COSTS \$</b>									<b>87,005.00</b>					
<b>TOTAL ABATEMENT AND RE-APPLICATION COSTS FOR THIS FACILITY \$</b>									<b>236,212.50</b>					

ASBESTOS CONTAINING MATERIAL LOCATIONS  
AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	ABATEMENT RATE	COST	REAPPLICATION RATE	COST	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
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LAKES DISTRICT HOSPITAL

FOOT NOTES:

- / Asbestos insulating cement in this location is in poor condition. Entry to this space must be performed utilizing appropriate personal protective equipment and moderate risk work procedures.
- // Assumed asbestos application, no access to this room was possible during our assessment of the facility.

GENERAL NOTES:

- 1 Abatement and re-application costs are based on individual applications. Prices will vary dependent upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.
- 2 Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.
- 3 Only known and visible asbestos materials are listed. There is a distinct possibility that asbestos materials may be present in wall, ceiling and floor void spaces not identified in this report. Any materials located in void spaces should be sampled for asbestos content prior to disturbance.
- 4 This is an occupied building assessment for asbestos containing materials. No sampling of building membrane materials was conducted there such sampling could breach the water tightness of the building. Additionally, applications routinely sampled prior to building demolition were not assessed through this inspection, concealed flooring applications beneath covering flooring and sub-flooring materials, where coring would be required to identified concealed materials, was not performed. A pre-demolition assessment should be performed prior to building demolition.

FRIABILITY	CONDITION	REMOVAL PRIORITY	VIS (VISIBILITY)
HIGH (easily crumbled by hand)	GOOD (no visible signs of disturbance)		Applications are exposed unless otherwise noted
MED (not easily crumbled by hand)	FAIR (visible signs of disturbance, no debris noted on ground)		AF - Application concealed above fixed ceiling
LOW (tool or implement required to disturb)	POOR (delamination/deterioration evident/imminent, may have debris on ground)		L - Low application height <8'
ACCESSIBILITY	IMMEDIATE		
LOW (material concealed or enclosed)	1 Remove within one year due to this applications location and the surrounding areas use, damage is probable.		
MED (material exposed but out of hand reach)	2 Removal, in conjunction with proposed building renovations or maintenance, is recommended		
HIGH (material exposed and within hand reach)	3 Removal, prior to renovation or demolition activities, is recommended		

ASBESTOS CONTAINING MATERIAL LOCATIONS  
AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (Room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	RATE	ABATEMENT COST	REAPPLICATION RATE	COST APPLICATION	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
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LAKE DISTRICT HOSPITAL

SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS														
ID CODE AND VISUAL DESCRIPTION	SAMPLE No.		ASBESTOS CONTENT											
A1 Soft Stipple Ceiling Texture - Nurses Office 111	1080-07		Non-Asbestos											
C1 Grey Fibrous Pipe Fitting Insulating Cement - Penthouse Fan Room 300	Not Sampled		Known Asbestos Application											
D1 Domestic Hot Water Tank Insulating Cement - Basement Boiler Room 003	Not Sampled		Known Asbestos Application											
D2 Heat Exchanger Tank - Basement Fan Room 005	Not Sampled		Known Asbestos Application											
G1 1x1' Donna Conna Compresses Cellulose Ceiling Tile - Basement Corridor 011	Not Sampled		Known Non-Asbestos Application											
G2 1x1' Large and Small Holed Donna Conna Compresses Cellulose Ceiling Tile - Basement Laundry Room 023	Not Sampled		Known Non-Asbestos Application											
G3 2x4' Textured Finish Compresses Cellulose Ceiling Tile - Basement Dining Room 028	Not Sampled		Known Non-Asbestos Application											
G4 1x1' Holed and Textured Finish Donna Conna Compresses Cellulose Ceiling Tile - Nurses Station 117	Not Sampled		Known Non-Asbestos Application											
G5 2x4' Short Omni-Directional Fisures with Large and Small Pinhole Ceiling Tile - Lab 133	Not Sampled		Known Non-Asbestos Application											
H1 12x12" Beige with Minimal Thin Brown Streaked Vinyl Floor Tile - Basement Washroom 003	1080-01		Known Non-Asbestos Application											
H2 9x9" Brown with Brown and White Streaked Vinyl Floor Tile - Basement Corridor 011	1080-03		3% Chrysotile Asbestos											
H3 12x12" Marble Pattern New Vinyl Floor Tile - Quite Room 120	Not Sampled		3% Chrysotile Asbestos											
H4 12x12" White with Large and Small Grey and Brown Splotted Composite Floor Tile - Operating Room 150	Not Sampled		Known Non-Asbestos Application											
H5 12x12" Dark Brown with Small Black Splotted Composite Floor Tile - Operating Room 151	Not Sampled		Known Non-Asbestos Application											
I1 Beige with Small Cream and Brown Splotted Pattern Tarkett Vinyl Floor Sheeting - Basement Office 022	Not Sampled		Known Non-Asbestos Application											
I10 White 10" Square Pattern Paper Backed New Corlon Vinyl Floor Sheeting - Dr. Lounge 131	Not Sampled		Known Non-Asbestos Application											
I11 Beige, Brown and Dark Brown Swirl Pattern Jute Backed Marmoleum Floor Sheeting - Maternity 160	Not Sampled		Known Non-Asbestos Application											
I2 Brown with Brown and Cream Splotted Pattern Jute Backed Marmoleum Floor Sheeting - Reception 100	Not Sampled		Known Non-Asbestos Application											
I3 Beige with Brown and Cream Swirl Pattern Jute Backed Marmoleum Floor Sheeting - Corridor 101	Not Sampled		Known Non-Asbestos Application											
I4 Beige with Short Brown Streaked New Foam Core Vinyl Floor Sheeting - Washroom 103	Not Sampled		Known Non-Asbestos Application											
I5 Grey with Dark Grey and Cream Splotted Pattern Jute Backed Marmoleum Floor Sheeting - Public Health Nurse Office 104	Not Sampled		Known Non-Asbestos Application											
I6 Beige with Long Brown Streaked Foam Core Vinyl Floor Sheeting - Washroom 110A	1080-05		Known Non-Asbestos Application											
I7 Beige, Brown and Cream Random Size Stone Pattern Paper Backed Corlon Vinyl Floor Sheeting - Public Health Nurse Washroom 111A	1080-06		Non-Asbestos											
I8 White with Random Sized Blue and Cream Splotted Paper Backed New Corlon Vinyl Floor Sheeting - Washroom 115A	Not Sampled		Non-Asbestos											
I9 Blue with Blue and Cream Streaked New Foam Core Vinyl Floor Sheeting - X-Ray 125	Not Sampled		Known Non-Asbestos Application											
J1 Terrazzo Pattern Cement Asbestos Board - Pantry 113	Not Sampled		Known Asbestos Application											
L1 Incandescent Lighting Gray Paper Insulating Pad - Basement Corridor 015	Not Sampled		Known Asbestos Application											
P1 Drywall Filler - Basement Washroom 003	1080-02		Non-Asbestos											
P2 Finished Plaster - Basement Kitchen Stores 014A	1080-04		Non-Asbestos											
S1 Exterior Acrylic Stucco - Exterior	Not Sampled		Known Non-Asbestos Application											



**NURSES RESIDENCE BUILDING**

**PRIORITIZE ASBESTOS ABATEMENT SCHEDULE  
AND ABATEMENT BUDGET ESTIMATES (2008)**

ASBESTOS CONTAINING MATERIAL LOCATIONS  
AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	RATE	ABATEMENT COST	REAPPLICATION RATE	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
LAKES DISTRICT HOSPITAL - NURSES RESIDENCE BUILDING													
BASEMENT FLOOR													
001 Boiler Rom	C1 - Insulating Cement	L	Good	High	High	50	FTG	\$ 95.00	\$ 4,750.00	\$ 45.00	\$ 2,250.00	\$ 7,000.00	1
001 Boiler Rom	C1 - Insulating Cement	L	Poor	High	High	2	FTG	\$ 95.00	\$ 190.00	\$ 45.00	\$ 90.00	\$ 280.00	IMM
002 Stairwell	I2 - Floor Sheeting		Good	Mod	High	90	SF	\$ 10.00	\$ 900.00	\$ 8.00	\$ 720.00	\$ 1,620.00	3
003 Basement	C1 - Insulating Cement	AF	Good	High	High	100	FTG	\$ 110.00	\$ 11,000.00	\$ 45.00	\$ 4,500.00	\$ 15,500.00	3
004 Crawlspace	C1 - Insulating Cement	L	Poor	High	High	150	FTG	\$ 95.00	\$ 14,250.00	\$ 45.00	\$ 6,750.00	\$ 21,000.00	1
010 Basement Washroom	I2 - Floor Sheeting		Good	Mod	High	130	SF	\$ 10.00	\$ 1,300.00	\$ 8.00	\$ 1,040.00	\$ 2,340.00	3
UPPER FLOOR													
101 Entry	L1 - Insulating Pad		Fair	Mod	High	1	Unit	\$ 50.00	\$ 50.00	\$ -	\$ -	\$ 50.00	1
102 Vestibule	L1 - Insulating Pad		Fair	Mod	High	1	Unit	\$ 50.00	\$ 50.00	\$ -	\$ -	\$ 50.00	1
103 Store Room	L1 - Insulating Pad		Fair	Mod	High	1	Unit	\$ 50.00	\$ 50.00	\$ -	\$ -	\$ 50.00	1
104 Stairwell	L1 - Insulating Pad		Fair	Mod	High	1	Unit	\$ 50.00	\$ 50.00	\$ -	\$ -	\$ 50.00	1
107 Laundry Room	I2 - Floor Sheeting		Good	Mod	High	125	SF	\$ 10.00	\$ 1,250.00	\$ 8.00	\$ 1,000.00	\$ 2,250.00	3
120 Washroom	I2 - Floor Sheeting		Good	Mod	High	130	SF	\$ 10.00	\$ 1,300.00	\$ 8.00	\$ 1,040.00	\$ 2,340.00	3
IMMEDIATE ABATEMENT AND RE-APPLICATION COSTS \$								280.00					
PRIORITY 1 RECOMMENDED ABATEMENT AND RE-APPLICATION COSTS \$								28,200.00					
PRIORITY 2 RECOMMENDED ABATEMENT AND RE-APPLICATION COSTS \$								-					
TOTAL ABATEMENT AND RE-APPLICATION COSTS FOR THIS FACILITY \$								52,530.00					

## FOOT NOTES:

/ Asbestos insulating cement in this location is in poor condition. Entry to this space must be performed utilizing appropriate personal protective equipment and moderate risk work procedures.

## GENERAL NOTES:

- 1 Abatement and re-application costs are based on individual applications. Prices will vary dependent upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.
- 2 Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.
- 3 Only known and visible asbestos materials are listed. There is a distinct possibility that asbestos materials may be present in wall, ceiling and floor void spaces not identified in this report. Any materials located in void spaces should be sampled for asbestos content prior to disturbance.
- 4 This is an occupied building assessment for asbestos containing materials. No sampling of building membrane materials was conducted there such sampling could breach the water tightness of the building. Additionally, applications routinely sampled prior to building demolition were not assessed through this inspection, concealed flooring applications beneath covering flooring and sub-flooring materials, where coring would be required to identified concealed materials, was not performed. A pre-demolition assessment should be performed prior to building demolition.

ASBESTOS CONTAINING MATERIAL LOCATIONS  
AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	RATE	ABATEMENT COST	REAPPLICATION RATE	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
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## LAKES DISTRICT HOSPITAL - NURSES RESIDENCE BUILDING

<b>FRIABILITY</b>													
HIGH (easily crumbled by hand)			<b>CONDITION</b>									<b>VIS (VISIBILITY)</b>	
MED (not easily crumbled by hand)			GOOD (no visible signs of disturbance)									Applications are exposed unless otherwise noted	
LOW (tool or implement required to disturb)			FAIR (visible signs of disturbance, no debris noted on ground)									AF - Application concealed above fixed ceilings	
			POOR (delamination/deterioration evident/imminent, may have debris on ground)									L - Low application height >8'	
<b>ACCESSIBILITY</b>			<b>REMOVAL PRIORITY</b>										
LOW (material concealed or enclosed)			<b>IMMEDIATE</b>										
MED (material exposed but out of hand reach)			1 Remove within one year due to this applications location and the surrounding areas use, damage is probable.										
HIGH (material exposed and within hand reach)			2 Removal, in conjunction with proposed building renovations or maintenance, is recommended										
			3 Removal, prior to renovation or demolition activities, is recommended										

SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS												
ID CODE AND VISUAL DESCRIPTION	SAMPLE No.		ASBESTOS CONTENT									
C1 Grey Fibrous Pipe Fitting Insulating Cement - Boiler Room 001	Not Sampled		Known Asbestos Application									
G1 1x1' Donna Conna Compresses Cellulose Ceiling Tile - Dining Room 103	Not Sampled		Known Non-Asbestos Application									
H1 9x9" Cream with Light Brown Splotched and Tar Paper Backed Vinyl Floor Tile - Store Room 108	1080-09		Non-Asbestos									
I1 Oak Strip Pattern Vinyl Floor Sheeting - Dining 103	Not Sampled		Known Non-Asbestos Application									
I2 Beige, Brown and Cream Square Mosaic Pattern Paper Backed Corlon Vinyl Floor Sheeting - Laundry 107	1080-08		35% Chrysotile Asbestos									
L1 Incandescent Lighting Gray Paper Insulating Pad - Entry 101	Not Sampled		Known Asbestos Application									

**THE PINES LONG TERM CARE FACILITY**  
**PRIORITIZE ASBESTOS ABATEMENT SCHEDULE**  
**AND ABATEMENT BUDGET ESTIMATES (2008)**

# ASBESTOS CONTAINING MATERIAL LOCATIONS AND PRIORITIZED ABATEMENT COST ESTIMATES

12/27/2008

BUILDING & FUNCTIONAL AREA (room # and description)	ID CODE DESCRIPTION AND APPLICATION	VIS	CONDITION	ACCESSIBILITY	FRIABILITY	QUANTITY	UNIT	ABATEMENT RATE	COST	REAPPLICATION RATE	COST	COST PER APPLICATION	REMOVAL PRIORITY	FOOT NOTES
<b>THE PINES LONG TERM CARE FACILITY</b>														
No asbestos containing applications were observed in this facility														
<b>IMMEDIATE ABATEMENT AND RE-APPLICATION COSTS \$ -</b>														
<b>PRIORITY 1 RECOMMENDED ABATEMENT AND RE-APPLICATION COSTS \$ -</b>														
<b>PRIORITY 2 RECOMMENDED ABATEMENT AND RE-APPLICATION COSTS \$ -</b>														
<b>TOTAL ABATEMENT AND RE-APPLICATION COSTS FOR THIS FACILITY \$ -</b>														

**GENERAL NOTES:**

- 1 Abatement and re-application costs are based on individual applications. Prices will vary dependent upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.
- 2 Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.
- 3 Only known and visible asbestos materials are listed. There is a distinct possibility that asbestos materials may be present in wall, ceiling and floor void spaces not identified in this report. Any materials located in void spaces should be sampled for asbestos content prior to disturbance.
- 4 This is an occupied building assessment for asbestos containing materials. No sampling of building membrane materials was conducted there such sampling could breach the water tightness of the building. Additionally, applications routinely sampled prior to building demolition were not assessed through this inspection, concealed flooring applications beneath covering flooring and sub-flooring materials, where coring would be required to identified concealed materials, was not performed. A pre-demolition assessment should be performed prior to building demolition.

FRIABILITY	CONDITION	VIS (VISIBILITY)
HIGH (easily crumbled by hand)	GOOD (no visible signs of disturbance)	Applications are exposed unless otherwise noted
MED (not easily crumbled by hand)	FAIR (visible signs of disturbance, no debris noted on ground)	
LOW (tool or implement required to disturb)	POOR (delamination/deterioration evident/imminent, may have debris on ground)	
ACCESSIBILITY	REMOVAL PRIORITY	
LOW (material concealed or enclosed)	<b>IMMEDIATE</b> Immediate removal recommended. There is a distinct possibility of asbestos fibre release	
MED (material exposed but out of hand reach)	1 Remove within one year due to this applications location and the surrounding areas use, damage is probable.	
HIGH (material exposed and within hand reach)	2 Removal, in conjunction with proposed building renovations or maintenance, is recommended	
	3 Removal, prior to renovation or demolition activities, is recommended	

ID CODE AND VISUAL DESCRIPTION	SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS		ASBESTOS CONTENT
C1 Beige Non-Fibrous Pipe Fitting Insulating Cement - Basement Mechanical Room	1080-12	Non-Asbestos	Non-Asbestos
G1 2x4' Cross-Directional Fissures with Large and Small Pinholes Ceiling Tile - North Wing Corridor	Not Sampled	Known Non-Asbestos Application	Known Non-Asbestos Application
I1 Cream with Small Brown Spotted Tarkett Vinyl Floor Sheeting - Dining Area	Not Sampled	Known Non-Asbestos Application	Known Non-Asbestos Application
I2 Oak Strip Pattern Vinyl Floor Sheeting - Nurses Station	Not Sampled	Known Non-Asbestos Application	Known Non-Asbestos Application
I3 Beige, Brown and Cream Ransom Sized Stone Pattern Paper Backed New Corlon Vinyl Floor Sheeting - Washroom 25	Not Sampled	Known Non-Asbestos Application	Known Non-Asbestos Application
I4 Beige Textured Rubber Non-Slip Floor Sheeting - North Bath Room	Not Sampled	Known Non-Asbestos Application	Known Non-Asbestos Application
I5 Pink with Cream and Dark Pink Spotted Tarkett Vinyl Floor Sheeting - Washroom 20	Not Sampled	Known Non-Asbestos Application	Known Non-Asbestos Application
M1 Brown Duct Mastic - Basement Mechanical Room	1080-10	Non-Asbestos	Non-Asbestos
P1 Drywall Filler - Basement Store Room	1080-11	Non-Asbestos	Non-Asbestos

