Baltimore P. S. HVAC and Classroom Refresh

Issued for Building Permit and Tender

Prepared for

Kawartha Pine Ridge District School Board (KPRDSB)

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For all Mechanical Specifications refer to the drawings

END OF INDEX DIVISION 1

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 Division 1 requirements apply to all Sections of Work.

1.2 SUMMARY OF WORK

.1 Provide all items, articles, materials, services and incidentals, whether or not expressly specified or shown on Drawings, to make finished work complete and fully operational, consistent with the intent of the Contract Documents.

.2 Provide all work indicated in Contract Documents, regardless whether located within or outside Owner's property lines.

.3 The following work is not included in this Contract:

.1 Work designated N.I.C. on the Drawings.

1.3 THE CONTRACT DOCUMENTS

.1 Work will be performed under one Contract; the Contract will be in the form of the Agreement between Owner and Contractor.

.2 Division 1 General Requirements, of the Specification generally specify work and coordination of the work that is the direct responsibility of the Contractor but shall not be interpreted to define absolutely the limits of responsibility that must be established between the Contractor and his Subcontractors by their separate agreements.

.3 Ensure that Subcontractors understand that the General Conditions of the Contract, and Division 1 General Requirements, apply to Sections of the Specification governing their work.

.4 Ensure that the work includes all labour, equipment and products required, necessary or normally recognized as necessary for the proper and complete execution of the work of each trade.

.5 Work in this Specification is divided into descriptive Sections which are not intended to identify absolute contractual limits between Subcontractor, nor between the General Contractor and his Subcontractors. The Contractor shall organize division of labour and supply of materials essential to complete the Project in all its parts and provide a total enclosure and protection from weather of interior spaces, as established in the General Conditions of the Contract.

.6 As a result, the Consultant shall not be required to decide on questions arising with regard to agreements or contracts between the Contractor and Subcontractors or Suppliers, nor to the extent of the parts of the Work assigned thereto.

.7 Further, no extra will be allowed as a result of the failure to coordinate and allocate the Work such that the Work is Provided in accordance with the Contract Documents.

.8 Wherever the word "building" occurs in the Contract Documents it shall be taken to mean all the buildings included in the Contract.

.9 Wherever in the Contract Documents the words "approval", "approved", "direction", "directed", "selection", "selected", "request", "requested", "report", and similar words are used, such approvals, directions, selections, requests and reports shall be given by the Consultant in writing unless specifically stated otherwise.

.10 Wherever in the Contract Documents the word "supply" is used in any form, it shall mean that the work specified to be supplied includes delivery to site and unloading at location directed.

.11 Wherever in the Contract Documents the word "installed" issued in any form, it shall mean that the work specified for installation includes uncrating, unpacking, etc; moving from stored location to place of installation; and installing to meet specified requirements.

.12 Wherever in this Specification it is specified that work is to proceed or to meet approval, direction, selection or request of authorities having jurisdiction or others, such approval, direction, selection or request shall be in writing.

.13 Wherever in this Specification or as directed by the Consultant it is specified that work shall be repaired, made good or replaced, it shall be performed without any additional cost to the Owner.

.14 Whenever in the Specifications the term "and/or" is used, the Consultant shall decide which of the possible meanings, to be derived at from the sentence where this term occurs shall govern.

1.4 STANDARDS AND CODES

.1 Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions referred to in these specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at Contract date.

1.5 METRIC PROJECT

.1 This project is based on The International System of Units (SI). Measurements are expressed in metric (SI) units and depending on the progress made in the various sectors of the industry are either hard or soft converted units.

.2 All metric units specified shall be taken to be the minimum acceptable unless otherwise noted.

.3 It is the Contractor's responsibility to check and verify with manufacturers and suppliers on the availability of materials and products in either metric or imperial sizes.

.4 Where a material or product cannot be obtained in the metric size specified, provide the next larger imperial size available.

.5 Where both metric and imperial sizes or dimensions are shown, the metric size or dimension shall govern.

1.6 LAWS, NOTICES, PERMITS AND FEES

.1 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Work. Codes and regulations form an integral part of the Contract Documents.

.2 Permits:

.1 The Contractor shall obtain and pay for all permits, licenses, deposits and certificates of inspection as part of the Work, including permits for road closures.

.2 The Owner has initiated the permit application process for the following, but responsibility for completing the application process, including all associated costs and responsibilities, rests with the Contractor and is included as part of the Work.

.3 Obtain permits required to execute work on municipal rights of way. Obtain damage deposits for sidewalks, roads and services, unless otherwise indicated.

.3 Arrange for inspection, testing and acceptance of the Work required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.

.4 It is the responsibility of the Contractor to schedule notifications and inspections required by authorities having jurisdiction such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the Work. The Contractor, at no additional cost to the Owner, shall be solely responsible for any delay in the Work caused by failure to properly schedule required notifications and inspections.

1.7 DISCREPANCIES AND CLARIFICATIONS

.1 Advise Consultant of discrepancies discovered in requirements of the Contract Documents and request clarification from Consultant in written form.

.2 Advise Consultant when clarifications are required pertaining to meaning or intent of requirements of Contract Documents and request clarification from Consultant in written form.

.3 Do not proceed with related work until written clarification is provided by Consultant.

.4 Failure to notify Consultant shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to the Owner.

.5 Written instructions issued by Consultant for the purpose of clarification, implicitly supersede applicable and relevant aspects of the Contract Documents irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions.

1.8 SITE PROGRESS RECORDS

.1 Maintain at site a permanent written record of progress of work. Make the record available at all times with copies provided when requested. Include in record each day:

.1 Weather conditions with maximum and minimum temperatures.

.2 Conditions encountered during excavation. Record quantities pumped for dewatering.

.3 Commencement and completion dates of the work of each trade in each area of Project.

.4 Erection and removal dates of formwork in each area of Project.

.5 Dates, quantities, and particulars of each concrete pour.

.6 Dates, quantities, and particulars of roofing installation.

.7 Attendance of Contractor's and Subcontractor's work forces at Project and a record of the work they perform.

.8 Dates, status and particulars of submissions, ie. shop drawings, samples, mock-ups and the like.

.9 Dates, status and particulars of deliveries, ie. manufacturing dates, delivery and installation dates.

.10 Visits to site by Owner, Consultant, authorities having jurisdiction, testing companies, Contractor, Subcontractors, and suppliers.

.2 Maintain a progress chart in approved format. Show on chart proposed work schedule and progress of work by Contractor and Subcontractor. The status of delivery items, ie. shop drawings status, manufacture dates - delivery and installation dates.

1.9 DOCUMENTS AT THE PLACE OF THE WORK

.1 Maintain at the Place of the Work, one copy of each of following:

.1 Contract Documents including drawings, specifications, addenda, and other modifications to the Contract, including copies of standards and codes referenced in the Contract Documents.

.2 'Reviewed' or 'Reviewed as Modified' shop drawings. Refer to Section 01 33 00 for details of schedules required.

.3 Construction, inspection and testing, and submittal schedules.

.4 Supplemental Instructions, proposed Change Orders, Change Orders, and Change Directives.

.5 Field Test Reports.

.6 Consultant's field review reports and deficiency reports.

.7 Reports by authorities having jurisdiction.

.8 Building and other applicable permits, and related permit documents.

.9 Daily log of the Work.

.10 Project record drawings recording as-built conditions, instructions, changes, and the like, as called for in Section 01 31 00, prior to being concealed.

.2 Make above material available to Consultant upon request.

1.10 EXAMINATION

.1 Examine site, and ensure that each Section performing work related to site conditions has examined it, so that all are fully informed on all particulars which affect the Project Work (thereon and at the place of the building, and in order that construction proceeds competently and expeditiously).

.2 Ensure by examination that all physical features at the work, and working restrictions and limitations which exist are known, so that the Owner is not restricted in his use of the premises for his needs.

.3 Previously Completed Work:

.1 Where dimensions are required for proper fabrication, verify dimensions of completed work in place before fabrication and installation of work to be incorporated with it.

.2 Verify that previously executed work and surfaces are satisfactory for installation or application, or both, and that performance of subsequent work will not be adversely affected.

.3 Ensure that work installed in an unsatisfactory manner is rectified by those responsible for its installation before further work proceeds.

.4 Commencement of work will constitute acceptance of site conditions and previously executed work as satisfactory.

.5 Defective work resulting from application to, or installation on, or incorporation with, unsatisfactory previous work will be considered the responsibility of those performing the later work.

.4 Construction Measurements:

.1 Take site dimensions of completed work before installation of work to be incorporated commences.

.2 Before commencing installation of work, verify that its layout is accurately in accordance with intent of Drawings, and that positions, levels, and clearances to adjacent work are maintained.

.3 Before commencing work, verify that all clearances required by authorities having jurisdiction can be maintained.

.4 If work is installed in wrong location, rectify it before construction continues.

.5 Where dimensions are not available before fabrication commences, the dimensions required shall be agreed upon between the trades concerned.

.6 All measurements shall be Imperial.

1.11 PROTECTION OF WORK, PROPERTY AND PERSONS

.1 Include in work necessary methods, materials, and construction to ensure that no damage or harm to work, materials, property and persons results from the work of this Contract. Temporary facilities relating to protection are specified in Section 01 50 00.

.2 Comply with all instructions and/or orders issued by authorities having jurisdiction.

.3 Ensure that compulsory wearing of hard hats and safety boots is observed by all persons employed on the work. Provide spare hard hats for visitors, refuse admission to the premises to those refusing to wear same.

.4 Keep excavations, and pits free of rainwater, ground water, backing up of drains and sewers, and all other water. Pump dry as required.

.5 Protect adjacent private and public property from damage and, if damaged, make good immediately. Make good private property to match in all details its original condition in material and finishes as approved, and public property in accordance with requirements specified and/or instructed by its Owner or as directed by the Consultant.

.6 Keep surfaces, on which finish materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.

.7 Do not apply visible markings to surfaces exposed to view in finished state or that receive transparent finishes.

.8 Protect surfaces of completed work exposed to view from staining, disfigurement and all other damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection in each case.

.9 Brace and shore masonry walls until their designed lateral support is incorporated at both top and bottom, in accordance with safe construction practices.

.10 Enforce fire prevention methods at site for new work. Maintain existing in accordance with local authorities having jurisdiction. Do not permit bonfires, open flame heating devices or accumulation of debris. Use flammable materials only if proper safety precautions are taken, both in use and storage.

.11 Do not store flammable materials in the building. Take necessary measures to prevent spontaneous combustion. Place cloths and other disposable materials that are a fire hazard in closed metal containers and remove them from the building every night.

.12 Where flammable materials are being applied, ensure that adequate ventilation is provided, spark-proof equipment is used, and smoking and open flames are prohibited.

.13 Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers or in open drain courses.

.14 Public Utilities and Services:

.1 Verify location of and limitations imposed by, existing mechanical, electrical, telephone and similar services, and protect them from damage. If necessary, relocate active services to ensure that they function continuously wherever

possible in safety and without risk of damage or down time to the existing buildings.

.2 Cap off and remove unused utility services encountered during work after approval is given by the utilities concerned or authorities having jurisdiction, which ever may apply. Relocation, removal, protection and capping of existing utility services shall be performed only by the applicable utility, and of other services by licensed mechanics.

.3 Make arrangements and pay for connection charges for services required for the Work.

.15 Ensure that precautions are taken to prevent leakage and spillage from plumbing and mechanical work that may damage surfaces and materials finished or unfinished.

.16 Give constant close supervision to roofing/waterproofing membranes following their installation, during the time they are temporarily protected or exposed, to ensure that no damage occurs to them before completion of building.

.17 Prevent spread of dust beyond the construction site by wetting, or by other approved means, as required or as directed by the Consultant and/or authorities having jurisdiction.

.18 Make good roads, soft landscaping, walkways, curbs, sidewalks, possessions and property, soiled or damaged due to the Work, to requirements of authorities having jurisdiction and requirements of and Making Good, as applicable.

1.12 SAFETY AND SECURITY

.1 Be responsible for security of all areas affected by work of this Contract until taken over by Owner. Take steps to prevent entry to the Work by unauthorized persons and guard against theft, fire and damage by any cause.

.2 Provide suitable surveillance equipment and/or employ guard services, as required to adequately protect the Work.

.3 Maintain fire protection for work. Store paints and volatile substances in a separate and controlled location and inspect frequently. Inspect temporary wiring, drop cords, extension cables for defective insulation or connections frequently. Remove combustible wastes frequently. Prohibit smoking in areas where volatile and flammable substances are used.

.4 Do not cut, bore or sleeve through any loadbearing member, new or existing without Consultant's written authorization, unless specifically indicated on Drawings.

1.13 SALVAGE

.1 Unless otherwise specified, surplus material resulting from construction, and construction debris shall become the property of Contractor, who shall dispose of it away from site.

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

1.14 USE OF SITE

.1 Accept full responsibility for assigned work areas from the time of Contract award until Substantial Performance of the Work.

.2 Check means of access and egress, rights and interests which may be interfered with. Do not block lanes, roadways, entrances or exits. Direct construction traffic and locate access to site as directed by municipality.

.3 Where encroachment beyond property limits is necessary make arrangement with respective property owners.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Prices included in the Contract shall be complete for the applicable work, and shall constitute the full consideration, payment, compensation and remuneration to the Contractor for all such work. For greater certainty, but without limitation to the foregoing, such prices shall constitute full and complete consideration, payment, compensation and remuneration to the Contractor for the following (subject to adjustment only as specified in the Contract Documents):

.1 Expenditures for wages and for salaries of workmen, engineers, superintendents, draftsmen, foremen, timekeepers, accountants, expediters, clerks, watchmen and such other personnel as may be approved, employed directly under the Contractor and while engaged on the applicable work at the site and expenditures for travelling and board allowances of such employees when required by location of the applicable work or when covered by trade agreements and when approved; provided, however, that nothing shall be included for wages or salary of the Contractor if an individual, or of any member of the Contractor's firm if the Contractor is a firm or the salary of any officer of the Corporation if the Contractor is a corporation, unless otherwise agreed to in writing;

.2 Expenditures for material used in or required in connection with the construction of the applicable work including material tests and mix designed required by the laws or ordinances of any authority having jurisdiction and not included under Subparagraph .9.

.3 Expenditures for preparation, inspection, delivery, installation and removal of materials, plant, tools and supplies;

.4 Temporary facilities as required for the applicable work;

.5 Travelling expenses properly incurred by the Contractor in connection with the inspection and supervision of the applicable work or in connection with the inspection of materials prepared or in course of preparation for the applicable work and in expediting their delivery;

.6 Rentals of all equipment whether rented from the Contractor or others, in accordance with approved rental agreements including any approved applicable insurance premiums thereon and expenditures for transportation to and from the site of such equipment, costs of loading and unloading, cost of installation, dismantling and removal thereof and repairs or replacements during its use on the applicable work, exclusive of any repairs which may be necessary because of defects in the equipment when brought to the work or appearing within thirty (30) days thereafter;

.7 The cost of all expendable materials, supplies, light, power, heat, water and tools (other than tools customarily provided by tradesmen) less the salvage value thereof at the completion of the applicable work;

.8 Assessments under the Workplace Safety Insurance Act, the Unemployment Insurance Act, Canada Pension Act, statutes pay or any similar statutes; or payments on account usual vacations made by the contractor to his employees engaged on the applicable work at the site to the extent to which such assessments or payments for vacations with pay relate to the work covered by the specified price; and all sales taxes or other taxes where applicable;

.9 The amounts of all Subcontracts related to the specified price;

.10 Premiums on all insurance policies and bonds called for under this Contract as related to the specified price;

.11 Royalties for the use of any patented invention on the applicable work;

.12 Fees for licences and permits in connection with the applicable work;

.13 Duties and taxes imposed on the applicable work; and

.14 Such other expenditures in connection with the applicable work as may be approved; provided always that except with the consent of the Owner, the above items of cost shall be at rates comparable with those prevailing in the locality of the work.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Comply with GC 4.1 CASH ALLOWANCES.

.2 Cash allowances are designated for additional work and services deemed to be necessary by Owner, from time to time, throughout the execution of the Work. Where a cash allowance refers to an item or category of work already included in Contract Documents, it shall be assumed to cover work or services in addition to that indicated, unless specifically indicated otherwise.

.3 Contractor may be required from time to time to assist in tendering of certain items of work covered by allowance, as directed by Consultant.

1.2 AUTHORIZATION

.1 Expenditures from allowances included in the Contract must be authorized in writing by the Consultant.

.2 Work covered by allowances shall be performed for such amounts and by such persons as directed by the Consultant.

.3 Submit, before application for final payment, copies of all invoices and statements from suppliers and Subcontractors for work which has been paid for from cash allowances.

1.3 CASH ALLOWANCES

.1 Cash allowances include supply and installation unless specifically indicated otherwise.

.2 Supply only allowances shall include:

- .1 Net cost of products
- .2 Delivery to site
- .3 Applicable taxes and duties (excluding HST)

.3 Supply and install allowances shall include:

- .1 Net cost of products
- .2 Delivery to site
- .3 Unloading, storing, handling of products on site
- .4 Installation, finishing and commissioning of products
- .5 Applicable taxes and duties (excluding HST)

.4 Inspection and testing allowances shall include:

- .1 Net costs of inspection / testing services
- .2 Applicable taxes (excluding HST)

.5 Other costs related to work covered by allowances are not covered by the allowance but shall be included separately in Contract.

.6 Include a total of **$5,000.00** (five thousand dollars) in the Contract for the following cash allowances:

- .1 Independent Testing and Inspection (roof and building envelope)

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 APPROVED ALTERNATES AND APPROVED EQUALS

.1 Named Products alternates or equals, indicated by the phrases "or approved alternate by XYZ Manufacturing" or "or approved equal by XYZ Manufacturing", shall be interpreted to mean that named Product alternate or equal, if selected for use in lieu of indicated or specified Product, meets or exceeds performance, appearance, general arrangement, dimensions, availability, code and standards compliance, and colour of specified Product.

.2 Be responsible for costs and modifications associated with the inclusion of named Product alternate or equal at no additional cost to the Owner.

.3 The process for proposing and approving alternates or equals, including alternate design solutions, shall be the same process as for proposing and approving substitutions (refer to paragraph 1.2 below).

.4 Confirm delivery of specified items prior to proposing alternates or equals.

1.2 SUBSTITUTIONS

.1 Submission of substitutions:

.1 Proposals for substitutions of Products and materials must be submitted in accordance with procedures specified in this section.

.2 Consultant may review submissions, if directed by Owner, but in any case with the understanding that the Contract Time will not be altered due to the time required by the Consultant to review the submission and by the Contractor to implement the substitution in the Work.

.2 Submission requirements:

.1 Description of proposed substitution, including detailed comparative specification of proposed substitution with the specified Product.

.2 Manufacturer’s Product data sheets for proposed Products.

.3 Respective costs of items originally specified and the proposed substitution.

.4 Confirmation of proposed substitution delivery, in writing by Product manufacturer.

.5 Compliance with the building codes and requirements of authorities having jurisdiction.

.6 Affect concerning compatibility and interface with adjacent building materials and components.

.7 Compliance with the intent of the Contract Documents.

.8 Effect on Contract Time.

.9 Reasons for the request.

.3 Substitutions submitted on shop drawings without following requirements of this section prior to submission of the affected shop drawings will cause the shop drawings to be rejected.

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

.5 Consultant’s decision concerning acceptance or rejection of proposed substitutions is final. Should it appear to the Consultant that the value of services required to evaluate the substitution exceeds the potential reduction, the Consultant will advise the Owner that the substitution does not merit consideration before proceeding with a full evaluation. If

the substitution will produce a reduction commensurate with or exceeding the value of the Consultant's services to evaluate the substitution, the Consultant will request the Owner's direction to proceed with evaluation.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 REQUEST FOR INTERPRETATION - RFI

.1 A request for interpretation (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents.

.2 Submittal procedures:

.1 RFI form:

.1 Submit RFI on “Request for Interpretation” form, appended to this section. The Consultant shall not respond to an RFI except as submitted on this form.

.2 Where RFI form does not provide sufficient space for complete information to be provided thereon, attach additional sheets as required.

.3 Submit with RFI form necessary supporting documentation.

.2 RFI log:

.1 Maintain log of RFIs sent to and responses received from the Consultant, complete with corresponding dates.

.2 Submit updated log of RFIs with each progress draw submittal.

.3 Submit RFIs sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do this will not be paid by the Owner.

.4 RFIs shall be submitted only to the Consultant.

.5 RFIs shall be submitted only by Contractor. RFIs submitted by Subcontractors or Suppliers shall not be accepted.

.6 Number RFIs consecutively in one sequence in order submitted.

.7 Submit one distinct RFI per RFI form.

.8 Consultant shall review RFIs from the Contractor submitted in accordance with this section, with the following understandings:

.1 Consultant’s response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.

.2 Only the Consultant shall respond to RFIs. Responses to RFIs received from entities other than the Consultant shall not be considered.

.9 Allow five (5) Working Days for review of each RFI by the Consultant.

.1 Consultant’s review of RFI commences on date of receipt by the Consultant of RFI submittal and extends to date RFI returned by Consultant.

.2 When the RFI submittal is received by Consultant before noon, review period commences that day; when RFI submittal is received by Consultant after noon, review period begins on the next Working Day.

.10 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Contract Documents to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the interpretation of the Contract Documents cannot be resolved by direct reference to the Contract Documents. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

Contractor's Request for Interpretation

Contractor's Supplemental Instructions

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

Project: _____ RFI No.: _____

Date of Request: _____

Owner: _____

To: _____ *Contractor*: _____

(*Consultant's* Representative)

Contractor's Representative: _____

Project No.: _____

Consultant's Fax No.: _____ Fax No.: _____

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

Attachments: _____

Requested by: _____

Consultant's Supplemental Instruction:

Attachments: _____

Reply By: _____

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

Supplemental Instruction Issued:

By: _____

Consultant Date

Supplemental Instruction Accepted:

By: _____

Contractor Date

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

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 DESCRIPTION

.1 Coordination of the work of all Sections of the Specification is the responsibility of the Contractor.

.2 The Contractor will be deemed to possess the necessary technical skills to carefully evaluate all requirements of the Contract, and to have included in the Price all costs for the proper implementation of these requirements.

.3 The Contractor's responsibility includes, but is not restricted to, co-ordination specified in this Section, except where otherwise specified.

1.2 RELATED MECHANICAL AND ELECTRICAL WORK

.1 Coordination of the installation of mechanical and electrical systems indicated on the Drawings, including the interrelating operation and functioning between components of a system and between systems, is the responsibility of those performing the mechanical and electrical work, with final coordination the responsibility of the Contractor.

.2 Provide interference drawings as herein specified to ensure proper co-ordination of subtrade work. No extras will be considered for work not properly coordinated prior to installation.

.3 Ensure that service poles, pipes, conduit, wires, fill-pipes, vents, regulators, meters and similar Project service work is located in inconspicuous locations. If not indicated on Drawings, verify location of service work with Consultant before commencing installation.

1.3 QUALITY ASSURANCE

.1 Requirements of Regulatory Agencies:

.1 Coordinate requirements of authorities having jurisdiction.

.2 Quality Control:

.1 Ensure that work meets specified requirements.

.2 Schedule, supervise and coordinate inspection and testing as specified in Section 01 45 00.

.3 Job Records:

.1 Maintain job records and ensure that such records are maintained by Subcontractors.

1.4 SUPERINTENDENCE

.1 Provide superintendent and necessary supporting staff personnel who shall be in attendance at the Place of the Work while Work is being performed, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.

.2 The Contractor shall appoint a superintendent at the Place of the Work who shall have overall authority at the Place of the Work and shall speak for the Contractor and represent the Contractor’s interest and responsibilities at meetings at the Place of the Work and in dealings with the Consultant and the Owner.

.3 Supervise, direct, manage and control the work of all forces carrying out the Work, including subcontractors and suppliers. Carry out daily inspections to ensure compliance with the Contract Documents and the maintenance of quality standards. Ensure that the

supervisory staff includes personnel competent in supervising all Sections of Work required.

.4 Arrange for sufficient number of qualified assistants to the supervisor as required for the proper and efficient execution of the Work.

1.5 SUBMITTALS

.1 Provide a complete set of all required Contract Documents, together with instructions for changes to the work which are issued, to each firm preparing shop drawings.

.2 Schedule and expedite submission of specified submittals.

.3 Review submittals and make comments as specified in Section 01 33 00.

.4 Ensure that each original submission, and their subsequent revisions and resubmissions are made on schedule.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

.1 It is the responsibility of the Contractor to ensure that the supplier or distributor of materials specified or accepted alternatives, which have been bid, has materials on the site when required. The Contractor shall obtain confirmed delivery dates from the supplier, and ensure no delay in the progress of the work

.2 Provide equipment delivery schedule, coordinated with construction and submittals schedule, showing delivery dates for major and/or critical equipment. Provide delivery access and unloading areas.

.3 Make available areas for storage of products and construction equipment to meet specified requirements, and to ensure a minimum of interference with progress of the work and relocation.

.4 Make access available for transference of stored products and construction equipment to work areas.

.5 The Contractor shall contact the Consultant immediately upon receipt of information indicating that any material or item, will not be available on time, in accordance with the original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.

.6 The Consultant reserves the right to receive from the Contractor at any time, upon request, copies of actual purchase or work orders of any material or products to be supplied for the work.

.7 If materials and products have not been placed on order, the Consultant may instruct such items to be placed on order, if direct communication in writing from the manufacturer or prime suppliers is not available indicating that delivery of said material will be made in sufficient time for the orderly completion of the Work.

.8 The Consultant's review of purchase orders or other related documentation shall in no way release the Contractor, or his subcontractors and suppliers from their responsibility for ensuring the timely ordering of all materials and items required, including the necessary expediting, to complete the work as scheduled in accordance with the Contract Documents.

1.7 JOB CONDITIONS

.1 Ensure that conditions within the building are maintained and that work proceeds under conditions meeting specified environmental requirements.

.2 Ensure that protection of adjacent property and the work is adequately provided and maintained to meet specified requirements.

1.8 WARRANTIES

.1 Ensure that warranties are provided, as indicated in Section 01 78 36 Warranties.

.2 Coordinate warranty conditions of interconnected work to ensure that full coverage is obtained.

1.9 CO-ORDINATION

.1 Review Contract Documents and advise the Consultant of possible conflicts between parts of the work before preparation of shop drawings, ordering of products or commencement of affected work.

.2 Coordinate and be responsible for layout of all work in each area and work on which subsequent work depends to facilitate mutual progress, and to prevent conflict between parts of the work.

.3 No addition to the Total Price will be allowed because of interference between the parts of the work of a trade or between the work of different trades unless such interference was brought to the attention of the consultant in writing prior to the start of construction.

.4 Ensure that each Section makes known, for the information of the Contractor and other Sections, the environmental and surface conditions required for the execution of its work; and that each Section makes known the sequences of others' work required for installation of its work.

.5 Ensure that each Section, before commencing work, knows requirements for subsequent work and that each Section is assisted in the execution of its preparatory work by Sections whose work depends upon it.

.6 Ensure that work to be enclosed within ceiling and/or wall spaces can be so accommodates without interference and with other parts of the work.

.7 Ensure that setting drawings, templates, and all other information necessary for the location and installation of materials, holes, sleeves, inserts, anchors, accessories, fastenings, connections, and access panels are provided by each Section whose work requires cooperative location and installation by other Sections, and that such information is communicated to the applicable installer.

.8 Deliver materials supplied by one Section to be installed by another well before the installation begins, as per Construction Progress Schedule.

.9 Sections giving installation information in error, or too late to incorporate in the work, shall be responsible for having additional work done which is thereby made necessary.

.10 Remove and replace work installed in error which is unsatisfactory for subsequent work.

.11 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.

.12 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.

.13 Ensure that clearance required by authorities having jurisdiction and for proper maintenance are indicated on Drawings.

.14 Distribute coordination drawings well in advance of fabrication and installation of work affected. Place no orders for affected equipment without submission of coordination drawings to the supplier.

1.10 COOPERATION

.1 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the Work and set in place or instruct separate Subcontractors as to their location.

.2 Supply items to be built in, as and when required together with templates, measurements, shop drawings and other related information and assistance.

.3 Pay the cost of extra work and make up time lost as a result of failure to provide necessary information and items to be built in.

1.11 PROJECT RECORD DRAWINGS

.1 Record, as the work progresses, work constructed differently than shown on Contract Documents. Record all changes in the work caused by site conditions; by Owner, Consultant, sub-consultants, Contractor, and Subcontractor originated changes; and by site instructions, supplementary instructions, field orders, change orders, addendums, correspondence, and directions of authorities having jurisdiction. Accurately record location of concealed structure, and mechanical and electrical services, piping, valves, conduits, pull boxes, junction boxes and similar work not clearly in view, the position of which is required for maintenance, alteration work, and future additions. Do not conceal critical work until its location has been recorded.

.2 Dimension location of concealed work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to concealed work. Dimension all terminations and offsets of runs of concealed work.

.3 Make records in a neat and legibly printed manner with a non-smudging medium.

.4 Identify each record drawing as "Project Record Copy". Maintain drawings in good condition and do not use them for construction purposes.

.5 After completion of the work, purchase a complete set of white prints from the Consultant and transfer the information recorded on the white prints accurately, neatly in red ink with dimensions, as applicable. Return these marked-up as-built white prints plus two additional sets of white prints to the Consultant for his review. Any subsequent changes found by the Consultant shall remain the responsibility of the contractor and new white prints will be issued for these changes and re-submitted back to the Consultant at no charge to the Owner.

.6 Maintain Project record drawings in a state current to Project. Such state will be considered a condition precedent for validation of applications for payment. The Consultant's visual inspection will constitute proof that record drawings are current.

.7 Provide Consultant with accurate red-marked record drawings for their transfer to latest version of AutoCad with application for Certificate of Substantial Performance. Final acceptance of the Work will be predicated on receipt and approval of record drawings.

1.12 DETAIL FINISHING DRAWINGS

.1 During the course of the work, the Owner will provide the Contractor with detail drawings showing the interior finishes and furnishings of the building. The Contractor shall read these drawings in conjunction with the Contract Documents. The Contractor shall check the detail drawings against the Contract Documents and shall report any discrepancies to the Consultant.

1.13 CUTTING AND PATCHING

.1 Before cutting, drilling, or sleeving structural load-bearing elements, obtain approval of location and methods from the Structural Engineer and the General Contractor.

.2 Do not endanger work or property by cutting, digging, or similar activities. No Section shall cut or alter the work of another Section unless such cutting or alteration is approved by the latter Section and the General Contractor.

.3 Cut and drill with true smooth edges and to minimum suitable tolerances.

.4 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The Section performing work that penetrates a fire, air, vapour, moisture, thermal or acoustic separation of the building shall pack voids tightly with rock wool, fibreglass or fire stop material as may be required; seal air, vapour and moisture barriers; and caulk joints as may be required to ensure that no air movement through the penetration is possible.

.5 Cutting, drilling and sleeving of work shall be done only by the Section who has installed it. The Section requiring drilling and sleeving shall inform the Section performing the work of the location and other requirements for drilling and sleeving.

.6 Replace, and otherwise make good, all damaged work, as identified by the Consultant or Contractor.

.7 Cutting and Patching for Holes Required by Mechanical and Electrical work:

.1 Include under mechanical or electrical work for cutting or provision of holes up to and including 50 square inches and related patching, except as otherwise indicated.

.2 Include under work of this Division holes and other openings larger than 50 square inches, and chases, bulkheads, furring and required patching. This Section shall be responsible for determination of work required for holes in excess of 50 square inches.

.8 This Section shall be responsible for all cutting and patching in addition to that specified for mechanical and electrical work, and shall directly supervise performance of cutting and patching by other Sections.

.9 Patching or replacement of damaged work shall be done by the Subcontractor under whose work it was originally executed, and at the expense of the Subcontractor who caused the damage.

.10 Make patches as invisible as possible in final assembly to the approval of the Consultant/Owner. Unacceptable work will be replaced at no charge to the Owner.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 ADMINISTRATIVE

.1 Schedule and administer meetings every 2 weeks (or more frequently as required) with the Consultant throughout the progress of the Work. Schedules to be updated with the Consultant every 2 weeks for distribution at each meeting.

.2 Prepare agenda for such meetings.

.3 The Owner's Representative shall chair such meetings. The Consultant shall administer such meetings and prepare minutes within three (3) days after the meeting date for distribution to the Owner and the Contractor.

.4 Distribute written notice of each meeting four (4) days in advance of meeting date to the Consultant and the Owner and other affected parties.

.5 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent. Subcontractors and Suppliers do not attend meetings unless authorized by the Consultant and the Owner.

.6 Prepare and distribute monthly progress reports in accordance with Section 01 32 16, and containing updated schedules, construction photos in accordance with Section 01 33 00, shop drawing logs, requests for interpretation logs, submittals and budget.

1.2 CONTRACT START-UP MEETING

.1 Within five (5) days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities prior to the commencement of the Work.

.2 The Owner, the Consultant, the Contractor, site superintendent(s), inspection and testing company, and authorities having jurisdiction, as applicable and at their discretion, will be in attendance.

.3 Agenda to include the following:

.1 Appointment of official representative of participants in the Project.

.2 Status of permits, fees and requirement of authorities having jurisdiction. Action required.

.3 Review of standard project forms.

.4 Requirements for Contract modification and interpretation procedures, including, but not limited to: requests for interpretation, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.5 Requirements for notification for reviews. Allow a minimum of two (2) Working Days notice to Consultant for review of the Work.

.6 Review of schedules and scheduling procedures and requirements in accordance with Section 01 32 16.

.7 Appointment of inspection and testing agencies or firms, Section 01 45 00.

.8 Requirements for temporary facilities, signs, offices, storage sheds, utilities; Section 01 50 00.

.9 Security requirements at and for the Place of the Work, Section 01 50 00.

.10 Record drawings, Section 01 33 00.

.11 Maintenance manuals, Section 01 33 00.

.12 Take-over procedures, acceptance, Section 01 78 00.

.13 Warranties, Section 01 78 36.

.14 Progress claims, administrative procedures, holdbacks.

.15 Insurances, transcripts of policies.

.16 Contractor's safety procedures.

.17 Cleaning/staging area for vehicles.

.18 Workplace Safety and Insurance Board Certificate.

.4 The Consultant shall organize and chair the contract start-up meeting. Consultant shall record minutes of the contract start-up meeting and distribute a copy to each participant within ten (10) days of meeting.

1.3 PRE-INSTALLATION MEETINGS

.1 During the course of the Work prior to Substantial Performance of the Work, schedule pre-installation meetings as required by the Contract Documents and coordinated with the Consultant.

.2 As far as possible, pre-installation meetings shall be scheduled to take place on the same day as regularly scheduled progress meetings.

.3 Agenda to include the following:

.1 Appointment of official representatives of participants in the Project.

.2 Review of existing conditions and affected work, and testing thereof as required.

.3 Review of installation procedures and requirements.

.4 Review of environmental and site condition requirements.

.5 Review of schedules and scheduling procedures and requirements of the applicable portions of the Work in accordance with Section 01 32 16, in particular:

.1 Schedule of submission of samples, mock-ups, and items for Consultant's consideration.

.2 Delivery schedule of specified equipment.

.3 Requirements for notification for reviews. Allow a minimum of two (2) Working Days notice to Consultant for review of the Work.

.6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences, Section 01 50 00.

.7 Requirements for inspections and tests, as applicable.

.1 Schedule and undertake inspections and tests in accordance with Sections 01 32 16 and 01 45 00.

.8 Special safety requirements and procedures.

.4 The following shall be in attendance:

.1 Contractor.

.2 Subcontractors affected by the work for which the pre-installation meeting is being conducted.

.3 Consultant.

.4 Manufacturer's representatives, as applicable.

.5 Inspection and testing company, as applicable.

1.4 PROGRESS MEETINGS

.1 During the course of the Work prior to Substantial Performance of the Work, schedule progress meetings as directed by the Consultant.

.2 In advance of progress meetings, Contractor shall submit to the Consultant a two week look ahead schedule of items of work to be undertaken in the two weeks subsequent to the progress meeting. Two week look ahead schedule will be reviewed at the meeting and recorded in the minutes of the meeting. Refer to Section 01 32 16 for requirements for look ahead schedule.

.3 Attendees at progress meetings shall include the following:

- .1 Contractor.
- .2 Contractor's site superintendent(s).
- .3 Consultant.
- .4 Owner.

.4 Agenda to include the following:

- .1 Review, approval of proceedings of previous meeting.
- .2 Review of items arising from proceedings.
- .3 Review of progress of the Work since previous meetings.
- .4 Review of schedules in accordance with Section 01 32 16, including:
  - .1 Revisions to construction schedule.
  - .2 Progress and schedule for subsequent period of the Work: Two (2) week look-ahead.
  - .3 Problems that impede compliance with construction schedule.
  - .4 Review of off-site fabrication delivery schedules.
  - .5 Review of material delivery dates/schedule.
  - .6 Corrective measures and procedures to regain construction schedule.
  - .7 Review of submittal schedules: expedite as required.
- .5 Field observations, problems, conflicts.
- .6 Review status of submittals.
- .7 Maintenance of quality standards.
- .8 Pending changes and substitutions.
- .9 Review of Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
- .10 Review of status of as-built documents.
- .11 Other business.

1.5 PRE-TAKEOVER MEETING

.1 Prior to application for Substantial Performance of the Work, schedule a pre-takeover meeting.

.2 Agenda to include the following:

- .1 Review, approval of proceedings of previous meeting.
- .2 Review of items arising from proceedings.

.3 Review of procedures for Substantial Performance of the Work, completion of the Contract, and handover of the Work.

.4 Field observations, problems, conflicts.

.5 Review of outstanding Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.

.6 Problems which impede Substantial Performance of the Work.

.7 Review of procedures for deficiency review. Corrective measures required.

.8 Progress, schedule, during succeeding period of the Work.

.9 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for Substantial Performance of the Work.

.10 Review of status of as-built documents and record drawings.

.11 Other business.

1.6 POST-CONSTRUCTION MEETING

.1 Prior to application for completion of Contract, schedule a post-construction meeting. Four days prior to date for meeting, Consultant shall confirm a date for meeting based on evaluation of completion requirements.

.2 Agenda to include the following:

.1 Review, approval of proceedings of previous meeting.

.2 Confirmation that no business is arising from proceedings.

.3 Confirmation of completion of the Contract, and handover of reviewed documentation from the Consultant to the Owner.

.4 Confirmation of completion of proposed Change Orders, Change Orders, Change Directives, and Supplemental Instructions.

.5 Problems that impede Contract completion.

.6 Identify unresolved issues or potential warranty problems.

.7 Confirmation of completion of deficiencies.

.8 Corrective measures required.

.9 Confirm submittal requirements for warranties, manuals, and demonstrations and documentation for Contract completion are in order.

.10 Review of procedures for communication during post-construction period.

.11 Handover of reviewed record documents by the Consultant to the Owner.

.12 Handover of Contract completion insurance policy transcripts by Contractor.

.13 Submission of final application for payment.

.14 Review and finalize outstanding claims, pricing, and allowance amounts.

.15 Status of commissioning and training.

.16 Demobilization and the Place of the Work restoration.

.17 Review of requests for interpretation log.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 PLANNING, SCHEDULING AND MONITORING - GENERAL

.1 This section includes requirements for the preparation, monitoring and revision of construction schedules.

.2 The purpose of the schedules and reports mandated in this section is to:

- .1 Ensure adequate planning and execution of the Work by the Contractor;
- .2 Establish the standard against which satisfactory completion of the project will be judged;
- .3 Assist the Owner and the Consultant in monitoring progress;
- .4 Assess the impact of changes to the Work.

.3 The Contractor has the obligation and responsibility at all times to plan and monitor all of its activities, anticipating and scheduling its staff, materials, plant and work methods in a manner that is likely to ensure completion of the Work in accordance with the terms and conditions of the Contract and at a rate that will allow the Work to be completed on time.

1.2 CONSTRUCTION SCHEDULE

.1 Within five (5) days of Contract award, submit in format acceptable to Consultant, minimum three (3) copies of Contractor's critical path construction schedule.

.2 Set up format to permit plotting of actual construction progress against scheduled progress.

.3 Schedule shall show:

- .1 Commencement and completion dates of Contract.
- .2 Commencement and completion dates of construction stages/phases, if any.
- .3 Commencement and completion dates of each trade. Major trades shall be further broken down as directed by Consultant; generally follow Specification format.
- .4 Order and delivery dates for major or critical equipment.
- .5 Critical dates for shop drawing/sample submissions.
- .6 Any other information relating to orderly progress of Contract, considered by Contractor or Consultant to be pertinent.

.4 The total number of activities and the distribution of activities shall reflect the complexity of the Work and shall be finite, measurable, identify a specific function and identify a trade responsible for its completion.

.5 Prepare a narrative to accompany the preliminary construction schedule that provides a detailed description of the labour, materials, plant, means and methods that the Contractor intends to utilize in carrying out the Work to achieve the planned rates of production required to support the activity durations shown in the schedule. The narrative shall also provide explanations supporting the use of lead-lag relationships and, where permitted, constrained dates.

.6 Consultant, together with Contractor shall review construction progress once a month during or immediately following regular site meeting, or more often as directed by Consultant.

.7 Update construction schedule, whenever changes occur, in manner and at times acceptable to Consultant.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Schedules shall be submitted to the Consultant in both hard copy and electronic forms. Electronic schedule submissions shall be in an original scheduling software data file type that permits modification of the layouts and data. In case of a discrepancy between an electronic copy of the schedule and the corresponding hard-copy schedule, the hard copy of the schedule that has been formally submitted and reviewed in accordance with the requirements of Section 01 33 00 shall govern.

.3 Include costs for execution, preparation and reproduction of schedule submittals in tendered price.

.4 Submission of the schedules referred to in this Section shall constitute the Contractor's representation that:

.1 Contractor and its Sub-Contractors intend to execute the Work in the sequence indicated on such schedule;

.2 Contractor has distributed the proposed schedule to its Sub-Contractors for their review and comment, and has obtained their concurrence;

.3 All elements of the Work required for the performance of the Contract are included. Failure to include any such element shall not excuse the Contractor from completing the Work within the Contract Time and within any other constraints specified in the Contract;

.4 Seasonal weather conditions have been considered and included in the planning and scheduling of the Work influenced by high and low ambient temperatures and/or precipitation;

.5 Contractor has thoroughly inspected the Site and has incorporated any other special conditions in planning the Work such as specified or required non-work periods, etc.

.5 Cash flow diagram:

.1 Contractor shall submit an updated cash flow diagram quarterly.

.2 Cash flow diagram shall be in format acceptable to the Owner.

.3 Cash flow diagram shall represent Contractor's anticipated invoicing.

1.4 PROGRESS RECORD

.1 Maintain on site, permanent written record of progress of work. Record shall be open to inspection by Consultant at all times and copy shall be furnished to Consultant upon request.

.2 This record shall show weather conditions, dates of commencement, progress and completion of various trades and items of work. Particulars pertaining to erection and removal of forms, pouring of concrete, installation of roofing and other critical or major components as well as number of employees of various trades and type and quantity of equipment employed daily, shall be noted.

.3 Display a copy of the construction schedule in the site office from start of construction to completion. Superimpose actual progress of work on schedule at least once each week.

1.5 PROGRESS MONITORING

.1 Monitor progress of Work in detail to ensure integrity of critical path, by comparing actual completions of individual activities with their scheduled completions, and reviewing progress of activities that have started but are not yet completed. Monitoring should be

undertaken sufficiently often so that causes of delays are immediately identified and removed if possible.

.2 On an ongoing basis, record "progress to date" on copy of schedule to be available at the Site. Inspect Work with the Owner and the Consultant at least bi-weekly to establish progress on each current activity.

1.6 UPDATES AND REVISIONS TO SCHEDULE

.1 The Contractor's schedule is to be updated and resubmitted to the Consultant as a progress schedule at least once per month, on a date to be mutually agreed by the Contractor and the Consultant, together with the related data and reports required by this Section. Updated schedule is to include a 2 week look-ahead schedule in the form of a bar chart.

.2 Each progress schedule shall record and report actual completion and/or start dates for each completed or in-progress activity, activity percent complete for in-progress activities and forecast completion dates for all activities that are not yet complete. Do not automatically update actual start and finish dates by using default mechanisms found in scheduling software. The progress schedule will show the projected completion date of the Work based on the progress information inserted into it, without changes to the schedule logic or the original duration of any activity. The Contractor shall use the retained logic option when executing schedule calculations. The final as-planned schedule (or an approved revision thereto) will be shown as a target schedule to indicate whether the current progress schedule remains on target, has slipped or is ahead of schedule.

.3 The Contractor may then, in a second and subsequent update to the progress schedule, incorporate any logic and duration changes that represent its revised planning, provided all such changes are identified and documented in the schedule narrative required to accompany the progress schedule, and are agreed to by the Consultant.

.4 If it appears that the progress schedule submitted by the Contractor no longer represents the actual sequencing and progress of the Work, the Consultant may instruct the Contractor to revise the progress schedule.

.5 In order to improve the schedule, eliminate unforeseen problems or reduce the time required for an activity, modifications to the schedule may be suggested by the Contractor, Sub-Contractors, Owner or Consultant during the execution of the Contract, and such modifications may be implemented by mutual agreement. The Contractor shall submit to the Consultant for acceptance proposed adjustments to the final as-planned schedule or any subsequent updates that will not change the Contract Time.

.6 If, at any time, the work is behind schedule with respect to the progress schedule currently in force, and if the Consultant believes there is a risk of the Work not being completed within the Contract Time as a result of such delay, the Contractor shall take all necessary measures to make up for such delay either by increasing staff, plant or facilities, or by amending its work methods, whichever is applicable.

.7 In all cases of delay or potential delay, the Contractor shall keep the Owner and the Consultant informed of its intentions with regard to mitigation of such delay and the Owner's Consultant may, if it is deemed necessary, require the Contractor to revise all or part of its current progress schedule.

.8 The current Contract Schedule can only be revised as agreed with the Owner and the Consultant by Change Order or an accepted revision to the logical sequence of described construction operations.

.9 Once accepted, the revised schedule will become the current Contract Schedule against which progress is reported and to which subsequent updates will be compared. The new Contract Schedule will be clearly identified to show it as the current Contract Schedule.

.10 Where the progress schedule shows completion of the Contract, or of any interim milestone, later than the Contract or milestone completion dates, acceptance of such progress schedules and of the monthly progress report will not constitute acceptance of the delay by the Consultant or the Owner.

1.7 RECORD DRAWINGS

.1 Obtain and keep on site at all times a complete and separate set of black line white prints.

.2 Note clearly, neatly, accurately and promptly as the work progresses all architectural, structural mechanical and electrical changes, revisions and additions to the work and deviations from the Contract Documents.

.3 Accurate location, depth, position, size and type of concealed and underground services, both inside and outside shall be included as part of these record drawings.

.4 Record drawings shall be available for review at each site meeting.

.5 Refer to Section 01 31 13 for requirements on submission of record drawings.

1.8 PROGRESS PHOTOGRAPHS

.1 Concurrently with monthly application for payment submit digital photographs as follows:

.1 Up to four photographs shall be taken from positions determined by Consultant.

.2 Photographs shall be properly exposed and in focus; views shall be unobstructed.

.3 Identify each photograph in the digital title stating name of project, name of photographer, description of view and date of photograph taken.

1.9 PRODUCT DELIVERY CONTROL

.1 It is the responsibility of the Contractor to ensure that the supplier or distributor of materials specified or alternatives accepted, which he intends to use, has materials on the site when required. The Contractor shall obtain confirmed delivery dates from the supplier.

.2 Provide equipment delivery schedule, coordinated with construction and submittals' schedule, showing delivery dates for major and/or critical equipment.

.3 The Contractor shall contact the Consultant immediately upon receipt of information indicating that any material or item, will not be available on time, in accordance with the original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.

.4 The Consultant reserves the right to receive from the Contractor at any time, upon request, copies of actual purchase or work orders of any material or products to be supplied for the work.

.5 If materials and products have not been placed on order, the Consultant may instruct such items to be placed on order, if direct communication in writing from the manufacturer or prime suppliers is not available indicating that delivery of said material will be made in sufficient time for the orderly completion of the Work.

.6 The Consultant's review of purchase orders or other related documentation shall in no way release the Contractor, or his subcontractors and suppliers from their responsibility

for ensuring the timely ordering of all materials and items required, including the necessary expediting, to complete the work as scheduled in accordance with the Contract Documents.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Provide submittals as requested by the Contract Documents, as specified herein, and in accordance with the conditions of the Contract.

.2 In addition to submittals specifically requested by the Contract Documents, provide other submittals as may be reasonably requested by the Consultant, or as are required to coordinate the Work and to provide the Owner with choices available, within the scope of Contract Documents.

.3 Contractor's review of submittals:

.1 Review submittals for conformity to Contract Documents before submitting to Consultant. Submittals shall bear stamp of Contractor and signature of a responsible official in Contractor's organization indicating in writing that such submittals have been checked and coordinated by Contractor. Contractor's review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the Place of the Work proposed for installation.

.2 Check and sign each submittal and make notations considered necessary before submitting to Consultant for review. Where submittal is substantially and obviously in conflict with requirements of Contract Documents, reject submittal without submitting to Consultant and request resubmission. Note limited number of reviews of each submittal covered under Consultant's services as specified below.

.3 Contractor shall assume sole responsibility for any conflicts occurring in the Work that result from lack of comparison and coordination of submittals required for the Work.

.4 Submittals that have not been reviewed, checked, and coordinated by Contractor prior to submission to Consultant, will be rejected.

.5 Notify Consultant in writing of changes made on submittals from Contract Documents. Consultant's review of submittals shall not relieve Contractor of responsibility for changes made from Contract Documents not covered by written notification to Consultant.

.4 Consultant's review of submittals:

.1 Review of submittals by Consultant is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the Contract Documents. This review shall not mean that Consultant approves the detail design inherent in the submittals, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of Contract Documents.

.2 Contractor shall be responsible for dimensions to be confirmed and correlated at the Place of the Work for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the Work.

.3 As part of their scope of work, Consultant shall review shop drawings no more than twice. Should three or more reviews be required due to reasons of Contractor omissions causing resubmission requests, then Contractor shall reimburse the Consultant for time expended in these extra reviews. Time shall be invoiced to the Owner (to be deducted from monies due to the Contractor and paid to Consultant by Owner) at rates recommended by Consultant's professional association and disbursements shall be invoiced at Consultant's

cost. The Contractor shall cover directly costs and administration associated with courier services and the like for these extra shop drawing reviews.

.4 Consultant's review and markings on submittals do not authorize changes in the Work or the Contract Time.

.5 Submittals received but not required by the Contract Documents or requested by the Consultant will not be reviewed by the Consultant and will be marked 'NOT REVIEWED' by the Consultant and returned to the Contractor.

.5 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Be responsible for delays, make up time lost and pay added costs, at no additional cost to the Owner, incurred because of not making submittals in due time to permit proper review by Consultant.

.6 Submittals that contain substitutions will be rejected.

.7 Do not proceed with work affected by a submittal, including ordering of Products, until relevant submittal has been reviewed by Consultant.

.8 Prepare submittals using SI (metric) units.

.9 Contractor's responsibility for errors and omissions in submittals is not relieved by Consultant's review of submittals.

.10 Contractor's responsibility for deviations in submittal from requirements of Contract Documents is not relieved by Consultant's review of submittal, unless Consultant gives written acceptance of specific deviations.

.11 Engineered submittals:

.1 Submittals for items required to be sealed by professional engineer (or as otherwise indicated as engineered), shall be prepared under the direct control and supervision of a qualified professional engineer registered in the Place of the Work, and having minimum professional liability insurance required in accordance with the General Conditions, as amended.

.2 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, and authorities having jurisdiction.

.3 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal. Prepare calculations in a clear and comprehensive manner so that they can be easily reviewed. Incomplete or haphazard calculations will be rejected.

.4 The professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups, at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the Consultant, to authorities having jurisdiction as required, and in accordance with the building code.

.5 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the Contract Documents, including reviewed shop drawings and design calculations.

.6 Upon completion of the parts of the Work covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall

prepare and submit to the Consultant and authorities having jurisdiction, as required, a letter of general conformity for those parts of the Work, certifying that they have been Provided in accordance with the requirements both of the Contract Documents and of the authorities having jurisdiction over the Place of the Work.

.7 Costs for such field reviews and field review reports and letters of general conformity are included in the Contract Price.

.12 Keep copies of reviewed submittals at the Place of the Work in a neat, orderly condition. Only submittals that have been reviewed by the Consultant's and are marked with Consultant's review stamp, as applicable, are permitted at the Place of the Work.

.13 The Work shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the Contract Time and at no additional cost to the Owner.

1.2 SUBMISSION PROCEDURES

.1 Coordinate each submittal with requirements of the Work and Contract Documents. Individual submittals will not be reviewed until related information is available.

.2 Distribute copies of submittals to parties whose work is affected by submittals except Consultant and Owner before final submission for review by Consultant.

.3 Accompany submittals with transmittal letter, in duplicate, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each submittal.

.5 Other pertinent data.

.4 Each submittal shall be identified numerically by relevant specification section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 08 11 13-01-R0.

.5 Make any changes in submittal that Consultant may require, consistent with Contract Documents, and resubmit as directed by Consultant.

.6 Notify Consultant, in writing, when resubmitting, of any revisions other than those requested by Consultant.

.7 After Consultant's review, distribute copies to affected parties.

1.3 PRODUCT DATA SHEETS

.1 Submit Product data sheet prints; three (3) sets for Consultant (which includes 1 set that will be returned once submittal has been reviewed), 1 set for Contractor and 1 set each of applicable consulting engineers.

.2 Submit Product data sheets for requirements requested in the Contract Documents and as the Consultant may reasonably request where shop drawings will not be prepared due to a standardized manufacture of a Product. Manufacturers' catalogue cuts will be acceptable in such cases, providing that they are 8-1/2" x 11" originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data, including installation instructions. Submissions showing only general information are not acceptable.

.3 Where requirements of Contract Documents are more stringent than design proposed on Product data sheets, the requirements of the Contract Documents take priority.

.4 Upon completion of review by Consultant, one (1) marked set of Product data sheets will be returned to Contractor for reproduction and distribution.

.5 Retain one (1) complete set of prints of reviewed Product data sheets for issuance to Owner immediately prior to Substantial Performance of the Work, in an acceptable, bound manner.

1.4 SHOP DRAWINGS

.1 Submit shop drawings for which submission is required in other Sections of this Specification. Include in final shop drawing submissions detailed information, templates and installation instructions required for incorporation and connection of the work concerned, and other details as may be specified in other Sections.

.2 In addition to shop drawings specified in other Sections, submit shop drawings required by authorities having jurisdiction in accordance with their requirements.

.3 The General Contractor shall check, sign, and make notations he considers necessary on shop drawings before each submission to the Consultants for their review.

.4 Indicate on each submission changes from the Contract Drawings and Specification that have been incorporated in the shop drawings. The Contractor shall be responsible for changes made from the Contract Drawings and Specification which are not indicated or otherwise communicated in writing with the submission.

.5 Shop drawing review by Consultant or sub-consultants is for the sole purpose of ascertaining conformance with the general design concept and as a precaution against oversight or error. This review shall not mean that Consultant and sub-consultants approve the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. No review of design shall be assumed made when such design is a responsibility of the Contractor included in the work. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all Subcontractors.

.6 Show on shop drawings all pertinent information required for materials and installation, and for proper integration of this installation with work of others.

.7 The shop drawings shall show, but not necessarily be limited to the following:

.1 Clear and obvious notes of any proposed changes from Drawings and Specifications.

.2 Fabrication and erection dimensions.

.3 Provisions for allowable construction tolerances and deflections provided for live loading.

.4 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.

.5 Location and type of anchors, and exposed fastenings.

.6 Materials and finishes.

.7 Descriptive names of equipment.

.8 Mechanical and electrical characteristics when applicable.

.9 Information to verify that superimposed loads will not affect function, appearance, and safety of the work detailed as well as of interconnected work.

.10 Assumed design loadings, and dimensions and material specifications for load bearing members.

.11 Dimensions and dimensioned locations of proposed chases, sleeves, cuts and holes in structural members.

.8 Submit shop drawings electronically unless specifically asked by the consultant to submit as hard copies. Include transmittal cover page, all pages to be compatible and legible when printed at 8-1/2" x 11" size with title block appearing on each. To include copies of engineering data sheets, catalogue cuts and standard diagrams may be substituted for shop drawings where applicable.

.9 Shop drawings which require extensive correction or are in substantial disagreement with intent of contract documents will be sent back for revisions and resubmission. The reproducible copy will be returned.

.10 Otherwise, shop drawings will be sent back with review comments only. The reproducible copy and two (2) white prints will be returned. One (1) white print will be retained.

.11 Conform to review comments and stamped instructions of each shop drawings reviewer.

.12 Only drawings noted for revision and resubmission need be resubmitted. Include revisions required by previous reviews before resubmission of shop drawings.

.13 Do not add new details or information to shop drawings after they have been reviewed, unless requested by the reviewer, requiring a re-submission.

.14 Do not proceed with work dependent on shop drawing information until approval is given and verification received from Contractor. The Contractor shall 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.

.15 Fabricate work exactly as shown on shop drawings. If shop practice dictates revisions, revise drawings and resubmit.

.16 File one (1) copy of each finally revised and corrected shop drawing on site.

.17 Provide shop drawings as called for in the Trade Sections of this Specifications.

1.5 SAMPLES

.1 Submit samples for which submission requirement is specified in Trade Sections of this Specification.

.2 Submit samples in triplicate of adequate size to represent the material in its intended use on Project. Submit an extreme range of samples when the degree of marking or colour cannot be represented by a single sample.

.3 Label samples with Project name, number, Contractor, and date.

.4 Include in the work cost of delivery and handling, assembly, and return to supplier of samples.

.5 If sample is disapproved, two samples will be returned. If sample is approved, one sample will be returned, marked "Approved".

.6 Approved samples shall serve as a model against which the products incorporated in the work shall be judged.

.7 Each product incorporated in the work shall be precisely the same in all details as the approved sample.

.8 Should any change of material, colour, texture, finish, dimensions, performance, function, operation, construction, joining, fastening, fabrication techniques, service characteristics, and other qualities be made to a product after approval has been given, submit for approval of the revised characteristics in writing and resubmit samples of the product for approval if requested.

.9 When samples are very large, require assembly, or require evaluation at the site, they may be delivered to the site, but only with approval and as directed.

.10 Provide samples as called for in the Trade Sections of this Specifications.

1.6 MOCK-UPS

.1 Where required by the Contract Documents or as may reasonably be requested by the Consultant during the course of the Work, Provide field or shop erected example of work complete with specified materials and workmanship.

.2 Erect mock-ups at locations as specified and as acceptable to Consultant. Do not proceed with work for which mock-ups are required prior to Consultant's review of mock-ups.

.3 Modify or remove and replace mock-ups as many times as required to secure acceptance of the Consultant. Such removal and replacement shall be done at no increase in either the Contract Price or the Contract Time.

.4 Protect and maintain mock-ups until directed to be removed. Commence work demonstrated in mock-up only after review and acceptance of workmanship. If possible, mock-up may become part of finished work, at sole discretion, and with prior written acceptance, of Consultant.

.5 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be compared.

.6 Remove and replace materials or assemblies not matching reviewed mock-ups.

.7 Resubmit mock-ups until written acceptance is obtained from Consultant.

1.7 INSERT LOCATION DRAWINGS

.1 Submit insert location drawings which are required for installation of work.

.2 Indicate on insert location drawings the location and size of sleeves, anchor bolts, openings and miscellaneous items to be incorporated in the work.

.3 Submit insert location drawings well in advance of construction of work incorporating built-in work.

1.8 COORDINATION DRAWINGS

.1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.

.2 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment, apparatus, and connections are coordinated.

.3 Ensure that clearance required by authorities having jurisdiction and for proper maintenance are indicated on Drawings.

.4 Distribute coordination drawings well in advance of fabrication and installation of work affected. Place no orders for affected equipment without submission of coordination Drawings to the supplier.

1.9 PROJECT RECORD DRAWINGS

.1 Submit Project Record Drawings specified under work of Section 01 31 13 with application for Certificate of Substantial Performance. Final acceptance of the work will be predicted on receipt and approval of record drawings.

1.10 WARRANTIES

.1 The Contractor shall submit all the warranties as herein specified, in an approved uniform format as indicated in Section 01 78 36 Warranties.

1.11 MAINTENANCE MANUAL AND OPERATING INSTRUCTIONS

.1 Submit one digital copy on a USB stick of Maintenance Manuals at completion of Project on application for Certificate of Substantial Performance, Maintenance Manual shall consist of shop drawings, extended warranties and Project Data Book.

.2 Include in Maintenance Manual one copy of each final approved shop drawing issued for Project of which have been recorded changes made during fabrication and installation caused by unforeseen conditions.

.3 Submit extended warranties together in one report binder, properly titled and with a typed table of contents.

.4 The Project Data Book shall:

.1 Consist of a hard-cover, black, vinyl-covered, loose-leaf, letter size binder.

.2 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.

.3 Be organized into applicable sections of work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.

.4 Contain only typed or printed information and notes, and neatly drafted drawings.

.5 Contain maintenance instructions as specified in various Sections and as referenced in Section 01 78 00.

.6 Contain brochures and parts lists on all equipment.

.7 Contain a list of manufacturers and trade names of finishes and coatings applied.

.8 Contain sources of supply for all proprietary products used in the work.

.9 Contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above.

.10 Contain finished hardware schedule.

.11 Contain charts, diagrams and reports indicated on Mechanical and Electrical Drawings.

1.12 EXTRA MATERIALS

.1 Supply extra materials at completion of Project as specified in Trade Sections of this Specification.

.2 Deliver extra materials to location designated by the Owners representative.

1.13 INSPECTION COMPANY REPORTS

.1 Submit copies of test and verification reports as specified in Section 01 45 00 and in other Sections of the Specifications of "Source Quality Control" and "Field Quality Control" immediately they are completed.

.2 Submit one copy of each report unless specified otherwise, and signed by a responsible officer of the inspection and testing company to the Owner and Consultant.

.3 Submit an additional report directly after it is completed to:

.4 Applicable design engineer.

.5 The Contractor.

.6 Authorities having jurisdiction when such reports are required by them.

.7 Each report shall include:

.1 Date of issue.

.2 Project name and number.

.3 Name and address of inspection and testing company.

.4 Name and signature of inspector or tester.

.5 Date of inspection or test.

.6 Identification of product and Specifications Section covering inspected or tested work.

.7 Location of inspection or from which tested material was derived.

.8 Type of inspection or test.

.9 Remarks and observations on compliance with Contract Documents.

1.14 PROGRESS PHOTOGRAPHS

.1 Unless otherwise specified, provide and submit digital copies of each from six (6) difference vantage points on the project site as directed, and taken as soon as possible after the first day of each month throughout the project.

.2 Provide digital photos Identify in each photo file title, the name of project, name of Contractor, name of Consultant and date. Include short log describing camera position, also direction of view for each print and a constant location number. The Consultant may request changes of vantage points, either interior or exterior, as the job progresses. He may further request more than six (6) in which case, the additional photographs will be paid for by the Owner as an addition to the contract amount.

.3 Submit digital photographs with each application for payment.

1.15 PROGRESS BILLING

.1 Coordinate progress billing with cost breakdown.

.2 Include value of work completed during billing period.

.3 Include running total of value of work completed by the end of the billing period.

.4 Format of progress billing shall be as requested by and approved by the Owner.

.5 Progress billings shall be dated and submitted on the 25th day of each month.

.6 Progress billings shall be discussed as part of the preconstruction meeting.

1.16 PRICING OF CHANGES TO WORK

.1 Submit with quotations for changes to work detailed estimate sheets showing initial and revised quantities of labour, materials and equipment, and the related unit costs.

.2 Payment for use of small tools, travelling, out-of-town accommodations and preparation of price change submittals will be considered a part of overhead as specified in the Supplementary Conditions.

.3 Submit quotations within ten (10) days of issuance of the contemplated change for changes to work with full documentation to Consultant.

1.17 WASTE MANAGEMENT

.1 Contractor shall prepare and submit waste audit and reduction plan in compliance with the requirements of Ontario Regulations 102/94, Waste Audits and Waste Reduction Workplans and 103/94, Industrial, Commercial and Institutional Source Separation Programs under the Environmental Protection Act of Ontario. For definitions refer to Ontario Regulation 105/94, Definitions.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 PERMITS, LICENCES, FEES

.1 Comply with requirements of GC 10.2.

.2 Where permits, licences and inspection fees are required by authorities having jurisdiction for specific trade functions, they shall be obtained by particular subtrade responsible for that work.

.3 Review building permit set with Consultant immediately following receipt of building permit and jointly determine whether or not changes to Contract are required.

.4 Be responsible for ensuring that no work is undertaken which is conditional on permits, approvals, reviews, licences, fees, until all applicable conditions are met. No time extension will be allowed for delay in obtaining necessary permits.

.5 Report to the Consultant in writing any condition which would prohibit granting of any permit or approval before work affecting such items is commenced.

.6 Give notice of completion of project prior to occupancy, as required by applicable legislation.

1.2 BUILDING CODE, BY-LAWS, REGULATIONS

.1 Carry out work in accordance with requirements of the Ontario Building Code, latest issue, including all amendments and revisions.

.2 Comply with requirements, regulations and ordinances of other jurisdictional authorities.

.3 Where it is necessary to carry out work outside property lines, such as sidewalks, paving or concrete curbs, comply with applicable municipal requirements.

.4 Promptly submit written notice to Consultant, of observed variance of Contract Documents from requirements of Building Code and authorities having jurisdiction. Assume responsibility for work known to be contrary to such requirements and performed without notifying Consultant.

1.3 AUTHORITIES HAVING JURISDICTION

.1 Where reference are made to "authorities having jurisdiction", it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

.1 Work shall include protection measures consisting of materials constructions and methods, and first-aid equipment and personnel, required by the latest edition of The Occupational Health and Safety Act, and the Workplace Safety and Insurance Board (WSIB) Regulations, of the Province of Ontario, and as otherwise imposed by authorities having jurisdiction to save persons and property from harm.

.2 Ensure that pollution, noise pollution and environmental control of construction activities are exercised as required during the work.

.3 Except where special permission is obtained, maintain clear access for roads and sidewalks on public property.

.4 Maintain all (Municipal and Provincial) roads and sidewalks clear of construction materials and debris, including excavated material. Clean roads and sidewalks as

frequently as required to ensure that they are cleared of materials, debris and excavated material.

.5 Remove snow and ice from sidewalks as required and to the standards acceptable by the Municipality.

1.5 CONSTRUCTION SAFETY

.1 Comply with requirements of GC 3.6.

.2 Be governed by pertinent safety requirements of Federal or Provincial Governments and of municipal bodies having authority, particularly the Ontario Construction Safety Act, and regulations of Ontario Ministry of Labour, and work in conjunction with proper safety associations operating under the authority of Ontario Workers' Compensation Act.

.3 Do not, in the performance of the work, in any manner endanger the safety or unlawfully interfere with the convenience of the public.

.4 Notify the Ontario Ministry of Labour of intended work of this Contract as required by the Occupational Health and Safety Act. One copy of the "Notice of Project" shall be handed to Consultant.

1.6 FIRE PROTECTION

.1 Refer to technical Sections of Specifications and Drawings for fire protection requirements.

.2 Test methods used to determine fire hazard classification and fire endurance rating shall be as required by Ontario Building Code.

.3 Upon request, furnish Consultant with evidence of compliance with project fire protection requirements.

.4 Materials and components used to construct fire rated assemblies and materials requiring fire hazard classification shall be listed and labelled, or otherwise approved, by fire rating authority. Labelled materials and their packaging shall bear fire rating authorities label showing product classification.

.5 Fire rated door assemblies shall include doors, frame, anchors and hardware and shall bear label of fire rating authority showing opening classification and rating.

.6 Materials having a fire hazard classification shall be applied or installed in accordance with fire rating authority`s printed instructions.

.7 Fire rated assemblies shall be constructed in accordance with applicable fire test report information issued by fire rating authority. Deviation from fire test report will not be allowed.

.8 Construct fire separations as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from floor to underside of structural deck above.

.9 Fill and patch voids and gaps around openings and penetrations in and at perimeter of assemblies so as to maintain continuity and to produce a fire resistant smoke tight seal, acceptable to jurisdictional authorities and Consultant.

1.7 HAZARDOUS MATERIALS

.1 Comply with provisions of the Occupational Health and Safety Act as amended to include WHMIS (Workplace Hazardous Materials Information System).

.2 Ensure that Material Safety Data Sheets (MSDS) are available on site prior to first delivery to site of any controlled material or substance.

.3 Maintain on site for duration of Contract a hazardous materials log containing all required MSDS.

.4 Log shall be open for inspection for Owner, Consultant and all personnel on site.

.5 Ensure that workers are instructed in the purpose and content of MSDS.

1.8 WASTE MANAGEMENT

.1 Comply with applicable regulations of the Ministry of Environment and Energy governing waste management.

.2 Prepare and submit waste audit, waste reduction and source separation plans in accordance with applicable regulatory requirements.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 REFERENCE STANDARDS

.1 Where edition date is not specified, consider that references to manufacturer's and, published codes, standards and specifications are made to the latest edition (revision) approved by the issuing organization, current at the date of this Specification.

.2 Reference standards and specifications are quoted in this Specification to establish minimum standards. Work of quality or of performance characteristics that exceeds these minimum standards will be considered to conform.

.3 Should the Contract Documents conflict with specified reference standards or specification, the General Conditions of the Contract shall govern.

.4 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information or storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.

.5 Have a copy of each code, standard and specification, and manufacturer's directions, instructions and specifications, to which reference is made in the Specifications, always available at construction site.

.6 Standards, specifications, associations, and regulatory bodies are generally referred to throughout the specifications by their abbreviated designations. These are as follows:

ABBREVIATION	MEANING
AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers` Association
AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AGA	American Gas Association
AIA	American Institute of Architects
AIMA	Acoustical & Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association Inc.
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Airconditioning Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute (USA)
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWS	American Welding Society
CCA	Canadian Construction Association
CCRC	Canadian Code for Residential Construction
CEC	Canadian Electrical Code
CFUA	Canadian Fire Underwriters Association
CGA	Canadian Gas Association
CGSB	Canadian General Standards Board
CIQS	Canadian Institute of Quantity Surveyors
CISC	Canadian Institute of Steel Construction
CITC	Canadian Institute of Timber Construction
CLA	Canadian Lumbermen’s Association
CMHC	Canada Mortgage & Housing Corporation

COFI	Council of Forest Industries of British Columbia
CPCI	Canadian Prestressed Concrete Institute
CRCA	Canadian Roofing Contractors Association
CSA	Canadian Standards Association
CSC	Construction Specifications Canada
CSI	Construction Specifications Institute (USA)
CSPI	Corrugated Steel Pipe Institute
CSSBI	Canadian Sheet Steel Building Institute
CUA	Canadian Underwriters` Association
CWB	Canadian Welding Bureau
CWC	Canadian Wood Council
DND	Department of National Defence, Canada
FM	Factory Mutual Engineering Corporation
FS	Federal Specification (USA)
IES	Illuminating Engineering Society
IGMAC	Insulated Glass Manufacturers Association of Canada
LTIC	Laminated Timber Institute of Canada
MIA	Marble Institute of America
MPMDD	Modified Proctor Maximum Dry Density
NAAMM	National Association of Architectural Metal Manufacturers (USA)
NBFU	National Board of Fire Underwriters
NBC	National Building Code of Canada
NBS	National Bureau of Standards (USDC)
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
NHLA	National Hardwood Lumber Association (USA)
NLGA	National Lumber Grades Authority
NRC	National Research Council
OBC	Ontario Building Code
OHSA	Occupational Health and Safety Act
OPSS	Ontario Provincial Standard Specifications
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
RAIC	Royal Architectural Institute of Canada
SDI	Steel Deck Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPMDD	Standard Proctor Maximum Dry Density
SSPC	Steel Structures Painting Council
TTMAC	Terrazzo, Tile & Marble Association of Canada
ULC	Underwriters' Laboratories of Canada
ULI	Underwriters' Laboratories, Inc. (USA)
USAS	United States of America Standards Institute
WSIB	Workplace Safety and Insurance Board

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Related Requirements Specified Elsewhere:

.1 Inspections and testing required by the laws, ordinances, rules and regulations of authorities having jurisdiction:
.1 General Conditions of the Contract.

.2 Verification by certification that specified products meet requirements of reference standards:
.2 In applicable Sections of the Specification.

.3 Testing, balancing and adjusting of equipment:
.3 In applicable mechanical and electrical Sections of the Specification.

.4 Cutting and Patching:
.4 Section 01 31 13.

.5 Submission of Inspection and Testing Reports:
.5 Section 01 33 00.

1.2 TOLERANCES FOR INSTALLATION OF WORK

.1 Unless acceptable tolerances are otherwise specified in a Section or a reference standard or are otherwise required for proper functioning of equipment, site services, and mechanical and electrical systems:

.1 "plumb and level" shall mean plumb or level within 3mm in 3048mm (1/8" in 10').

.2 "square" shall mean not in excess of 10 seconds lesser or greater than 90 degrees.

.3 "straight" shall mean within 3mm (1/8") under a 3048mm (10') long straight edge.

1.3 CONSTRUCTION REVIEW

.1 The Consultant and his sub-consultants may carry out construction review during the progress of the work. The Consultant's general review during construction, and inspection and testing by independent inspection and testing companies reporting to the Consultant, are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve him of contractual responsibility.

1.4 QUALITY CONTROL

.1 Bring to the attention of the Consultant any defects in the work or departures from the Contract Documents which may occur during construction. The Consultant will decide upon corrective action and state his recommendations in writing.

.2 The Consultant may appoint and direct inspection and testing companies to review completed work in addition to inspection and testing specified for inclusion in the work under Source and Field Quality Control in other Sections.

1.5 INSPECTION AND TESTING

.1 Source and Field Quality Control Specified in Other Sections:

.1 This Section includes requirements for performance of inspection and testing specified under Source Quality Control and Field Quality Control in other Sections of the Specification.

.2 Do not include in work of this Section responsibilities and procedures that relate solely to an inspection and testing company's function under the direction of the Owner and that are specified in another Section which is paid for directly by the Owner. Such information is included in this Section for only the Contractor's information.

.2 Do not limit responsibility for ensuring that products and execution of the work meet Contract requirements and inspection and testing required to this end, to specified inspection and testing.

.3 Payment for Inspection and Testing Services:

.1 Payment for specified inspection and testing will be made by the Contractor, as required by each applicable Section.

.2 Payment for reinspection and retesting of defective and rejected work shall be made by the Owner and backcharged to the Contractor.

.3 Contractor to engage approved company(s) for inspections and tests for additional inspections and tests as may be performed for the Contractor's own purposes and convenience. Include cost of this inspection and testing in the Stipulated Price Contract.

.4 Include cost in the Stipulated Price Contract for tests of reinforcing steel for which no mill tests are submitted.

1.6 INSPECTION AND TESTING SERVICES AND REFERENCE STANDARDS

.1 Qualifications of Inspection and Testing Companies:

.1 Companies engaged for inspection and testing shall provide equipment, methods of recording and evaluation, and knowledgeable personnel to conduct tests precisely as specified in reference standards.

.2 If requested, submit affidavits and copies of certificates of calibration made by an accredited calibrator to verify that testing equipment was calibrated and its accuracy ensured within the previous twelve months.

.3 Inspection and testing of concrete and concrete materials will be carried out by a CSA Certified testing laboratory to CSA A283, for review in accordance with CSA A23.1/A23.2.

.2 Reference Standards:

.1 Perform inspection and testing in accordance with standards quoted and as required by procedures described in specified reference standards that are applicable to the work being inspected and tested.

1.7 SUBMITTALS

.1 Submit inspection and testing reports in accordance with Section 01 33 00.

1.8 RESPONSIBILITIES OF THE CONSULTANT

.1 The Contractor will submit a list of Inspection and Testing companies to the Consultant for his review.

.2 The Consultant and Contractor will direct inspection and testing companies in the type and extent of inspection and testing to be undertaken.

.3 The Consultant will receive submitted reports of inspections and tests for evaluation and will decide upon any actions that may be required.

.4 The Consultant will provide Drawings and Specifications required by inspection and testing companies.

1.9 RESPONSIBILITIES OF THE CONTRACTOR

.1 Inspection and testing performed by firms engaged for Source and Field Quality Control specified in other Sections shall not relieve the Contractor from responsibility of performing his work in accordance with the Contract Documents.

.2 Provide access for inspection and testing personnel to work in progress and to fabricator's operations.

.3 Provide samples of materials to be tested in required quantities at locations testing is performed.

.4 Submit copies of mill test reports in accordance with Section 01 33 00.

.5 Provide labour and facilities:

.1 To facilitate inspections and tests.

.2 For storing of specimens at required temperature and free from vibration, in conformance with reference standard and inspection and testing company instructions.

.3 For obtaining, handling and transporting of samples at site and plant.

.6 Notify Consultant, and inspection and testing company at least 48 hours before work to be inspected and tested commences.

.7 When it is discovered on inspection that work is proceeding with incorrect materials or methods, ensure that corrections are immediately made and that improperly completed work is replaced.

.8 Inspect all work done by subtrades prior to application of final cover materials i.e. pressure plates, drywall ceilings, concrete slab pours and the like.

1.10 RESPONSIBILITIES OF INSPECTION AND TESTING COMPANIES

.1 Determine from Specifications and Drawings the extent of inspection and testing required for work of contract as directed by Consultant. Notify Consultant of any omissions or discrepancies in the work inspected and/or tested.

.2 Perform applicable inspection and testing described in the Specification and as may be additionally directed.

.3 Provide competent inspection and testing personnel when notified by the Contractor that applicable work is proceeding. Inspection personnel shall co-operate with the Consultant and Contractor to expedite the work.

.4 Inform the Consultant of intended scheduling of inspections and of each visit of inspection personnel to the work site and fabricator's operations.

.5 Notify the Consultant and Contractor of deficiencies and irregularities in work immediately they are observed in course of inspections and tests.

.6 Inspection and testing companies shall not perform or supervise any of the Contractor's work, and shall not authorize:

.1 Performance of work that is not in strict accordance with the Contract Documents.

.2 Approval or acceptance of any part of the work.

1.11 INSPECTION AND TESTING PROCEDURES

.1 Perform specified inspection and testing only in accordance with specified reference standards, or as approved.

.2 Observe and report on compliance of work to requirements of Contract Documents.

.3 Ensure that inspectors are on site or at fabricator's operations for full duration of critical operations, and as otherwise required to determine that work is being performed in accordance with the Contract Documents.

.4 Identify samples.

.5 Identify sources of materials.

.6 Review and report on progress of work. Report on count of units fabricated and inspected at fabricator's operations.

.7 Observe and report on conditions of significance to work in progress at time of inspection or at fabricator's operations. Include where applicable and if critical to work in progress:

.1 Time and date of inspection.

.2 Temperature of air, materials and adjacent surfaces.

.3 Humidity of air, and moisture content of materials and adjacent materials.

.4 Presence of sunlight, wind, rain, snow and other weather conditions.

.8 Include in reports all information critical to inspection and testing.

.9 Ensure that only materials from the work and intended for use therein are tested.

.10 Determine locations for work to be tested.

1.12 DEFECTIVE WORK

.1 Where factual evidence exists that defective workmanship has occurred or that work has been carried out incorporating defective materials, the Consultant may have tests, inspections or surveys performed, analytical calculation of structural strength made, and the like, in order to help determine whether the work must be replaced. Testing, retesting, inspections or surveys carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, the work may be acceptable.

.2 All testing shall be conducted in accordance with the requirements of the Consultant.

.3 Defective work discovered before expiration of the warranty period specified in the General Conditions of the Contract, as may be extended in this Specification, will be rejected, whether or not is has been previously inspected. If rejected, defective materials or work incorporating defective materials or workmanship shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

1.13 BUILDING ENVELOPE

.1 Requirements specified herein apply to all elements of the exterior building envelope.

.2 Continuity of air barrier/vapour retarder and insulation components is critical and must be maintained at all locations. Where different systems meet, ensure proper interface and continuity between adjacent components by implementing suitable construction sequences and by using compatible materials only.

.3 Provide control joints in exterior building components of design and spacing which will permit expansion and contraction of components without causing distortion, failure of joint seals, undue stress, cracking, bowing or other defects detrimental to appearance and

performance. Review design and location of control joints with Consultant prior to start of work and follow directions given by Consultant.

.4 Anchor exterior cladding components to structure in manner suitable to accommodate structural deflection and creep. Design anchorage to withstand expected wind loads, positive and negative, in accordance with applicable regulations.

.5 Ensure that air spaces within exterior building components are firestopped in accordance with applicable regulations.

.6 Ensure that air spaces on the outside of vertical air barrier/vapour retarder (walls) are constructed with adequate drainage provisions to the exterior.

1.14 DRAINAGE

.1 Lay out and construct work to ensure that positive drainage is provided to roof drains, floor drains, site drains and catch basins, as set in their final position, preventing undrained areas and ponding.

.2 Ensure that allowable construction tolerances and structural deflection do not cause ponding of water.

.3 Report to Consultant in writing prior to executing work affected, in case adequate drainage cannot be provided.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Include in the work construction of temporary facilities as required for the performance of the work as construction aids and as required by authorities having jurisdiction, or as otherwise specified. Install to meet needs of construction as work progresses. Maintain construction and temporary facilities during use, repair them when damaged, relocate them as required by the work, remove them at completion of need, and make good adjacent work and property affected by their installation.

.2 Include in the work, construction of temporary facilities to provide for construction safety such as: fences, barricades, bracing, supports, storage, sanitation and first aid facilities, fire protection, stand pipes, electrical supply, temporary heat, steam supply, ventilation, construction equipment with its supports and guards, stairs, ramps, platforms, runways, ladders, scaffolds, guardrails, temporary flooring, rubbish chutes, and walkway, morality and guard lights, all as required of the Construction by the Occupational Health and Safety Act of the Province of Ontario, latest edition, as well as all other regulations of the authorities having jurisdiction.

.3 Construct temporary work of new materials unless otherwise approved.

.4 Ensure that structural, mechanical, and electrical characteristics of temporary facilities are suitable and adequate for the use intended. Be responsible that no harm is caused to persons and property by failure of temporary facilities because of placing, locations, stability, protection, structural sufficiency, removal, or any other cause.

.5 Prepare shop drawings and specifications of temporary work, and submit for approval of authorities having jurisdiction if so required. Submit duplicate copy to Consultant for his information.

.6 Locate temporary facilities where shown on Drawings or as directed.

.7 Apply two coats of paint, in approved colours, to temporary constructions, such as storage sheds; offices; supports; bracing and back side of signs; barricades; and where otherwise specified.

.8 Temporary Electric Service:

.1 Provide and maintain an adequate temporary electrical service for performance of the Work including, but not limited to, operation of electric pumps, motors, vibrators and other power tools, hoisting and related construction and general illumination during the Work. Provide power at temporary storage sheds and field office when required.

.2 Make connections available to any part of the work within distance of a 3048 mm (10') extension. Each Subcontractor shall be responsible for their own extension cords.

.3 Contractor shall provide and be responsible for payment of temporary power required for all equipment for construction use in excess of available existing sources.

.4 Provide and maintain any components and equipment necessary to transform supply power to necessary temporary power voltage.

.5 Contractor will be permitted use of existing power for construction purposes at no cost to the Contractor. Provide additional temporary power for individual tasks required by the technical sections

.9 Temporary Lighting:

.1 Install lighting for the following:

.1 Emergency evacuation, safety and security throughout the Project at intensity levels required by authorities having jurisdiction.

.2 Performance of work throughout work areas as required, evenly distributed, and at intensities to ensure proper installations and applications are achieved.

.3 Performance of finishing work in areas as required, evenly distributed, and of an intensity of at least 30 foot candles.

.2 Permanent lighting may be used during construction, provided lamps, fluorescent tubes and ballasts that are so used are replaced with new at time work is turned over to Owner.

.10 Temporary Heating and Ventilation:

.1 Provide and pay for temporary heating, cooling and ventilating required for the Work, including attendance, maintenance and fuel.

.2 Provide temporary heat and ventilation as required to:

.1 Facilitate continuous uninterrupted progress of the Work.

.2 Protect the Work and Products against damage and defacement caused by weather, harmful levels of temperature, humidity, and moisture.

.3 Provide ambient temperatures and humidity levels for proper storage, installation and curing of materials, in accordance with specified standards and manufacturer's requirements.

.4 Provide adequate ventilation to meet health regulations for safe working environment.

.3 Maintain work areas at not less than 7 deg C. Increase temperatures in isolated areas to 20 deg C as required by various sections of the specifications or by Product manufacturers.

.4 Solid fuel salamanders will not be permitted.

.5 Provide temporary heat or adequate protection by means of straw or other coverings to floor slabs, footings, or any part of building not specifically designed to withstand frost penetration.

.6 Furnish other temporary heating as required by various sections of the specifications or by Product manufacturers.

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

.8 If possible, and when approved by the Owner, the permanent heating and ventilation system may be used during construction. If approved, the Contractor shall be responsible for its operation, and for replacing and repairing damage it may suffer, and shall assume operation and maintenance of the system in all its parts and payment for fuel consumed.

.9 Operation and maintenance shall include inspection at least every two weeks of thermostats, valves, switches, lubrication, fan, belt and motor adjustment, cleaning and/or replacement of filters, and replacement of filters and re-servicing of system at completion of work.

.10 Connect electric motors only to permanent source of power, or otherwise provide proper source with correct design characteristics and with no fluctuation in voltage.

.11 Commence warranty period after re-servicing and from time the Owner takes over the premises.

.11 Temporary Water Supply:

.1 Provide water of potable quality for all construction purposes, at one location at least, on each floor area.

.2 Extend supply pipe or pipes from nearest available sources and maintain in good condition until no longer required.

.3 If possible, and when approved by the Owner, the permanent site water source be used to provide water during construction.

.12 Temporary Sanitary Facilities:

.1 Provide sanitary facilities for persons on the work site as approved by the authorities having jurisdiction. Install them in sufficient number and maintain them in a sanitary condition. (unless the board allows contractor to use a designated washroom with in the school, which the contractor will be responsible for cleaning during the project)

.2 Do not permit construction personnel to use washroom and toilet facilities on premises which have been installed as part of the new work or which are part of the existing building for use by non-construction personnel.

.13 Temporary First-Aid Facilities:

.1 Provide site equipment and medical facilities necessary to supply first-aid service to injured personnel in accordance with regulations of the Workers' Compensation Act. Maintain facilities for duration of Contract.

.14 Connections to Utilities:

.1 Make arrangements for connections to water, sewer, gas, electric, and telephone utilities as required for temporary use during construction.

.2 The Owner is responsible for payment of final connection charges that are part of service contracts between him and each utility.

1.2 CONSTRUCTION AIDS

.1 Hoists and Cranes:

.1 Each Subcontractor is responsible for providing his own hoisting and crane operations. Equipment shall be operated by qualified hoist and/or crane operators.

.2 Where multiple trades are involved in high level work, the Contractor shall co-ordinate the hoisting and trade requirements.

.2 Building Enclosure:

.1 Not Used

.3 Scaffolding:

.1 Each Subcontractor shall provide his own scaffolding.

.2 Scaffolding shall be erected clear of walls, and to ensure that it does not interfere with continuing work.

.3 Subcontractor shall be responsible for its examination for sufficiency of his scaffolding and be responsible for accidents due to its insufficiency.

.4 The Contractor will be responsible for co-ordination of scaffold work if multiple trade usage can by achieved from one installation.

.4 Provide temporary stairs, ladders, ramps required for movement and placing of materials, equipment and personnel.

1.3 TEMPORARY BARRIERS

.1 Provide temporary hoarding and fencing as specified in Section 01 56 26 Temporary Fencing and complying with the local Building Code, all other by-laws of the municipality and all other authorities having jurisdiction.

1.4 PROTECTION

.1 Provide temporary protection to construction as required by the Work, to protect it from damage.

.2 Box with wood or otherwise protect from damage, by continuing construction, finished sills, jambs, corners, and the like.

.3 Adequately protect the Work at all stages of operations and maintain protection until the Work is completed. Remove and replace, at no additional cost to Owner, damaged Work and materials that cannot be repaired or restored to the approval of the Consultant.

.4 Provide spare safety helmets for and enforce their use by Owner, Consultants, and representatives and authorized visitors to the site.

.5 In addition to requirements of authorities having jurisdiction, provide temporary protection and safeguards adequate to protect against:

.1 Accident or injury to workers and other persons on the site or adjacent work and properties.

.2 Damage to any part of the Work and to any adjoining or adjacent structure, property, services, and other similar items, by overloading, weather, frost, any other cause resulting from the execution of the Work.

.3 Protect work, existing property, adjacent tenant and public property from damage during performance of Work. Should any part of the Work or any buildings, services or similar items on or surrounding the areas of the work and adjacent to any road leading thereto become damaged or disfigured due to lack or failure of such protection, they shall be made good with material identical with the existing and adjoining surfaces, to the satisfaction of the authorities having jurisdiction and the Owner.

.4 Damaged work shall be made good by those performing work originally, or workers experienced or skilled in that particular type of work, at expense of those causing damage.

.5 Provide and maintain necessary temporary enclosures, hoardings, fences, gates, barriers, guards, hoists, cranes, stairs, ladders and scaffolding, walks, platforms, staging as necessary for the Work and protection of workers, public and others from injury, and for public access to adjacent buildings. All such apparatus shall meet requirements of the authorities having jurisdiction.

.6 Provide secure, rigid guard railings, hoardings and barricades around openings, as required by authorities having jurisdiction and to maintain safety.

.7 Provide proper guard devices, signs, signals and lights for the prevention of accidents.

.8 Maintain at night, sufficient and suitable warning lights to prevent accidents and injuries to persons and/or property.

.9 Alter, remove and relocate or replace hoardings, barriers and entrances as required by the Work. Hazards requiring such protection shall be eliminated as soon as possible and protection devices removed. Maintain protection until state of construction allows their removal.

.10 Provide and maintain temporary weathertight protection for all exterior openings in walls, floors and roofs until the building is closed in.

.11 Close off floor areas where walls are not finished, seal off openings and enclose building interior work area. Polyethylene or other approved translucent material shall be framed in or around wall openings. Provide temporary doors, frames, hinges, locks, keys and bolts as required.

.12 Should the work be stopped for any cause, provide protection and bracing for the Work.

.6 Lay protective 13 mm (1/2") plywood over completed areas of roof on which other trades are to work.

1.5 PUBLIC PROTECTION

.1 Provide fencing, barricades, hoarding, notices and warning boards and maintain lights and signals for protection of workers engaged on the Work, for protection of adjoining property and for protection of the public.

.2 Such protective measures shall be finish painted to Owner's approved colour, when visible to the public.

.3 Where any special hazard exists from which it is not possible to protect the public safety by other means, watchpersons shall be employed to preserve public safety until the area of special hazard no longer poses a risk to public safety.

1.6 PLANT PROTECTION

.1 Protect all existing trees and landscaping which is to remain at the Place of the Work, using methods and materials recommended by the Canadian Nursery Trades Association and as approved by the Consultant.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2440 mm (8').

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Provide minimum 1.8 m high chain link fencing outside of dripline of trees or groups of trees and other plants. Leave fenced areas undisturbed; do not use areas for storage, stockpiling or any other purpose. Do not dump or flush any contaminants in areas of tree feeder roots.

.5 Where limbs or portions of plants are required to be removed to accommodate new work, they shall be removed in accordance with accepted arboricultural practice.

.6 Where root systems of protected trees adjacent to construction are exposed or damaged, they shall be neatly trimmed and the area backfilled with suitable material to prevent desiccation.

.7 Where necessary give plants an overall pruning to restore the balance between roots and top growth and/or to restore appearance.

.8 Minimize stripping of topsoil and vegetation.

.9 Restrict tree removal to areas indicated or designated by Consultant.

1.7 FIRE SAFETY REQUIREMENTS

.1 Comply with fire and safety regulations required by the authorities having jurisdiction.

.2 Take necessary precautions to eliminate fire hazards and to prevent damage to Work, building materials, equipment and other property both public and private having to do with Work. Inspect Work at minimum weekly intervals for this purpose.

.3 Store and locate products and equipment packed in cardboard cartons, wood crates and other combustible containers in orderly and accessible manner.

.4 Tarpaulins shall be fire-resistant.

.5 Open fires and burning of rubbish are not permitted on the site.

.6 Provide and maintain in working order, ULC labelled fire extinguishers or other approved fire extinguishing equipment, locate in prominent positions, in accordance with requirements of authorities having jurisdiction and insurance companies having jurisdiction, codes, regulations and bylaws in the building until the permanent fire protection system in the building is available.

.7 Provide temporary standpipe system, when required by authorities having jurisdiction.

.8 Except as otherwise specified herein, soldering, welding and cutting operations shall be carried out in areas free of combustible and flammable contents, with walls, ceilings and floors of noncombustible construction or lined with noncombustible materials.

.9 When it is not practicable to undertake welding, soldering and cutting operations in areas described in the previous paragraph, combustible and flammable materials shall either be removed minimum of 9144 mm (30') from the work area or otherwise protected against ignition by sheet metal or other noncombustible material.

.10 When welding, soldering, or cutting is to be carried out near piping containing flammable gas, the section of piping located within 914 mm (3') of the torch or other source of combustion shall be covered with wet, noncombustible insulating material at least 6 mm (1/4") thick.

.11 Prior to initiating any open flame work or welding operation, discuss the proposed work with the Consultant and take necessary precautions to prevent inadvertent activation of the existing fire alarm system. Have sufficient suitable hand operated fire extinguishers on hand near the work area. Ensure that an additional person is readily available to operate fire extinguishers should the need arise.

1.8 PERSONAL HEALTH AND SAFETY REQUIREMENTS

.1 Comply with all requirements of the Occupational Health and Safety Act, Ministry of Labour, Construction Safety Association and all other authorities having jurisdiction in the place of the Work.

.2 Contractor shall submit company safety policy for review by Owner and Consultant. The policy must meet or exceed the requirements of the authorities having jurisdiction.

.3 Contractor shall employ and pay for services of safety supervisor in accordance with the requirements of the authorities having jurisdiction. Safety supervisor shall have training with the Construction Safety Association.

.4 Alcohol and/or drugs will not be allowed on the site. Anyone found in possession of alcohol and/or drugs shall be dismissed from the site immediately and without notice, maybe subject to civil and/or criminal proceedings.

.5 WHMIS program shall be fully enforced.

.6 Contractor shall be prepared to sign the "Guidelines For The Structure and Function Of The Joint Occupational Health and Safety Committee", if requested by the Owner.

.7 When carrying out soldering, welding or cutting procedures, be it in shop or in the field, ensure that workers comply with the following:

.1 Wear appropriate protective clothing such as gloves, leather aprons and/or arm spark guards.

.2 Wear suitable goggles or face shields as appropriate.

.3 Protect co-workers from eye or other injuries through the use of fire resistant portable shielding devices.

.4 Provide and use a portable fume eliminator at all times during welding, soldering, or cutting operations within the existing building.

1.9 SECURITY

.1 Maintain security of construction site by control of access through enclosing barricades, and hoardings during times work is in progress, and by locking hardware.

.2 Properly close and lock the construction site at nights, Sundays, holidays and other occasions when the Work is not in progress.

.3 The Owner assumes no responsibility for the safeguarding of tools or equipment from theft.

.4 Take precautions to guard construction site, premises, materials and the public during and after working hours. During regular working hours, maintain watch to guard construction site and contents.

.5 Maintain security at all times construction is shut down because of a strike or a lockout.

.6 Provide security guards and security lighting during all after hour work.

.7 Provide personnel to direct traffic as required during working hours.

1.10 ACCESS ROADS, WALKS AND PARKING

.1 Access Roads and Walks:

.1 All construction vehicles and personnel required for construction shall use existing access roads and walks as determined at later date by Owner. When no longer required, or at completion of Work, make good disturbed surfaces. Maintain roads and walks, removing dirt, mud, debris, ice, snow and other obstructions during use.

.2 Provide for access of emergency vehicles at all times.

.2 Parking:

.1 Parking for Contractor's, subcontractors, suppliers and/or their employee's vehicles shall be limited to restricted area as designated by the Owner.

.2 The Owner, property management and their employees will not be responsible for parking fines incurred by the Contractor, Subcontractors, suppliers and/or their employees.

1.11 SITE SIGNS

.1 No signs, bills or posters will be allowed on the site, other than site signs as follows:

.1 Project construction sign shall be supplied and installed by Owner under work of separate Contract.

.2 Place only specified project construction sign and notices regarding safety, caution, or instructions on or near site.

.3 No unauthorized signs, bills, posters or advertisements of any kind are permitted. Should such unauthorized advertisements be applied to the temporary hoarding by the public or anyone else, upon discovery of such, the Contractor shall remove them on a weekly basis.

.4 Erect all notices as directed by Owner.

.5 Remove all notices on completion of the Contract.

1.12 FIELD OFFICES AND SHEDS

.1 Field Offices:

.1 Provide temporary offices for Owner's, Consultant's and Contractor's use. They shall contain facilities as required for Contractor, a conference table and chairs for site meetings, and facilities for the Owner and the Consultants.

.2 Temporary field offices shall be designated on site until such time where an area located inside the constructed building, can be designated by the Owner. No other location shall be used for temporary field office. Temporary site office shall not exceed 3048 mm (10') x 15240 mm (50').

.3 Facilities shall consist of: an office desk and chair, a two drawer filing cabinet, two chairs, use of a telephone, use of facsimile machine, and a layout table for drawings located so that when drawings are spread out their orientation is same as that of building under construction.

.4 Heat, cool and light offices to minimum code requirements for office buildings.

.5 Keep temporary field office clean and remove all rubbish at the end of each work day.

.6 Include construction and operating hardware, with security locks, as required by the Owner.

.2 Site Storage:

.1 Until such time where an area can be located inside the constructed building, designated by the Owner as a temporary site storage, provide storage trailers or construct weather-tight storage sheds for storage of materials that may be damaged or defaced by weather, in locations indicated by the Owner.

.2 Provide floors raised 150 mm (6”) clear of ground for storage of Products.

.3 Include security locks, as required.

.4 Install lighting in storage areas and heat in those storage areas containing materials damaged by low temperature.

.5 Provide separate shed located where directed in writing by Consultant for storage of volatile materials.

.6 Owner is not responsible for securing Products or materials at the Place of the Work.

.7 Handle and store materials so as to prevent damage or defacement to the Work and surrounding property.

1.13 DUST CONTROL

.1 Provide dust tight screens or barriers to localize dust generating activities for the protection of tenants, employees, equipment, adjacent and finished areas of Work, and the public. Maintain and relocate protection until Work is complete. Respond immediately to complaints of dust received from the public, authorities having jurisdiction, Owner and Consultant.

.2 Obtain Consultant's approval of installed dustproof screens and protection methods before proceeding with construction/alteration work.

.3 Painted gypsum wallboard and metal stud dustproof screens, shall extend to underside of structure, and shall be erected to protect adjoining areas and rooms. Apply bead of sealant or other acceptable seal continuously around periphery of each face of partitioning to seal gypsum board/structure junction where dustproof screens abut fixed building components. Seal perimeter of cutouts, around fixtures and fittings and other penetrations. Tape or seal between adjacent boards. Separate construction areas from occupied areas.

.4 Provide protection for existing equipment sensitive to dust and noise. Co-ordinate location of dust barriers and dust tight doors with Consultant.

.5 Install temporary packing at bottom of doors to areas where demolition/construction shall be performed to prevent dust seepage into existing spaces. Do not permit dust and dirt to escape beyond area being constructed/altered.

.6 Provide daily vacuuming of construction dust from existing areas as work progresses; this shall be considered a minimum requirement, increase vacuuming as necessary. The Owner may have vacuuming work done by others and cost deducted from Contractor's progress payments if this requirement is not fulfilled.

.7 Provide locked doors in barriers to permit access by Consultant, Owner and Owner's security personnel to construction areas and to areas under Contractor's custody. Supply padlocks and construction cores.

.8 Remove dustproof screens at completion of work in areas and make good damaged or blemished areas. Patch and make good to access, altered and damaged areas caused by work and screens. Maintain integrity of fire or sound separation.

.9 Prevent nuisance to adjacent areas near the work from dust by taking additional appropriate anti-dust measures at such times as found necessary, and at other times complaints of dust are received from the Owner's representative and others.

1.14 NOISE AND VIBRATION CONTROL

.1 Take measures to control noise and vibration generated by the Work.

.2 Take appropriate noise and vibration control measures at times found necessary, and at other times complaints of noise are received from the public, authorities having jurisdiction, Owner and Consultant.

.3 These requirements are for the consideration of the public, tenants and employees. Requirements shall not be construed as cause for elimination or restriction of Contractor's working schedule, claims for delay of work nor additional costs.

1.15 COLD WEATHER WORKING

.1 Particular attention is drawn to the requirement that the Contractor shall commence work immediately the Contract is awarded and shall continue full scale operations throughout the winter months and thereafter until the work is completed and accepted by the Consultant.

.2 It is understood that the Contract Price includes sufficient funds for the provisions of temporary heating, temporary shelters and all other necessary cold weather measures to enable all trades to proceed without delay regardless of weather.

1.16 SNOW REMOVAL

.1 Allow no accumulation of ice and snow within the Place of the Work. There shall be no use of salt for de-icing in areas of building work.

.2 Remove snow from access routes to the Work to maintain uninterrupted progress of the Work.

1.17 PEST CONTROL

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

1.18 FIRES

.1 Open burning fires on site will not be permitted.

1.19 FIRST AID SERVICES

.1 Provide and maintain First Aid services as required by the authorities having jurisdiction, the Workplace Safety and Insurance Board (WSIB) and Union Agreements.

1.20 TRAFFIC CONTROL

.1 Do not block roads or impede traffic. Keep construction traffic to designated roads only. Provide flag-person to direct traffic as required.

.2 Provide a hard surface area at the Place of the Work for cleaning down trucks prior to entry onto municipal roads or private roads outside of the Place of the Work.

.3 Keep public and private roads free of dust, mud and debris resulting from truck, machinery and vehicular traffic related specifically to this Project, for the duration of Work.

.4 Clean roads regularly, public or private. Wash down and scrape flush roads at least daily when earth moving operations take place. Maintain public property in accordance with requirements of authorities having jurisdiction.

1.21 ENVIRONMENTAL/POLLUTION CONTROL/SITE CLEANING

.1 Prevent the escape of untreated effluent, be it liquid or gaseous substance or any liquid or solid wastes, being objectionable or detrimental to adjoining areas of the construction site.

.2 Burning or burying of rubbish, waste, and the like is not permitted on construction site.

.3 Only fires for heating bitumen and temporary heaters as specified are permitted on site.

.4 Take care to prevent staining or smoke damage to structure or materials. Replace stained or damaged work.

.5 Make every effort to provide environmental protection, take precautionary measures to prevent excessive noise, sounds, vibrations, dust, air pollution, smoke, etc., which may become objectionable to people occupying adjacent areas.

.6 Keep building site clean and free or unsightly collection of waste materials and debris. Provide for temporary storage and collection of waste materials, and dispose to local authorities having jurisdiction recommendations at intervals to maintain a clean site condition.

.7 Confine apparatus, the storage of materials and the operations of workers to the site. Do not unreasonably encumber the premises with construction materials.

1.22 TEMPORARY DRAINAGE AND DEWATERING

.1 The Work includes the removal of collected groundwater and surface water accumulating from precipitation and groundwater infiltration throughout the course of the Work until date of Substantial Performance of the Work.

.2 Keep drainage lines and gutters open. No flow of water shall be directed across or over pavements except through pipes or properly constructed troughs. Keep portions of the Work properly and efficiently drained during construction and until completion. Be responsible for disturbances, dirt and damage which may be caused by or result from water backing up or flowing over, through, from or along any part of the Work, or due to operations which may cause water to flow elsewhere.

.3 Keep trenches and other excavations free of water. Remove water in a manner that will prevent loss of soil, and maintain the stability of existing soils.

.4 Dispose of such water in a manner that will not be hazardous to public health and safety, private property, or to the Work.

.5 Drainage of trenches or other excavation through storm drainage pipe will be allowed only with the express permission of the authority having jurisdiction.

.6 When drainage is permitted in writing to be directed to existing catch basins, regularly and at Substantial Performance of the Work inspect such catch basins and remove accumulated debris and sediment.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Requirements for temporary hoarding.

1.2 PERMITS

.1 Arrange and pay for necessary permits for proper execution and completion of the work of this section.

1.3 SUBMITTALS

.1 Shop Drawings:

.1 Submit shop drawings for temporary barriers and enclosures in accordance with Section 01 33 00.

.2 Clearly indicate details of construction, profiles, jointing, fastening and other related details.

1.4 HOARDING DESIGN

.1 Design hoarding to meet bylaws and regulations of authorities having jurisdiction and obtain approvals from authorities having jurisdiction.

.2 Location and types of hoarding as indicated on Drawings.

.3 Design and install hoarding to withstand wind loads at the Place of the Work without collapse, permanent deformation, or other failure of the hoarding system.

2 PRODUCTS

2.1 HOARDING MATERIALS

.1 Plywood Hoarding:

.1 Provide rough hardware required for the work of this section.

.2 Framing lumber and posts: Unless otherwise specified or indicated, NLGA No. 2 Construction SPF.

.3 Reused material may be used.

.4 Dimensions as follows, unless otherwise indicated or required by authorities having jurisdiction:

.1 Vertical posts: 89 mm x 89 mm (3-1/2" x 3-1/2").

.2 Horizontal rails: 39 mm x 89 mm (1-1/2" x 3-1/2").

.3 Hoarding: Plywood, 1220 mm x 2440 mm x 13 mm thick (4' x 8' x 1/2"), sheathing grade conforming to CSA 0141-M1978.

.4 Reused material may be used.

.5 Hoarding to be painted in accordance with Section 09 90 00. Colour: As selected by the Consultant.

.2 Chain Link Hoarding:

.1 Fence fabric: 3.75 mm diameter (No. 9 gauge) steel wire woven in a 50 mm (2") mesh, hot dipped galvanized after weaving and knuckled finish top and bottom selvage edges.

.2 Galvanized fabric to have a minimum zinc application of 490 g/m² of surface area.

.3 Posts: CLFMI (Chain Link Fence Manufacturer Institute) Type 1, standard buttwelded Schedule 40, ASTM F1083-10 standard weight, galvanized pipe.

.4 Provide prefabricated panelized chain link and post galvanized metal hoarding system.

.3 Signage: Provide suitable sized notice signs at entrance to the Place of the Work with contrasting text "RESTRICTED ACCESS - CONSTRUCTION SITE" complete with the name of Contractor.

3 EXECUTION

3.1 HOARDING FABRICATION

.1 Provide hoarding immediately upon award of Contract.

.2 Erect framing members and install hoarding panels at the perimeter of the Place of the Work as indicated or required by authorities having jurisdiction to fully enclose the Place of the Work and as follows, unless otherwise indicated or required by authorities having jurisdiction:

.1 Height of hoarding: 2440 mm (8') minimum, unless otherwise indicated, above grade at any point.

.2 Vertical posts spaced 2440 mm (8’) on centre, maximum.

.3 Vertical posts: Set a minimum of 1220 mm (4’) in the ground.

.4 Horizontal rails securely nailed or screwed to vertical posts at top, bottom, and intermediate locations at 610 mm (24") on centre.

.5 Erect panels around objects as required.

.6 Hoarding shall contain no opening more than 100 mm (4") wide or less than 914 mm (3') above the bottom of the fence except where required for access to and from the Place of the Work.

.7 Provide no rails, other horizontal or diagonal bracing, attachments, or pattern of openings on the outside that would facilitate climbing.

.8 At access openings: Provide gates that provide performance and safety at least equivalent to hoarding and contain wire mesh of sufficient openness to provide visibility for traffic entering or exiting the Place of the Work.

.3 Provide overhead protection hoarding where public access is required.

.4 Provide hoarding, access gates, access doors, in conformance with the Contract Documents and authorities having jurisdiction.

.5 Incorporate silt control fabric from 200 mm (8”) below existing grade and attach to hoarding to provide silt control to requirements of authorities having jurisdiction and Owner.

.6 Mesh fencing: Erect metal posts at 3050 mm (10') on centre maximum with tensar mesh.

.7 Hoarding hardware: Provide rough and finish hardware as required.

3.2 DESIGN AND SAFETY REQUIREMENTS FOR TEMPORARY WORK

.1 Be responsible for design, erection, operation, maintenance and removal of temporary structural and other temporary facilities, barriers, and enclosures.

.2 Engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the Contract Documents; and in cases where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.

.3 Engage and pay for professional engineer(s) registered in Place of the Work to design and supervise construction and maintenance of hoardings, covered ways, protective canopies and project sign(s). Designs provided by Consultant or Owner for such work cover general appearance only.

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Products refer to materials, manufactured components and assemblies, fixtures and equipment incorporated in the work.

.2 Use only products of Canadian manufacture unless such products are not manufactured in Canada, are specified otherwise, or are not competitive.

.3 Products for use in the Project and on which the Bid was based shall be in production at time of tender date, with a precise model and shop drawings available for viewing.

.4 Where equivalent products are specified, or where alternatives are proposed, these products claimed by the Contractor as equivalent shall be comparable in construction, type, function, quality, performance, and, where applicable, in appearance. Where specified equivalents are used in the Stipulated Price for the work, they shall be subject to final approval.

.5 Incorporate products in the work in strict accordance with Manufacturers' directions, instructions and specifications, where reference is made to them, shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, and other matters concerning the materials that are pertinent to their use and their relationship to materials with which they are incorporated.

.6 Products delivered to the Project site for incorporation in the work shall be considered the property of the Owner. Maintain protection and security of products stored on the site after payment has been made for them.

.7 Do not install permanently incorporated labels, trademarks and nameplates, in visible locations unless required for operating instructions or by authorities having jurisdiction.

1.2 PRODUCT HANDLING

.1 Manufacture, pack, ship, deliver and store products so that no damage occurs to structural qualities and finish appearance, nor in any other way detrimental to their function or appearance, or both.

.2 Ensure that products, while transported, stored or installed, are not exposed to an environment which would increase their moisture content beyond the maximum specified.

.3 Schedule early delivery of products to enable work to be executed without delay. Before delivery, arrange for receiving at site.

.4 Deliver and store products at site where directed by the Contractor.

.5 Brace work such as door frames, large window units and similar products to prevent distortion or breakage in handling.

.6 Deliver packaged products, and store until use, in original unopened wrapping or containers, with manufacturer's seals and labels intact.

.7 Label packaged products to describe contents, quantity and other information as specified.

.8 Label fire-rated products to indicate approval of Underwriters' Laboratories.

.9 Product handling requirements may be repeated, and additional requirements specified, in other Sections.

1.3 STORAGE AND PROTECTION

.1 Store products on site with secure protection against all harmful environmental conditions. Prevent damage, adulteration, staining and soiling of materials while stored.

.2 Protect prefinished metal surfaces by protective coatings or wrappings until time of final cleanup specified in Section 01 78 00. Protection shall be easily removable under work of Section 01 78 00 without damage to finishes.

.3 Store manufactured products in accordance with manufacturers' instructions.

.4 Store steel, lumber, masonry units, and similar products on platforms raised clear of ground.

.5 Store finished products and woodwork under cover at all times.

.6 Do not store products at locations or in such a manner that they damage previously completed work.

.7 Storage and special protection requirements may be repeated and additional requirements specified, in other Sections.

1.4 SCHEDULING OF PRODUCT DELIVERY

.1 Verify that products supplied by all Sections are ordered from suppliers in sufficient time to ensure delivery for incorporation in the work within the time limits established by approved construction schedule.

.2 Obtain confirmed delivery dates from product suppliers.

.3 Immediately inform the Consultant should supplier's confirmation of delivery dates indicate that Project completion may be delayed.

.4 Submit copies of purchase orders and confirmations of delivery dates for products as may be requested.

.5 A schedule of product delivery shall be established and reviewed at each job site meeting.

.6 When deemed necessary, plant visits shall occur by the General Contractor to ensure delivery dates given are true and accurate.

1.5 DEFECTIVE PRODUCTS AND WORK

.1 Products and work found defective; not in accordance with the Specifications; or defaced or injured through negligence of the Contractor, his employees or Subcontractors, or by fire, weather or any other cause will be rejected for incorporation in the work whether or not incorporated in the work.

.2 Remove rejected products and work from the premises immediately.

.3 Replace rejected products and work with no delay after rejection. Provide replacement products and execute replacement work precisely as required by the Specifications for the defective work replaced. Previous inspection and payment shall not relieve the Contractor from the obligation of providing sound and satisfactory work in compliance with the Specifications.

.4 Testing and retesting of any part of the work as directed by the Owner, Consultant or Contractor to establish its conformance to the Contract Documents shall be performed at no addition to the Contract Price.

1.6 WORKERS, SUPPLIERS AND SUBCONTRACTORS

.1 Assign work only to workers, suppliers, and Subcontractors who have complete knowledge, not only of the conditions of the Specifications, but of jurisdictional requirements, and reference standards and specifications.

.2 Give preference to use of local workers, suppliers and Subcontractors wherever possible.

.3 Certified and qualified installers of a specific product line shall be used when called for in these Specifications.

2 PRODUCTS

2.1 SPECIFIED PRODUCTS

.1 Products used for temporary facilities may have been previously used, providing they are sound in structural qualities.

.2 Specified Options: The Work is based on materials, Products and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive specifications and by performance specifications.

.1 Where only one manufacturer's catalogued trade name is specified for a Product, the Product is single sourced and shall be supplied by the specified manufacturer.

.2 Where more than one manufacturer's catalogue trade name is specified for a Product, supply the Product from any one of those manufacturers specified.

.3 When a Product is specified by reference to a standard, select any Product from any manufacturer that meets or exceeds the requirements of the standard.

.4 When a Product or system is specified by prescriptive or performance specifications, Provide any Product or system which meets or exceeds the requirements of the prescriptive or performance specifications.

.5 The onus is on the Contractor to prove compliance with governing published standards, prescriptive specifications and with performance specifications.

.3 Products, materials, equipment and articles (referred to as Products throughout the Contract Documents) incorporated in the Work shall be new, not damaged or defective, and of the quality standards specified, for the purpose intended. If requested, furnish evidence as to type, source and quality of Products Provided.

.4 Where Contract Documents list acceptable Products or acceptable manufacturers, select as applicable, any one Product from any one manufacturer meeting performance of specifications.

.5 Where Contract Documents require design of a Product or system, and minimum material requirements are specified, the design of such Product or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.

.6 Defective Products, whenever identified prior to completion of the Work, will be rejected, regardless of previous reviews. Review of the Work by the Consultant or inspection and testing companies does not relieve the Contractor of the responsibility for executing the Work in accordance with the requirements of the Contract Documents, but is a precaution against oversight or error. Remove and replace defective Products and be responsible for delays and expenses caused by rejection at no additional cost to the Owner.

.7 Should any dispute arise as to quality or fitness of Products, the decision rests strictly with Consultant based upon the requirements of the Contract Documents.

.8 Unless otherwise indicated in the Contract Documents, maintain uniformity of manufacturer for any like item, material, equipment or assembly for the duration of the Work.

.9 Products exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.

.10 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical, electrical, machinery or like rooms.

.11 Owner retains right to select from choices available within specified Products for colours, patterns, finishes or other options normally made available. Submit full range of Product options in accordance with 01 33 00 for such selection.

.12 Quality Control:

.1 Implement a system of quality control to ensure compliance with Contract Documents.

.2 Notify Consultant of defects in the Work or departures from intent of Contract Documents that may occur during construction. Consultant will recommend appropriate corrective action in accordance with requirements of the Contract.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in the Contract Documents, install or erect Products in accordance with manufacturer's printed instructions. Do not rely on labels or enclosures supplied with Products. Obtain printed instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between the Contract Documents and manufacturer's instructions.

.3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no additional cost to the Owner.

.4 Manufacturers' representatives shall have access to the Work at all times. Contractor shall render assistance and facilities for such access in order that the manufacturers' representatives may properly perform their function.

3.2 GALVANIC/DISSIMILAR METAL CORROSION

.1 Insulate dissimilar metals from each other by suitable plastic strips, washers or sleeves to prevent galvanic corrosion where conductive liquid or electrolyte exists.

3.3 WORKMANSHIP

.1 General:

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

.2 Do not employ an unfit person or anyone unskilled in their required duties.

.3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with Consultant, whose decision is final.

.4 Upon request by the Consultant, submit proof, in the form of CCDC 11 - Contractor's Qualification Statement, of qualifications of Subcontractors to verify Subcontractor's qualifications and experience meet or exceed the requirements of the Contract Documents.

.1 If, upon review of the Contractor's Qualification Statement, it is found that the Subcontractor does not meet the qualification requirements specified in the Contract Documents pertaining to the parts of the Work for which the Subcontractor has been retained, the Contractor shall replace the unqualified Subcontractor with a qualified Subcontractor, satisfactory to the Contractor and the Owner, at no additional cost to the Owner and at no increase in the Contract Time.

.2 Coordination:

.1 Ensure cooperation of workers in layout of the Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

.3 Cutting and Remedial Work:

.1 Perform cutting and remedial work required to make parts of the Work come together. Coordinate the Work to ensure this requirement is maintained. Obtain permission from Consultant before commencing any cutting.

.4 Fastenings:

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action and corrosion between dissimilar metals and materials.

.5 Protection of work in progress:

.1 Take reasonable and necessary measures, including those required by authorities having jurisdiction, to Provide protection.

.2 Adequately protect parts of the Work completed or in progress. Parts of the 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 additional cost to the Owner.

.3 Do not cut, drill or sleeve any load bearing structural member without written permission of Consultant, unless specifically indicated.

.4 Keep floors free of oils, grease or other materials likely to discolour them or affect bond of applied surfaces.

.5 Protect work of other Subcontractors from damage while doing subsequent work. Damaged work shall be made good by appropriate Subcontractors but at expense of those causing damage.

.6 Protect existing buildings, curbs, roads and lanes. If, during the Work, any buildings, curbs, roads or lanes are damaged, bear costs for repairs.

.6 Existing Utilities:

.1 When breaking into or connecting to existing services or utilities, execute the Work at times approved by Owner, with a minimum of disturbance to Owner's ongoing operations, the Work, and traffic.

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

.7 Operational requirements: Operable Products shall be Provided fully operational and ready for intended use.

END OF SECTION

1 GENERAL

1.1 EXAMINATION

.1 Examine the site, existing premises and surrounding areas and be fully informed as to the conditions and limitations under which the work has to be executed. Claims for additional costs will not be entertained with respect to conditions which could reasonably have been ascertained by an inspection prior to bid closing.

.2 Prior to commencement of work, make careful examination of previously executed work, existing conditions, levels, dimensions and clearances. Promptly advise Consultant of unsatisfactory preparatory work and substrate conditions; commencement of work implies acceptance of conditions.

1.2 PROTECTION

.1 Ensure that no damage is caused to existing structures, buildings, foundations, pavement, fences, curbs, grounds, plants, property, utilities, services, finishes during the progress of Work. Repair and make good any damage caused at no extra cost to Owner to the complete satisfaction of the respective property owners and authorities having jurisdiction. Do not proceed with repairs or remedial work without written permission of the Consultant. Only trades specifically capable of performing the work will be allowed to make remedial or repair work.

.2 Keep surfaces to receive finished flooring dry and free from oil and grease. Stockpiling of damp or wet building materials and use of mixing boxes or water buckets without protecting floors from moisture gain by approved means, is prohibited.

.3 Keep municipal roads clean of mud and debris resulting from construction traffic.

.4 Prevent soiling of pavement due to spillage, mixing of material or any other cause. Make good any damage caused.

.5 Protect new work from damage with suitable protective coverings.

.6 Protect work during periods of suspension, regardless of reason for suspension.

1.3 SERVICES AND UTILITY SYSTEMS

.1 Consult with utility companies and other authorities having jurisdiction to ascertain the locations of existing services on or adjacent to site.

.2 Information as to the location of existing services, if shown on the Drawings, does not relieve the Contractor of their responsibility to determine the exact number and location of existing services.

.3 Give proper notices for new services as may be required. Make arrangements with authorities and utilities for service connections required.

.4 Pay any charges levied by utilities or authorities for work carried out by them in connection with this Contract, unless specified otherwise.

.5 Operate and maintain all utility systems affected by work of this Contract, until the building or specific portions thereof have been accepted by the Owner.

.6 Report existing unknown services encountered during excavation to Consultant for instructions; cut back and cap or plug unused services. Be responsible for the protection of all active services encountered and for repair of such services if damaged.

1.4 SLEEVES, SUPPORTS, AND FASTENERS

.1 Unless specified in other Sections, furnish, set and secure inserts, hangers, sleeves, fasteners, adhesives, anchors and other supports and fittings required for proper installation of work.

.2 Use exposed metal fastenings and accessories of same texture, colour and finish as base metal on which they occur.

.3 Select appropriate type of anchoring and fastening devices and in sufficient quantity and in such manner as to provide positive permanent anchorage of unit to be anchored in position. Keep exposed fasteners to a minimum, evenly spaced and neatly laid out.

.4 Fasteners shall be of permanent type. Do not use wood plugs.

.5 Fasteners which cause spalling or cracking of material to which anchorage is being made shall not be used.

1.5 CONCEALMENT

.1 Conceal ductwork, piping, conduit and wiring located in finished areas, in ceiling spaces and furred construction unless specifically noted to be exposed.

.2 If any doubt arises as to means of concealment, or intent of Contract Documents in this connection, request clarification from Consultant before proceeding with portion of work in question.

1.6 CUTTING AND PATCHING

.1 Regardless of which Section of work is responsible for any portion of cutting and patching, in each case tradesmen qualified in work being cut and patched shall be employed to ensure that it is correctly done.

.2 Any cost caused by omission or ill-timed work shall be borne by party responsible therefore.

.3 Do not endanger any work by cutting, digging or otherwise altering, and do not cut nor alter any loadbearing element without written authorization by Consultant. Provide bracing, shoring and temporary supports as required to keep construction safely supported at all times.

.4 Cut holes carefully and not larger than required after they are located by Sections requiring them, using suitable equipment and tools.

.5 Patching and making good work shall be undetectable in finished work.

1.7 WORKMANSHIP

.1 All work shall be carried out in accordance with the best trade practice, by mechanics skilled in the type of work concerned.

.2 Products, materials, systems and equipment shall be applied, installed, connected, erected, used cleaned and conditioned in accordance with the applicable manufacturer's printed directions.

.3 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions, but inform Consultant in writing prior to proceeding with affected work. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

1.8 LINES AND LEVELS

.1 Verify all elevations, lines, levels and dimensions as indicated and report errors, any conflicts, or inconsistencies to the Consultant before commencing work or as soon as discovered.

.2 Arrange to have building base lines laid out by an Ontario Land Surveyor.

.3 Accurately lay out work and establish lines and levels in accord with requirements of Contract Documents.

.4 Set up, maintain and protect permanent reference points and provide general dimensions and elevations for all Sections of Work.

1.9 DIMENSIONS

.1 Check and verify dimensions wherever referring to work. Dimensions, when pertaining to work of another Section, shall be verified with Section concerned. Details and measurements of work which is to fit or conform with work installed shall be taken at site.

.2 Do not scale Drawings. If there is ambiguity, lack of information or inconsistency, immediately consult Consultant for directions. Be responsible for extra costs involved through the disregarding of this notice.

.3 Walls, partitions and screens shall be considered as extending from floor to underside of structural deck unless specifically indicated otherwise on Drawings.

1.10 LOCATION OF FIXTURES

.1 Location of fixtures, apparatus, equipment, fittings, outlets, conduits, pipes and ducts shown or specified, but not dimensioned, shall be considered approximate.

.2 Request direction from Consultant to establish exact location. Any relocation caused by Contractor's failure to request direction from Consultant shall be done by Contractor at no extra cost. Where job conditions require reasonable changes in indicated locations and arrangements, make changes at no additional cost.

.3 Conserve space and coordinate with work of other Sections to ensure that ducts, pipes, conduits and other items will fit into allocated wall and ceiling spaces, while ensuring adequate space for access and maintenance.

.4 Where ducts, piping and conduits are permitted to be exposed they shall be neatly and uniformly laid out parallel to adjacent building lines and parallel to each other where they run in the same direction. Review exposed installations with Consultant prior to start of work. At no cost to Owner make changes to exposed work as directed by the Consultant where such work is not installed in accordance with Consultant's prior review.

.5 Except where locations are specifically noted on Drawings, install exposed mechanical and electrical fixtures including outlets, switches, thermostats, panels and other items, located on walls, in orderly and neatly laid out manner, lining up with each other and grouped together where possible. Review installation with Consultant prior to start of rough-in work. Relocate at no cost to Owner any work which does not meet this requirement.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 Be responsible for cleanliness of assigned work areas to satisfaction of Consultant. Maintain work areas in neat and orderly condition at all times.

.2 Periodically, or when directed by the Consultant, remove from work areas rubbish and waste materials.

.3 Burning or burying of rubbish and waste materials on site is not permitted.

.4 Use only cleaning materials recommended by manufacturer of surface to be cleaned.

.5 Use cleaning material only on surfaces recommended by cleaning material manufacturer.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination and Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the work occurring onsite. Provide a clear delineation of responsibilities for each sub-trade.

.2 Sequencing: Ensure that the sub-trades mobilized onsite have access to the necessary bins to facilitate the separation of solid waste streams.

.3 Scheduling: Remove full bins in a timely fashion, and ensure that empty and partially full bins are properly labeled to minimize cross-contamination.

1.3 CLEANING DURING CONSTRUCTION

.1 Remove debris, packaging and waste materials frequently.

.2 Keep dust and dirt to an acceptable level, as directed.

.3 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often if required.

.4 Clear sidewalks of snow and ice, adjacent to construction site.

1.4 FINAL CLEANING

.1 Upon completion of work, or, where work is phased, upon completion of each phase, thoroughly clean all surfaces and components. Provide professional cleaning by a recognized, established cleaning company, to allow Owner to complete final cleaning and floor preparation / build-up.

.2 Remove stains, dirt and smudges from finished surfaces.

.3 Clean exposed finished surfaces in accordance with respective material manufacturer's recommendations.

.4 Clean mechanical and electrical fixtures and other fittings of labels, wrappings, paper and other foreign material.

.5 Replace heating, ventilation and air conditioning filters if units were operated during construction. Clean inside of ducts, blowers and coils.

.6 Remove from work areas all waste and surplus materials from all areas, including roofs and ceiling spaces.

.7 Steam clean existing masonry which becomes an interior exposed wall surface.

.8 Remove snow and ice from driveways, parking areas and walks.

.9 Power wash paved surfaces.

1.5 WASTE COLLECTION AND DISPOSAL

.1 All waste materials and debris resulting from the work of this Contract shall belong to the Contractor and shall be removed from the site and legally disposed.

.2 Periodically, or when directed by the Consultant remove waste material and debris.

.3 Construction Waste:

.1 Designate an area onsite for the separation and storage of waste materials. Allow enough space to accommodate multiple bins.

.2 At a minimum, provide storage bins onsite for concrete, metal, wood, cardboard, plastic, gypsum board and mixed waste. Landclearing debris, asphalt and concrete can be stockpiled onsite, as opposed to being placed in bins, for further processing.

.3 Provide signage on each bin to identify the specific waste streams that can be placed in each.

.4 The waste separation and storage area and bins are to be kept neat, and clean, and clearly marked in order to avoid contamination of materials.

.5 Hazardous waste and hazardous materials are not within the scope of this Section and must be handled in accordance with the requirements stipulated by local regulations.

.4 Domestic Recyclables

.1 “Blue Box” receptacles shall be placed in close proximity all site trailers, and throughout the building, to collect recyclable material generated by workers. At minimum, provide receptacles for metal and glass beverage and food containers and paper products.

.2 Make arrangements with the Municipality or a receiving facility to have domestic recyclables picked up regularly.

.3 Adjacent to each “Blue Box” receptacle, provide a mixed waste receptacle in order to avoid contamination of recyclables.

.5 Separate and salvage materials suitable for recycling from general waste stream and transport to recognized recycling facility.

.6 Burying, burning, selling waste materials on site is prohibited.

.7 Disposal of liquid wastes into waterways, sewers is prohibited.

1.6 SCHEDULING

.1 Ensure that an appropriately sized bin is provided onsite for each new waste stream that is introduced onsite.

.2 Arrange for the prompt collection by, or delivery to, the appropriate recycling or reuse facility when a bin is full, or nearly full.

1.7 ONSITE QUALITY CONTROL

.1 Waste Handling:

.1 Clean and strip materials (as stipulated by the receiving facility) prior to placing in collection containers. Deliver materials free of dirt, adhesives, solvents, and petroleum contamination.

.2 Ensure that no cross-contamination has occurred in bins and receptacles. Should bins become cross-contaminated, the Contractor shall separate the waste streams prior to removal from the site. The only exception to this is if a qualified off-site sorting facility is responsible for separating the waste streams.

.3 Ensure that signage is in place and clearly visible on all bins and receptacles.

.4 Ensure that bins and receptacles are easily accessible by workers and waste haulers. Supplies, equipment and materials must never restrict access.

.5 Ensure site is free and clear of accumulated debris. If materials are being stockpiled prior to removal from the site, ensure they are located away from the building, and out of the way of typical traffic patterns.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL INSTRUCTIONS

.1 The procedures for completing Contract and acceptance by the Owner shall be in accordance with the methods prescribed by Owner.

.2 Stages will be reviewed at the Contract start-up meeting to ensure that parties understand their responsibilities. Refer to Section 01 31 19 for procedures and requirements for Contract start-up meeting.

.3 Within four (4) weeks of commencement of the Work, submit to the Consultant a list of closeout submittals required by the Contract Documents.

.4 Note that entities other than the Owner may be involved in the closeout procedures described herein, including attendance at any operation and/or maintenance training sessions required. The Owner will coordinate such attendance as required.

1.2 FINAL CLEANING

.1 Co-ordinate final clean-up with the Owner's representatives and opening requirements.

.2 In addition to requirements for cleaning-up specified in the General Conditions of the Contract, and in Section 01 11 00, include in work final cleaning by skilled cleaning specialists on completion of construction.

.3 Remove temporary protections and make good defects before commencement of final cleaning.

.4 Replace glass and mirrors that have been broken, damaged and/or etched during construction, or which are otherwise defective.

.5 Remove dust, stains, paint spots, soil, grease, fingerprints, and accumulations of construction materials, interior and exterior to the building. Perform cleaning in accordance with installer's instructions for each material. Final cleaning shall include:

.1 Washing of interior concrete floors.

.2 Cleaning and polishing of:

.1 glass;

.2 mirrors;

.3 porcelain, enamel, and finish metals;

.4 washroom accessories.

.3 Vacuum cleaning of ceilings, walls and floors.

.4 Cleaning of glazed wall surfaces.

.5 Cleaning of hardware, mechanical fixtures, lighting fixtures, cover plates, and equipment, including polishing of their finish metal, porcelain, vitreous, and glass components.

.6 Removing of visible labels left on materials, components, and equipment.

.7 Maintain cleaning until Owner has taken possession of building or portions thereof.

1.3 CLOSE-OUT SUBMITTALS

.1 Collect reviewed submittals, and assemble required closeout submittals executed by Subcontractors, Suppliers, and manufacturers. Prior to submitting closeout submittals to the Consultant, undertake the following:

.1 Review maintenance manual contents (operating, maintenance instructions, asbuilt drawings, materials) for completeness.

.2 Review in relation to Contract Price, Change Orders, Change Directives, holdbacks and other adjustments to the Contract Price.

.3 Review inspection and testing reports to verify conformance to intent of Contract Documents and that changes, repairs or replacements have been completed.

.4 Execute transition of performance bond and labour and materials payment bond to warranty period requirements.

.5 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining at time of application for completion of the Contract. Consultant will issue a final change order reflecting approved adjustments to Contract Price not previously made, if any.

.2 No later than then (10) working days prior to submitting request for Consultant's review to determine if Substantial Performance of the Work has been achieved, submit to the Consultant the closeout submittals specified in this section, including, but not limited to, reviewed shop drawings, Product data sheets, samples, operating instructions, as-built records, and fully executed warranties and guarantees.

.3 For items of the Work delayed materially beyond date of Substantial Performance of the Work, provide updated closeout submittals within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.

.4 Neither the Consultant's review to determine if Substantial Performance of the Work has been achieved, nor acceptance of the Work, will take place until receipt, by the Consultant, of acceptable copies of the closeout submittals required herein and by the Contract Documents.

.5 Maintenance materials:

.1 Deliver to a location and at a time specified by the Owner, organize items in Owner's storage area as directed by the Owner, and as follows:

.5 Use unbroken cartons, or if not supplied in cartons, material shall be strongly packaged.

.6 Clearly mark cartons or packaging as to contents, project name, and Supplier.

.7 If applicable give colour and finish, room number or area where material is used.

.2 Replace incorrect or damaged maintenance materials delivered to Owner, including damage through shipment.

.3 Provide a typed inventory list of maintenance materials prior to Substantial Performance of the Work application. List all items, complete with quantities, and storage locations.

.4 Establish a master list identifying maintenance materials and maintain a log of when materials are turned over to Owner and signing authority for acceptance of materials on behalf of Owner. Master list and log shall be in a format acceptable to the Owner.

.6 Owner communication material:

.1 Deliver Owner communication material that was applied to hoarding and/or temporary barriers and enclosures during the Work. Salvage such material in accordance with Section 01 11 00.

1.4 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Deficiency review:

.1 Neither Owner nor Consultant will be responsible for preparation or issuance of extensive lists of deficiencies. Contractor assumes prime responsibility for ensuring that items shown and described in the Contract Documents are complete. Any reviews to approve the certificate of Substantial Performance of the Work will be immediately cancelled if it becomes obvious to the Consultant that extensive deficiencies are outstanding.

.2 The Contractor shall conduct an inspection of the Work to identify deficiencies and defects, which shall be repaired. When the Contractor considers that the Work is substantially performed, the Contractor shall prepare and submit to the Consultant a comprehensive list of items to be completed or corrected and apply for a review of the Work by the Consultant to determine if Substantial Performance of the Work has been achieved.

.3 The Contractor's request described above shall include a statement by Contractor that the Work to be reviewed by Consultant for deficiencies is, to the best of the Contractor's knowledge, in compliance with Contract Documents, reviewed shop drawings, and samples, and that deficiencies and defects previously noted by Consultant have been repaired.

.4 No later than fifteen (15) working days after the receipt of the Contractor's request described above, but contingent upon the prior receipt, by the Consultant, of the closeout submittals in the manner and form specified in this section, the Consultant and the Contractor will review the Work to identify any defects or deficiencies. If necessary, the Contractor shall tabulate a list of deficiencies to be corrected prior to Substantial Performance of the Work being certified by the Consultant.

.5 During review, the Consultant and the Contractor will decide which deficiencies or defects must be rectified before Substantial Performance of the Work can be certified, and which defects are to be treated as warranty items.

.6 Provide a schedule of planned deficiency review having regard to the foregoing.

.2 Certification of Substantial Performance of the Work:

.1 When the Consultant considers that the deficiencies and defects have been completed and that it appears that the requirements of the Contract Documents have been substantially performed, the Consultant shall issue a certificate of Substantial Performance of the Work to the Contractor, stating the date of Substantial Performance of the Work.

.2 The certificate of Substantial Performance of the Work shall be prepared in form required by Construction Lien Act.

.3 Final Inspection for completion of the Contract:

.1 Deficiencies and defects shall be made good before the Contractor submits a written request for final review of the Work and before the Contract is considered complete.

.2 When Contractor is satisfied that the Work is complete, and after the Contractor has reviewed the Work to verify its completion in accordance with the requirements of the Contract Documents, the Contractor shall

submit a written request for a final review by the Consultant, who in turn will notify the Owner.

.3 If there are any deficiencies identified as a result of this review, they shall be listed by the Consultant and submitted to the Contractor. This list shall be recognized as the final deficiency list for purposes of acceptance of the Work under the Contract.

.4 Such deficiencies shall be corrected by a date mutually agreed upon between Consultant and the Contractor, unless a specific date is required by Contract, and a further review by the Consultant shall be called for by the Contractor following his own review to take place within seven (7) days from date of request.

.5 Contractor shall thereafter submit invoice for final payment.

.6 Money shall be withheld for deficiency work and will be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

.4 If the Contractor needs to return to the Place of the Work to complete deficiencies after the Owner has taken possession, the Contractor shall provide the Owner with a minimum of one (1) week's prior notice of such requirement.

1.5 WARRANTY PERIOD

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

.2 At the beginning of the 12th month after Substantial Performance of the Work, the Owner, Contractor and Consultant, along with key Subcontractors as designated, shall carry out a complete review of the built project to determine which deficiencies are to be rectified under the warranty.

.3 Contractor shall be responsible for timely written notification of Owner, and Consultant a minimum of three (3) months prior to such end of warranty period inspection and any delay in such notification shall extend such warranty period until proper notification is received by Owner, and Consultant.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 WARRANTIES

.1 Warranties shall be in accordance with the General Conditions, as amended, and as follows:

.1 Warranties shall commence at date of Substantial Performance of the Work.

.2 Submit warranties for applicable items, signed by the applicable company responsible for each warranty.

.3 Submit warranties on form approved by Owner including, but not limited to, the following information:

.1 Name and address of Project.

.2 Warranty commencement date (date of Substantial Performance of the Work).

.3 Duration of warranty.

.4 Clear indication of what is being warranted and what remedial action will be taken under warranty.

.5 Authorized signature and seal of company providing each warranty.

.4 Owner shall be named in manufacturer's Product warranties. Submit on relevant Product manufacturer's standard warranty or guarantee form.

2 PRODUCTS – Not Used

3 EXECUTION – Not Used

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Unit Masonry

.2 Section 05 41 00: Structural Metal Stud Framing

.3 Section 05 50 00: Metal Fabrications

.4 Division 20: Mechanical

.5 Division 26: Electrical

.6 Section 31 50 00: Excavation Support and Protection

1.3 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI):

.1 ANSI A10.8-2011, Safety Requirements for Scaffolding and Comparison Document

.2 Canadian Standards Association (CSA):

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

.3 National Fire Protection Association (NFPA):

.1 NFPA 241-2013, Standard for Safeguarding Construction, Alteration, and Demolition Operations

.4 Provincial Legislation:

.1 Legislation specific to Authority Having Jurisdiction for work governed by this Section

1.4 DEFINITIONS

.1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.

.2 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

.3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

.4 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

1.5 DESCRIPTION

.1 Review drawings, site conditions, and other specification sections to ascertain the extent and nature of work of this section.

.2 The Work of this Section includes the following:

.1 Demolish and removal of portions of existing walls, and roofing materials, as indicated on drawings.

.2 Disconnect/cap existing service in areas of demolition.

.3 Dispose of demolished materials except where required to be salvaged or reused.

.4 Refer to demolition notes indicated on drawings.

1.6 EXAMINATION

.1 Visit and examine the site and note all characteristics and irregularities affecting Work of this Section. Submit a pre-demolition inspection report. Ensure the Owner of premises being inspected is represented at inspection.

.2 Where appropriate prepare a photographic or video record of existing conditions, particularly of existing work scheduled to remain.

.3 Where applicable, examine adjacent tenancies not part of the scope of work. Determine extent of protection required to areas and related components not subject to demolition.

1.7 SUBMITTALS

.1 Provide required information in accordance with Section 01 33 00.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Prepare schedule in conjunction with overall project schedule, and outline proposed methods in writing. Obtain approval before commencing demolition work, and indicate the following:

.1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity

.2 Interruption of utility services

.3 Coordination for shutoff, capping, and continuation of utility services

1.8 QUALITY ASSURANCE

.1 Conform to requirements of all authorities having jurisdiction.

.2 Comply with applicable requirements of CSA S350-M "Code of Practice for Safety in Demolition of Structures".

.3 Work of this Contract shall be executed by an approved company having a minimum of five (5) years continuous experience and able to deploy adequate equipment and skilled personnel to complete work expediently in an efficient and orderly manner.

.4 Perform cutting and coring, where applicable, by a firm specializing in this type of work, able to produce evidence of successful completion of similar work over a period of at least five (5) years immediately prior to date of contract.

.5 Apply for, secure, arrange and pay for all permits, notices and inspections necessary for proper execution and completion of work in this Section.

.6 The Board will provide and pay for the building permit and plumbing permit

1.9 PROTECTION

.1 Prevent movement or settlement of adjacent work. Provide and place bracing or shoring and be responsible for safety and support of such work. Be liable for any such movement or settlement, and any damage or injury caused.

.2 Cease operations and notify Consultant if safety of any adjacent work or structure appears to be endangered. Take all precautions to support the structure. Do not resume operations until reviewed with the Consultant.

.3 Prevailing weather conditions and weather forecasts shall be considered. Demolition work shall not proceed when weather conditions constitute a hazard to the workers and site.

.4 Prevent damage of surrounding vegetation by construction. Install tree protection barriers to trees that are scheduled to remain, as detailed on the drawings.

.5 Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.

.6 Temporarily suspended work that is without continuous supervision shall be closed to prevent entrance of unauthorized persons.

1.10 REMAINING AND ADJACENT STRUCTURES

.1 Do not interfere with, encumber, endanger or create nuisance, from any cause due to demolition work, to public property or any adjacent attached and/or detached structures in possession of Owner or others, which are to remain, whether occupied or unoccupied during this work.

.2 Make good damage to such structures resulting from work under this Section at no cost to Owner. Make good adjacent building surfaces damaged by work of this Section.

1.11 PROTECTION OF SERVICES AND STRUCTURES

.1 Take necessary precautions to guard against movement, settlement or collapse of existing adjacent utility services, public property and/or structures, whether to remain or not. If these or other unforeseen conditions develop, take immediate emergency measures, report to Consultant, confirm in writing, and await instructions before proceeding with any further related demolition work.

.2 Prior to saw cutting or core drilling of existing concrete slabs, use ground penetrating radar (GPR) to detect utilities and structural reinforcing. Concrete X-Rays can be used when access to both sides of concrete slab is accessible for placement of required x-ray film.

1.12 EXISTING SERVICES

.1 Prior to start of demolition disconnect all electrical and telephone service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment which must remain energized to serve other areas during period of demolition. Disconnect electrical and telephone service lines in demolition areas to the requirements of local authority having jurisdiction.

.2 In each case, notify the affected utility company in advance and obtain approval where required before commencing with the work on main services.

.3 Arrange with utility companies for locating of such services and for disconnection of existing services owned by utility companies and which will be disconnected by said utility companies, provided such services do not interfere with adjacent tenancy operators.

.4 Remove sewer and water lines where required within existing building as deemed necessary, and cap to prevent leakage, in accordance with authorities having jurisdiction.

.5 Existing services are to be maintained where required for normal tenant operation during regular hours of operation and/or as deemed necessary by Owner.

2 PRODUCTS

2.1 DEBRIS, SALVAGED MATERIAL AND EQUIPMENT DISPOSAL

.1 All materials and or equipment salvaged from demolition work becomes property of demolition Contractor unless designated otherwise.

.2 At no cost to Owner repair or replace material and/or equipment scheduled to remain which is damaged by demolition work. Do not sell any salvaged material or equipment directly from project site.

.3 Remove waste debris continually and entirely from project site during demolition work. Do not load vehicles transporting such debris beyond their safe capacity or in a manner which might cause spillage on public or private property. If spillage does occur, clean up immediately to prevent traffic hazards or nuisance.

2.2 PROTECTION

.1 Temporary Protection:

.1 Erect temporary hoarding protection, as indicated in Section 01 56 26, to enclose openings in exterior walls, and/or provide security to partially occupied interior spaces.

.2 Erect temporary dust screens, as indicated in Section 01 50 00, to prevent dust and debris to enter areas of the building which are not scheduled for demolition. Remove temporary dust screens when no longer required.

2.3 REPAIR MATERIALS

.1 Use repair materials identical to existing materials:

.1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

.2 Use a material whose installed performance equals or surpasses that of existing material.

.3 Comply with material and installation requirements specified in individual Specification Sections.

.2 Floor Patching and Levelling Compounds: Cement based, trowelable, self-levelling compounds compatible with specified floor finishes; gypsum based products are not acceptable for work of this Section; in accordance with Section 03 35 00.

.3 Concrete Unit Masonry: Lightweight concrete masonry units, and mortar, cut and trimmed to fit existing opening to be filled. Provide standard hollow core units, square end units and bond beam units as indicated on drawings.

.4 Brick: Install brick and mortar, cut and trimmed to fit existing opening to be filled, once demolition of hollow metal door and frame is completed. Match brick and mortar to existing adjacent materials as approved by the Consultant. Provide ties and accessories as required to complete the installation.

.5 Gypsum Board Patching Compounds: Joint compound to ASTM C475, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes in accordance with Section 09 21 16 – Gypsum Board Assemblies.

.6 Fireproofing: Patch and repair all fireproofing damaged during demolition of adjacent surfaces with compatible fireproofing materials. Provide test reports from fireproofing

manufacture warranting installation, adhesion and compatibility between existing and new fireproofing materials.

.7 Roofing: Remove no more existing roofing than can be covered in one day by new roofing. Refer to Section 07 51 00 for new roofing requirements.

2.4 EXISTING MATERIALS

.1 Items to be retained and relocated for use in new construction include, but are not limited to the following:

.1 Playground play structure

.2 Playground swings

.3 Basketball hoops

.4 Lockers and cabinets

.5 Confirm with Consultant any materials that appear to be in re-usable condition prior to disposal.

.6 Confirm with Consultant any materials scheduled for re-use that are not in re-usable condition prior to installation.

3 EXECUTION

3.1 GENERAL

.1 Exercise caution in dismantling, disconnecting of work adjacent to existing work designated to remain.

.2 Carry out demolition in a manner to cause as little inconvenience to the adjacent properties as possible.

.3 Carry out demolition in an orderly and careful manner.

.4 Demolition by explosives is not permitted.

.5 Selling or burning of materials on site is not permitted.

.6 Sprinkle exterior debris with water to prevent dust. Do not cause flooding, contaminated run-off or icing. Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.

.7 Lower waste materials in a controlled manner; do not drop or throw materials from heights.

.8 At end of each day's work, leave in safe condition so that no part is in danger of toppling or falling.

3.2 SAFETY AND SECURITY

.1 Maintain security of the building at all times during demolition work.

.2 Provide and maintain fire prevention equipment and alarms accessible during demolition.

3.3 ACCESS ROUTES

.1 Restrict operations to designated access routes.

.2 Do not obstruct roads, parking lots, sidewalks, hydrants and the like.

3.4 SELECTIVE DEMOLITION

.1 Provide necessary shoring and supports to assure safety of structure prior to cutting and coring.

.2 Where practical, sawcut and remove material as required.

.3 Where sawcutting is not appropriate, use suitable hand tools.

.4 Demolish, cut-out and remove from site all other work noted on drawings or required to permit new construction.

.5 Do not allow water to accumulate or flow beyond work area. Provide receptacles and mop-up as work proceeds.

.6 Fill all openings in concrete block walls with concrete masonry units, coursing to match existing, prepare ready to receive new finishes to match existing.

.1 Provide bond beams in new openings cut into existing concrete masonry unit walls.

.2 Provide finished end masonry units to patch and repair for new jamb sections in existing concrete masonry unit walls.

.7 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.

.8 Demolish existing flooring and wall finishes, and adhesive remnants as follows:

.1 Floor and wall substrate shall be smooth, free from ridges and depressions, and adhesive remnants that could telegraph through new flooring and wall finishes.

.9 Demolish completely all ceiling panels and grid as indicated.

.10 Remove all wall coverings scheduled for demolition. Patch and repair wall surfaces with skim coat of gypsum board joint compound leaving wall surfaces smooth and even ready for new wall finishes.

.11 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.

.1 Prepare existing surfaces schedule to receive new finish by grinding, filling, over-coating, stripping, washing, etching, shot blasting or other chemical or mechanical means, as required to ensure satisfactory installation of new finish.

3.5 PATCHING AND REPAIRING

.1 Floors and Walls:

.1 Where walls or partitions that are demolished extend from one finished area into another, patch and repair floor and wall surfaces in the new space.

.2 Provide an level and smooth surface having uniform finish colour, texture, and appearance.

.3 Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

.4 Patch with durable seams that are as invisible as possible.

.5 Provide materials and comply with installation requirements specified in other Sections of these Specifications.

.6 Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.

.7 Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

.2 Ceilings: patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

.3 Exterior Walls: Where existing doors and/or windows are schedule to be removed during demolition, patch and repair exterior walls using similar wall construction techniques as adjacent wall construction. Ensure compatibility between insulation, air barrier and vapour retarder, providing continuous air and vapour control and wall R-Value between existing and new construction. Provide exterior and interior finish materials, matching existing adjacent materials, to provide an even-plane surface of uniform appearance.

3.6 EXCESSIVE DEMOLITION

.1 Where excessive demolition occurs, be responsible for cost of replacing such work.

.2 Consultant shall determine extent of such 'over-demolition' and method of rectification.

3.7 COMPLETION

.1 Leave project site as directed, reasonably clean and presentable, free from above grade debris, any salvaged material and/or equipment except those designated to remain.

.2 Maintain access to exits clean and free of obstruction during removal of debris.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 Work of this Section includes the following:

- .1 Requirements for concrete floor additives such as:
  - .1 Penetrating sealer
  - .2 Hardener additive
- .2 Testing and measurement for floor flatness and levelness,
- .3 Trowelling, levelling, and floating of floor surfaces for ready for applied finishes.

1.3 RELATED REQUIREMENTS

.1 Section 05 50 00: Metal Fabrications

.2 Section 32 16 13: Curbs and Sidewalks

1.4 DEFINITIONS

.1 Floor Classifications: Classification of concrete floor slabs based on their intended use, methods of finishing and finish materials applied to flooring as denoted by the F-rating below, and as follows:

- .1 Single Course Floor: Floors placed in a single course with final finishing applied to properly levelled concrete.

.2 Finish or Finishes: Materials applied to finished concrete surface, i.e.: stained or coloured concrete, carpet, resilient flooring or ceramic tile.

.3 Finishing: Methods, tools and equipment employed to achieve levelness or surface flatness for shored slabs and slabs-on-grade, and durability indicated and as follows:

- .1 F3-Finishing: Floors having a straightedge value of ±1.6 mm over 3048 mm (1/6” over 10’); similar to CSA A23.1 Class C Slab Finishing.

1.5 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM):

- .1 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compound for Curing Concrete.
- .2 ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.

.2 American Concrete Institute (ACI):

- .1 ACI 117-2010, Specifications for Tolerances for Concrete Construction and Materials and Commentary
- .2 ACI 302.1R-15, Guide for Floor and Slab Construction

.3 Canadian Standards Association (CSA):

- .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.4 International Concrete Repair Institute (ICRI):

.1 ICRI 310.2R-2013, Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair

1.6 ADMINISTRATION REQUIREMENTS

.1 Coordination: Coordinate a meeting between the Contractor, Subcontractor responsible for concrete placement, and the Consultant to determine Site Quality Control testing section borders and sample measurement line locations, method of measurement, and accuracy requirements of the measuring devices.

.2 Pre-Construction Meetings: Arrange meeting with Contractor, Subcontractor for work of this Section and other Subcontractors affected by work of this Section to discuss effects and issues governing installation of concrete finishing materials; prepare an outline agenda for meeting in accordance with Section 01 31 19 Project Meetings.

1.7 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit manufacturers product data for each materials specified including recommended application rates and methods of installation.

.3 Informational Submittals: Provide the following submittals during the course of the work:

.1 Site Quality Control Submittals: Submit results for straightedge measurements to demonstrate compliance with specified tolerances. Record the following information on a drawing indicating floor slab layout, column locations and slab penetrations:

.1 Indicate variance from specified straightedge measurements as a + or - value.

.2 Failed tests in excess of 50% of the straightedge will require the Subcontractor to flash patch floor to achieve specified tolerance; example of tolerance failure.

.3 Slabs-On-Grade: Measurement of 1.6mm (1/16”) or greater than ±6mm (1/4”) measurement will be considered as a failed test and will require flash patching.

1.8 PROJECT CLOSEOUT SUBMISSIONS

.1 Operation and Maintenance Data: Submit detailed cleaning and maintenance instructions for concrete densifier products, and instruct Owner in proper care and maintenance of specified floor finishes, including a complete list of floor care products that will be required for ongoing maintenance, in accordance with Section 01 33 00.

1.9 QUALITY ASSURANCE

.1 Qualifications:

.1 Work of this Section shall be executed by a company that has adequate equipment and skilled tradesmen to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified, during a period of at least the immediate past five years.

.2 Co-operation:

.1 Ensure that concrete supplied for slabs contains no admixtures which would be incompatible with floor finishing materials.

1.10 SITE CONDITIONS

.1 Environmental Requirements:

.1 Ensure that adequate temporary heating is provided as required for cold weather work.

.2 Provide adequate moisture, sun shades and wind barriers to prevent too rapid drying of concrete during hot weather.

.2 Protection:

.1 Ensure that finished concrete floor areas are protected from abrasion from foot or wheeled traffic, and from damage caused by spillage of oil or other harmful materials.

2 PRODUCTS

2.1 MATERIALS

.1 Curing Sheet: 2 mil polyethylene sheet conforming to CGSB 51-GP-51M or laminated waterproof kraft paper.

.2 Liquid Applied Penetrating Sealer: Clear water based silane micro emulsion penetrating concrete sealer formulated to prevent water and chloride intrusion into concrete surfaces.

.1 Basis of Design Materials:

.1 Cipadam S-40 by CPD Construction Products

.2 Sikagard SN40 LO-VOC by Sika Canada Inc.

.3 MasterProtect H440 HZ by BASF.

.3 Hardener Aggregate: Pre-mixed, non-metallic aggregate, dry shake hardener.

.1 Basis of Design Materials:

.1 Floor Hardener Pre-Mix by CPD Construction Products

.2 Diamag 7 by Sika Canada Inc.

.3 MasterTop 100 by BASF.

.4 Underlayment:

.1 Concrete Substructure: Cementitious, self levelling, single component, polymer modified underlayment and manufacturer's recommended primer, for application thicknesses to a minimum feather edge to 13 mm (½"); acceptable.

.1 Basis of Design Materials:

.1 Planipatch by MAPEI Canada Inc.

.2 Sika Level-125 CA by Sika Canada Ltd.

.3 Floor-Top STG by W.R. Meadows of Canada

.5 Patching and Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, rapid curing, early strength floor patching compounds having high adhesion, for application in thicknesses to a minimum of 1/8" to 1".

.1 Basis of Design Materials:

.1 Mapecem 101 by MAPEI Canada Inc.

.2 SikaQuick 1000 by Sika Canada Ltd.

.3 Meadow-Crete H by W.R. Meadows of Canada

.6 Joint Sealant: Refer to Section 07 92 00 Joint Sealants.

3 EXECUTION

3.1 EXAMINATION

.1 Before commencing work, ensure that surfaces are acceptable to receive and maintain concrete finishing, and that specified installation will be achieved.

3.2 FINISHING FLOORS AND SLABS

.1 Finish floors and slabs in accordance with CSA A23.1 and ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces; do not wet concrete surfaces.

3.3 INSTALLATION

.1 Concrete Finishing:

.1 Roll or tamp concrete to force coarse aggregate into concrete mix and then screed.

.2 Bring surface to true grade by floating.

.3 Steel trowel to a true and even surface.

.4 Follow with second steel trowelling to produce a smooth burnished surface.

.2 Sealed Floors:

.1 Seal all exposed concrete floors. Apply sealer as recommended by manufacturer. Install bond breaker of silica sand, polyethylene film strip or foam filler in bottom of joints.

.3 Hardened Floors:

.1 Apply hardener aggregate to floor surfaces indicated on drawings and/or schedules in two shakes, half of the aggregate for each shake.

.2 Apply first shake when the concrete is firm enough to support workmen and equipment and when no standing water is present. Mechanically float aggregate into surface.

.3 Apply the second shake and mechanically float as specified above for finishing.

.4 Apply total amount of aggregate at rate of 60-100 lbs. per 100 sq.ft. of floor area.

.5 Cure concrete as specified in CAN/CSA-A23.1/A23.2-94, and as indicated in Paragraph 3.4 - Concrete Finishing Schedule. Ensure that no curing compound is used which is detrimental to bond of bedding for finish flooring or finish flooring materials.

.4 Floor Underlayment:

.1 Leak Prevention: Fill cracks and voids in subfloor where leakage of slurry could occur using suitable quick setting patch material or caulk, as recommended by underlayment manufacturer.

.2 Prime substrate according to manufacturers recommendations.

.3 Installation shall not begin until building is enclosed.

.4 Install sound attenuation mat where required on drawings, complete with isolation strips, prior to pouring floor underlayment.

.5 Mix underlayment in accordance with manufacturers written instructions and test mix for slump using 100 mm (4") cylinder.

.6 Pour underlayment to recommended thickness and immediately spread and screen to smooth surface.

.5 Control Joints:

.1 As soon as concrete surface is firm enough not to be torn or damaged by cutting, cut 5 mm (3/16") wide control joints into surface of concrete with abrasive blade power saw.

.2 Locate control joints on centre lines of columns, and at maximum spacing of 6096 mm (20') in both directions unless noted.

.3 Cut joints in slabs on grade 38 mm (1-1/2") deep.

.4 Within four (4) weeks of cutting joints, fill them with joint sealant. Completely clean side joint surfaces of dirt, oil, grease, and similar contaminants. Mask floor surfaces at joints while pouring. Prime side joint surfaces with compatible primer if surfaces are not completely dry.

.6 Cast-in all items as supplied by other Sections.

3.4 PATCHING AND REFINISHING

.1 Before completion of project, patch and refinish defective surfaces to match surrounding areas with no discernible variation in appearance.

3.5 CONCRETE FINISHING SCHEDULE

.1 Exposed Concrete:

.1 Steel trowel finish, cured by liquid curing-sealing compound.

.2 For Resilient Tile Flooring:

.1 Steel trowel finish, cured by compatible curing compound, curing sheet or moist curing.

.3 For Ceramic Tile and Quarry Tile:

.1 Installed with thin set mortar: light steel trowel finish, cured by curing sheet or moist curing.

.4 For Depressed Slabs:

.1 Rough broom finish, cured by curing sheet or moist curing.

.5 Exterior Concrete Sidewalks and Ramps:

.1 Broom finish for traction.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

.2 Conform to requirements of Division 4 Section Masonry Procedures.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Unit Masonry

1.3 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA):

.1 CSA A179-04 (R2009), Mortar and Grout for Unit Masonry

.2 CSA S304.1-04 (R2010), Design of Masonry Structures

.2 American Society for Testing of Materials (ASTM):

.1 ASTM C270-12, Standard Specification for Mortar for Unit Masonry.

1.4 QUALITY ASSURANCE

.1 Do mortar and grout work in accordance with CSA A179 except where specified otherwise.

.2 Use same brands of materials and source of aggregate for entire project.

.3 Irregularity in mortar joints for wall faces exposed or painted in the completed work: Not be noticeable when viewed from a distance of 4500 mm (15'-0").

2 PRODUCTS

2.1 MATERIALS

.1 Cement: Normal Portland, CAN/CSA-A3001, Type GU.

.2 Hydrated Lime: ASTM C207; Type S.

.3 Aggregate: CSA A179, except that the maximum allowable percentage passing 600 um (No. 30) sieve shall be 80% and maximum passing 300 um (No. 50) sieve shall be 50%.

.4 Integral Water Repellent Admixture: Liquid polymeric admixture added to mortar during mortar mixing in accordance with manufacturer's recommendations, provide Class E Rating when tested in accordance with ASTM E514.

.1 Basis of Design Product: Dry Block System by GCP Applied Technologies.

2.2 MORTAR TYPES

.1 Mortar and Grout, General: CSA A179.

.2 Mortar for Exterior Masonry Above Grade.

.1 Loadbearing: Type S.

.2 Non-Loadbearing: Type N.

.3 Parapet Walls, Chimneys, Unprotected Walls: Type S.

.3 Mortar for Foundation Walls, Manholes, Sewers, Pavements, Walks, Patios and Other Exterior Masonry at or Below Grade: Type S.

.4 Mortar for Interior Masonry.

.1 Loadbearing: Type S.

.2 Non-Loadbearing: Type N.

.5 Non-Staining Mortar: Use non-staining masonry cement for cementitious portion of specified mortar type.

.6 Parging Mortar: Type N.

2.3 MIXES

.1 Measure and mix mortar materials based on CSA A179 Proportion Specifications.

.2 Use Portland cement in mortar for exterior masonry work and masonry cement for interior masonry work.

.3 Incorporate admixtures into mixes in accordance with manufacturer's instructions.

.4 Do not mix different types of mortar or grout in the same mixer unless the mixer is thoroughly cleaned first.

.5 Type N Mortar: At Contractor’s option, one of the following:

.1 Pre-Mixed Mortar: CSA A179, portland cement/lime/aggregate, Type N, by St. Lawrence Cement Company, Canada Cement, St. Mary Cement or Lake Ontario Cement Ltd. Mix, use and store in accordance with manufacturer's instructions to produce small batches for immediate use only. Discard mixed mortar after 2 hours.

.2 Site Silo Mix: CSA A179, portland cement/lime/aggregate, Type N, by Mega-Mix Ltd. or Max-Mix Ltd. or Jiffy Concrete Products. Mix required amount from site silo as required. Take representative samples for testing consistency of strength in accordance with CSA A179. Use mortar within 2 hours after mixing at temperature of 26 deg C (79 deg F), or 2-1/2 hours at temperatures under 10 deg C (50 deg F).

.6 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.

3 EXECUTION

3.1 APPLICATION

.1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.

.2 Grouting: Do not place grout until height of masonry to be grouted has attained enough strength to resist grout pressure.

.1 Comply with requirements in CSA 371 for cleanouts and for grout placement, including minimum grout space and maximum pour height for low lift grouting.

.3 Parging: Apply parging in uniform coating not less than total 10 mm (3/8”) thick.

3.2 REPOINTING

.1 Repoint defective joints.

.2 Cut back joints 13 mm (1/2”) taking care not to damage units. Remove dust and loose materials by brushing or by water jet. If water jet is used, allow excess water to drain before repointing.

.3 Repoint with same mix and colour as original.

.4 Pack mortar tightly in thin layers, and tool joint to match non defective joints.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section includes supply and installation of unit masonry assemblies consisting of the following:

- .1 Veneer Brick
- .2 Architectural Concrete Masonry Units (CMUs)
- .3 Fire Rated Concrete Masonry Units (CMUs)
- .4 Precast Trims
- .5 Reinforcing steel
- .6 Masonry Joint Reinforcement
- .7 Ties and Anchors
- .8 Embedded Flashing
- .9 Miscellaneous Masonry Accessories

1.3 RELATED REQUIREMENTS

.1	Section 05 41 00:	Structural Metal Stud Framing
.2	Section 05 50 00:	Metal Fabrications
.3	Section 07 21 00:	Thermal Insulation
.4	Section 07 27 13:	Modified Bituminous Sheet Air Barriers
.5	Section 07 62 00:	Sheet Metal Flashing and Trim
.6	Section 07 92 00:	Joint Sealants
.7	Section 08 11 00:	Metal Doors and Frames

1.4 REFERENCE STANDARDS

.1 Brick Institute Association (BIA)

- .1 BIA Technical Notes 20, Cleaning Brickwork
- .2 BIA Technical Notes 23A - Efflorescence, Causes and Prevention

.2 Canadian Standards Association (CSA):

- .1 CSA A165 Series-04 (R2009), CSA Standards on Concrete Masonry Units
- .2 CSA A179-04 (R2009), Mortar and Grout for Unit Masonry
- .3 CSA A370-04 (R2009), Connectors for Masonry
- .4 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings
- .5 CSA S304.1-04 (R2010), Design of Masonry Structures
- .6 CSA W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction

.3 American Society for Testing of Materials (ASTM):

- .1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

.2 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

.3 ASTM A496/A496M-07, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement

.4 ASTM A563-07a, Standard Specification for Carbon and Alloy Steel Nuts

.5 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.6 ASTM A1011/A1011M-12, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

.7 ASTM C67-11, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.

.8 ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes

.9 ASTM C270-12, Standard Specification for Mortar for Unit Masonry.

.10 ASTM C494-11, Standard Specification for Chemical Admixtures for Concrete.

.11 ASTM E488/E488M-10, Standard Test Methods for Strength of Anchors in Concrete Elements

.12 ASTM E514/E514M-11, Standard Test Method for Water Penetration and Leakage Through Masonry

.4 Underwriters Laboratories of Canada (ULC):

.1 ULC List of Equipment and Materials for Fire Rated Construction

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Construction Conference: Arrange a site meeting attended by the contractor's superintendent, the Subcontractor's representative and foreman for this project, the Consultant, materials supplier(s), and other relevant personal before commencement of work for this Section; agenda for meeting will include; but not be limited to, the following:

.1 Confirmation of specifications and details for the project

.2 Required mortar, grout and concrete testing, batch control and grouting procedures

.3 Installation requirements of air/vapour membranes and insulation and coordination with other components of the Work

.4 Confirmation of cavity compartmentalization and drainage requirements

.5 Confirmation of appearance of exposed block lintels

.6 Confirmation of reinforcement at corners and wall intersections

.7 Coordination of interior and exterior crack control measures

.8 Confirmation of trowelled or tooled joints to concealed and exposed masonry faces

.9 Confirmation of methods for keeping mortar out of cavity space

.10 Confirmation of methods for controlling efflorescence during construction

.11 Confirmation of membranes and membrane flashing materials and details used for construction

.12 Review of submitted masonry unit samples

.13 Review of hot and cold weather requirements

.2 Coordination: Coordinate components of the work of this Section with work performed by other Sections including; but not limited to, the following:

.1 Rain Screen Wall Construction:

.1 Masonry veneer forms a part of the exterior rain screen and protective facing.

.2 Construct assembly to allow for ventilation, drainage and pressure equalization of the voids between the veneer and the insulation with the outside pressures.

.3 Construct cavity space divided into separate compartments as a means of controlling these pressure differences within the building envelope.

.2 Steel Support Angles and Brackets:

.1 Coordinate requirements for structural steel support angles and brackets supplied and installed onto the building structure by Section 05 50 00.

.2 Provide requirements for supply of loose steel lintels and shelf angles installed by this section to Section 05 50 00.

.3 Sheet Metal Flashings and Trim:

.1 Coordinate installation of prefinished sheet metal through flashings with Section 07 62 00.

1.6 WORK INSTALLED BUT SUPPLIED BY OTHERS

.1 Build into masonry elements inserts, anchors, bolts, sleeves and other items supplied by other Sections and which are required for installation and performance of work of other Sections.

.2 Install loose steel lintels required for support of masonry elements.

.3 Install steel door frames and access doors occurring in masonry elements.

.4 Install reinforcing steel and concrete fill into block lintels.

.5 Install precast concrete sills.

1.7 QUALITY ASSURANCE

.1 Meet requirements of CSA A370-04, CSA A371-04 and CSA S304.1-04.

.2 Ensure that work is executed under the continuous supervision and direction of a competent foreperson.

.3 Comply with requirements of Section 01 45 00 when constructing fire rated walls and partitions. Solidly fill around beams and joists penetrating fire rated walls/ partitions in accord with requirements of Ontario Building Code.

.4 Masonry units used in partitions / walls designated to provide a fire separation shall be of thickness and material required to achieve required rating. Hollow masonry units used in fire separation shall have the necessary percentage of solid material to meet required rating. Concrete block used in fire separation shall be suitably identified to permit verification of fire resistance rating.

1.8 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00.

.2 Submit samples of each type masonry accessory required, including but not limited to horizontal reinforcing, ties, weep hole inserts, dampproof coursing, mortar dropping control device.

.3 Shop Drawings: Submit shop drawings indicating the following:

.1 Indicate sizes, profiles, coursing, and locations of special shapes for concrete masonry units and cladding.

.2 Indicate sizes, profiles, and locations of each stone trim unit required.

.3 Detail corner units, end dam units, and other special applications for fabricated flashings.

.4 Samples for Verification: Submit samples for verification for each type and colour of the following:

.1 Decorative masonry cladding units, in the form of small scale units.

.2 Architectural concrete block units, in the form of small scale units.

.5 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Submit ULC Assembly Listings and Materials cut sheets for fire rated assemblies as follows:

.1 Not later than 30 working days following Award of Contract, submit copies of ULC Assembly and Materials Listing for indicating ULC Number and how assembly meets the rating criteria for assemblies listed on drawings or meets requirements of Supplementary Standard SB-3 of Ontario Building Code.

.2 Use the same system and material as would be required for a tested assembly for the project; ULC Listings are tested with the specific materials indicated; substitutions will not be permitted unless evidence of equivalency is confirmed.

.3 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site; include manufacturer's printed instructions for installation.

.6 Certificates: Submit statements of material properties indicating compliance with specified requirements for each type and size of the following:

.1 Masonry Units:

.1 Include material test reports substantiating compliance with requirements.

.2 Include ULC Listings for fire resistance rated materials and construction equivalent to assemblies with indicated on drawings indicating fire resistance ratings.

.2 Cementitious Materials:

.1 Include brand, type, and name of manufacturer for site mixed mortar materials.

.2 Include description of type and proportions of ingredients for pre-blended, dry mortar mixes.

.3 Include description of type and proportions of ingredients for grout mixes.

.3 Accessories:

.1 Reinforcing bars

.2 Joint reinforcement

.3 Anchors, ties, and metal accessories

.4 Site Quality Control Submissions: Submit detailed description of methods, materials, and equipment used in accordance with cold or hot weather requirements; and proposed unit masonry cleaning techniques.

1.9 SITE MOCK-UPS

.1 Construct sample panel of an exposed face brick/architectural block and block cavity back-up wall including reinforcement, insulation, air barrier, flashings and weep holes, minimum 1.6 m x 2.5 m in size. Build sample panel in stepped-back fashion to expose each material used (brick, insulation, air barrier, block) to a minimum height of 400 mm each. Coordinate with Sections 07 21 00 and 07 27 13 for installation of insulation and air barrier.

.2 Construct sample panel of interior concrete block partition, including wall corner and door opening, approximately 3 m long x full height.

.3 Locate sample panels where directed by Consultant.

.4 Construct panel to meet project requirements. Select masonry units to represent maximum texture and colour variations.

.5 Do not begin masonry work until panel is approved by Consultant. Approved panel shall represent minimum standard of quality for project masonry.

1.10 PRODUCT HANDLING & STORAGE

.1 Deliver and handle masonry units so as to prevent soiling and chipping.

.2 Store masonry units above and off ground on level platforms which permit air circulation under stacks.

.3 During storage, protect masonry units against moisture absorption, damage and staining.

.4 Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.11 PROTECTION

.1 When work is not in progress, cover tops of completed masonry elements exposed to weather with non-staining weatherproof covers. Covers shall be at least 600 mm wider than masonry elements and shall be well secured against displacement.

.2 Protect finished work at corners, sills, projections and other areas likely to be damaged, with suitable coverings until completion of building.

.3 Adequately brace masonry walls and partitions to resist effects of wind and other lateral forces.

1.12 SITE CONDITIONS

.1 Protection of Masonry: Protect masonry and other work from marking and other damage and as follows:

.1 Cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work during construction until permanent flashings and membranes are completed.

.2 Cover partially completed masonry when construction is not in progress to prevent wetting of inside wythes of construction and contribution to efflorescence.

.3 Extend cover a minimum of 24” down both sides and hold cover securely in place.

.4 Secure cover a minimum of 24” down face next to un-constructed wythe and hold cover in place where one (1) wythe of multi-wythe masonry walls is completed in advance of other wythes.

.5 Provide adequate bracing for masonry during construction and until permanent lateral supports are in place.

.6 Do not apply uniform floor or roof loads for a minimum of 12 hours and concentrated loads for a minimum of 3 days after building masonry walls or columns.

.2 Cold Weather Protection:

.1 Keep masonry materials completely free from ice and frost. Use approved smokeless heaters. Do not use scorched sand. Do not use salts, admixtures or antifreezes.

.2 Conform to the following construction requirements:

AIR TEMPERATURE	HEATING OF MATERIALS	PROTECTION
Above 5 deg C	Normal masonry procedures.	Cover walls and materials
Below 5 deg C	Heat mixing water. Maintain mortar temperatures between 5 deg C and 50 deg C until placed.	Cover walls and materials to prevent wetting and freezing.
Below 0 deg C	In addition to above heat sand. Thaw frozen sand and frozen wet masonry units before use.	With wind velocities over 35 km/h provide windbreaks during the workday and cover walls and materials at the end of each workday to prevent wetting and freezing. Maintain masonry above 0 deg C by using auxiliary heat or insulated blankets for 16 hours after laying masonry units.
Below -6 deg C	In addition to above heat dry masonry units to -6 deg C.	Provide enclosure and supply sufficient heat to maintain masonry enclosure above 0 deg C for 24 hours after laying masonry units.

.3 Hot Weather Requirements

.1 Comply with hot weather construction requirements contained in reviewed submittals.

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

.3 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.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Subject to compliance with requirements listed in this Section, manufacturers listed as offering products may be incorporated into the Work; alternates may be considered by the Consultant when submitted a minimum of five (5) days before closing of Bids.

.2 Manufacturer all exposed masonry by one manufacturer to provide uniform in colour, shade and texture.

2.2 MATERIALS

.1 Face Brick:

.1 Burned Clay Brick: Manufactured in accordance with CAN/CSA A82-06 (R2011), and as follows:

.1 Grade: Exterior Grade (EG)

.2 Type: X

.3 Size: Metric modular.

.4 Colour and Texture: To match existing school brick, as approved by the Consultant in writing, prior to ordering brick for the project. Remove brick supplied to site which has not been approved by the Consultant, at no additional cost to the Owner.

.5 Allow for two (2) colours.

.6 Approved Manufacturers:

.7 Forterra Brick

.8 Brampton Brick

.9 IXL Masonry Supplies

.2 Special Shapes:

.1 Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.

.2 Provide special shapes for applications where stretcher units cannot accommodate special conditions, including at corners, movement joints, bond beams, sashes, and lintels.

.3 Provide special shapes for applications requiring brick of size, form, colour, and texture on exposed surfaces that cannot be produced by sawing.

.4 Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

.2 Concrete Unit Masonry:

.1 Architectural Concrete Masonry Units: Manufactured in accordance with CAN/CSA CSA A165 Series-04 (R2009), and as follows:

.1 Classification: [H/15/A/M] [and] [S/15/A/M]

.2 Size: Modular metric to sizes indicated on Drawings.

.3 Type [CM1]:

.4 Configuration: [Full Block] [Half Block] [Veneer Block]

.5 Decorative Face Treatment: [Natural Block Face] [Split Face] [Polished Face[, with bevelled edges]] [Chiselled Face, [top and bottom] [top, bottom and sides]] [Hammered Face] [Saw Cut Face] [Stone Textured Face], based on [Manufacturer's name and product name].

.6 Profile: [Ledge] [2 Rib] [4 Rib] [6 Rib] [Single Score] [Three Score].

.7 Colour: [List Colour Designation]

.8 Basis of Design Materials: [List Model and Manufacturers Name][Schouldice Designer Stone].

.9 Special shapes:

.10 Provide [square] [bull nosed] [and] [half high] units for exposed corners.

.11 Provide purpose made shapes for lintels and bond beams.

.12 Provide additional special shapes required for project.

.13 Manufacture special shapes at same time and with the same batch as architectural concrete block to be used.

.2 Standard concrete blocks shall be autoclave or bubble cure process, high pressure steam cured, modular, conforming to CSA A165 Series-04 (R2009), with lineal shrinkage and moisture movement not to exceed 0.035% and shall be as follows:

.1 Classification: S/15/A/M, 75% solid for all locations where structural members bear on concrete block.

.2 H/15/A/M, for all other block work.

.3 Size: Modular metric to sizes indicated on Drawings.

.4 Special shapes:

.5 Provide square units for exposed corners.

.6 Provide purpose made shapes for lintels and bond beams.

.7 Provide additional special shapes required for project.

.8 Manufacture special shapes at same time and with the same batch as standard concrete block to be used.

.3 Fire Resistant Concrete Masonry Units: Manufactured in accordance with CAN/CSA A165 Series-04 (R2009) as modified below:

.1 Classification:

.2 2 Hour Fire Rating: H/15/C/O

.3 1 Hour Fire Rating: H/15/A/O

.4 Concrete Composition – 2 Hour Fire Rating: Type $L_2$20S Concrete.

.5 Size: Modular to sizes indicated on Drawings.

.6 Where concrete block walls are required as fire separations or barriers, they shall conform to the National Building Code. With respect to equivalent thickness and type of concrete. Consult with Consultant for locations and special conditions.

.4 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.

.3 Architectural Trim Units

.1 Trim Units: Manufactured in accordance with CAN/ CSA A165 Series-04 (R2009), and as follows:

.1 [Architectural Sill Profile:]

.2 Size: 5-1/2" deep, complete with drip edge, 3-1/2" high, and angled to 3-1/4" high, with beveled edges.

.3 At locations requiring sills to wrap a corner, provide corner sill unit as a one (1) piece unit completed with beveled profile to match adjacent sill units. Miter joints are not permitted, unless prior written approved by the Consultant is obtained.

.4 Colour: As indicated on the Drawings.

.5 Basis of Cambridge Series, Architectural Sills Model R24/3.5 Angled, by Richvale York Block Inc.

.4 Mortar Materials

.1 Mortar materials shall conform to CSA A179, as indicated in Section 04 05 13 Masonry Mortar and Grout.

.5 Metal Reinforcement, Ties and Anchors:

.1 Masonry Joint Reinforcement: In accordance with to CSA A371-04(R2009) and ASTM A496/A496M-07, with corrosion protection in accordance with CSA S304.1-04(R2010) and CSA A370-04 (R2009), and as follows:

.1 Interior Walls: Hot dip galvanized, carbon steel.

.2 Exterior Walls: Stainless steel.

.3 Lengths: A minimum of 10’ with prefabricated corner and tee units.

.2 Connectors: In accordance with to CSA A370-04 (R2009) and CSA S304.1-04(R2010) with hot dip galvanized finish.

.3 Single Wythe Masonry Joint Reinforcement: Either ladder or truss type with single pair of side rods.

.4 Ties and anchors specified in this section shall be designed in accordance with CSA A370-04 (R2009) for non-conventional masonry connectors as follows:

.1 Deflection: Maximum 1/16” including free play, when acted upon by a lateral load of 0.45 kN, in all possible positions of adjustment.

.2 Positive restraint at position of maximum adjustment.

.3 Free play of multi-component ties maximum 1/32” when assembled in all possible configurations.

.4 Anchors shall allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall.

.5 Masonry Unit Veneer/Concrete Masonry Unit Substrate Tie Systems:

.1 Masonry Unit Veneer/Steel Stud Tie Systems:

.1 Side of Steel Stud Mount:

.1 Tie Support: Fabricated hot dip galvanized in accordance with ASTM A123-09; designed to transfer wind loads to steel stud framing; length to suit total cavity, insulation and sheathing thickness.

.2 Ties: Wire ties fabricated from stainless steel wire in accordance with CSA G30.18-09; length to allow for cavity width and to extend minimum 2” into masonry unit joint.

.3 Fasteners: Self tapping metal screws to metal stud backup as recommended by tie manufacturer; of sufficient length to penetrate minimum ½” into steel stud.

.4 Acceptable Materials:

.1 Fero Holdings Ltd., Side Mounted Rap-Tie System

.2 Blok-Lok, BL-607

.2 Face of Masonry Mount:

.1 Backer Plate: Fabricated from stainless steel meeting requirements of CSA A370-04(R2009) and ASTM A1011/A101aM-12; designed to transfer wind loads to steel stud framing; length to suit total cavity, insulation and sheathing thickness, as detailed on Drawings.

.2 Ties: Wire ties fabricated from stainless steel wire in accordance with CSA G30.18-09; length to allow for cavity width and to extend minimum 2" into masonry unit joint.

.3 Fasteners: Self tapping metal screws to metal stud backup as recommended by tie manufacturer consisting of close tolerance bits for use in percussion drills, and hammer driven anchors with pullout strengths of 3.75 kN for hollow concrete masonry unit with a 25 mm (1") embedment

.4 Acceptable Materials:

.1 Blok-Lok, BL-407

.2 Fero Holdings Ltd., Rap-Tie System

.6 Lateral Partition Supports (Top of Wall Anchors):

.1 Angle Support: Fabricated from 1/8" core metal thickness angled steel plate having 3" long legs fastened to deck structure to allow vertical movement of masonry assembly; hot dip galvanized; coordinate with Section 07 84 00 for firestopping insulation and smoke seals.

.2 Plate Support: Fabricated from 1/8" core metal thickness stainless steel plate with 3/8" diameter metal 6" long welded to plate having closed end plastic tube fitted over rod that allows rod to move in and out of tube.

.3 Anchor Bolts: Where required provide Headed or L-shaped steel bolts in accordance with ASTM A307-10, Grade A; with ASTM A563-07a hex nuts and, where indicated, flat washers; hot-dip galvanized in accordance with ASTM A153/A153M-09, Class C.

.4 Post Installed Anchors: Provide chemical anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete when tested in accordance with ASTM E488/E488M-10 conducted by a qualified independent testing agency.

.7 Galvanizing for Masonry Reinforcement, Ties and Anchors:

.1 Hot Dip Hardware and Bolts: In accordance with ASTM A153/A153M-09, Class B-2 regardless of location.

.2 Hot Dip Sheet Steel: In accordance with ASTM A653/A653M-11, Coating Designation Z600, regardless of location.

.3 Structural Shapes and Pipes: In accordance with ASTM A123/A123-09, Grade 85, regardless of location.

.6 Embedded Flashing Material:

.1 Self-adhering rubberized asphalt flashing; non-extruding composite flashing membrane compatible with air and vapour membrane; consisting of pliable, adhesive rubberized asphalt compound, bonded to a high density, cross laminated polyethylene film to produce an overall thickness of a minimum of 1/32" and specifically manufactured for use as a through wall flashing and damp course membrane.

.2 Acceptable Materials:

.1 Blueskin TWF by Henry Company

.2 Perm-A-Barrier 4000 Wall Flashing by Grace Construction Products

.3 Sopraseal Stick 1100HT by Soprema

.3 Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

.4 Metal Flashing: Provide metal flashing materials in accordance with Section 07 62 00, and as follows:

.1 Fabricate through wall flashing with snap lock receiver on exterior face to receive counter flashing.

.2 Fabricate through wall flashing with drip edge by extending flashing 13 mm (1/2") out from wall, with outer edge bent down 30 deg and hemmed.

.3 Fabricate through wall flashing with sealant stop by bending metal back on itself 19 mm (3/4") at exterior face of wall and down into joint 10 mm (3/8") to form a stop for retaining sealant backer rod.

.4 Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending a minimum of 75 mm (3") into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam; form hem on upper surface of metal so that completed seam will shed water.

.5 Fabricate metal drip edges for flexible flashings from stainless steel; extend a minimum of 75 mm (3") into wall and 13 mm (½") out from wall, with outer edge bent down 30 deg and hemmed.

.7 Mortar dropping control device (cavity drainage mat):

.1 High density polyethylene or nylon mesh in trapezoidal configuration designed to facilitate effective drainage of moisture to weep holes; thickness to suit air space.

.2 Basis of Design Material: The Mortar Net by JV Building Supply, or approved equal.

.8 Premoulded joint filler:

.1 Exterior control joints: Emseal 25V expanding foam sealant.

.2 Interior walls, non-fire rated locations: mineral fibre insulation by Roxul or Fibrex.

.9 Control joints: Titewall BL-A by Blok-Lok Ltd.

.10 Weep Holes:

.1 PVC 'T' shaped brick vents by Goodco Limited, or cadium plated airplane type 'Weep Holes-343' by Blok-Lok Limited, set 32" O.C. for architectural block in the following locations:

.1 Bottom course of manufactured stone masonry units throughout;

.2 Top courses of manufactured stone masonry units throughout;

.3 Manufactured stone masonry units resting on lintels and intermediate angles.

.11 Date stone: Indiana limestone, size and inscription as indicated.

.12 Time Capsule: To be installed behind date stone, provided by Owner, when required.

2.3 MASONRY COATINGS

.1 Proprietary Masonry Cleaner: Masonry manufacturer's recommended cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discolouring or damaging masonry surfaces.

.1 Clear coating.

.2 Anti-Graffiti Coatings: Non-sacrificial, fully breathable sealer that does not alter the look of the substrate to which it is being applied, specifically formulated to prevent graffiti from curing into masonry substrate pores:

.1 Acceptable materials:

.1 Fabrikem Fabrishield PR Series

.2 Graffiti Master, Acryli-Master

.3 ProSoCo, Defacer Eraser Graffiti Barrier NS, with Protective Film Hardener

3 EXECUTION

3.1 ERECTION - GENERAL

.1 Lay masonry work in uniform manner. No one portion of any section of work shall rise more than 750 mm above general level. Do not lay more than 1500 mm in height of any wall in any working day.

.2 Unless otherwise noted, all walls and partitions shall extend to the underside of the structural deck.

.3 Cut exposed masonry units with power driven table model masonry saw only. Ragged or chipped edges will not be permitted.

.4 Consult with other Sections to avoid cutting and patching. Co-operate in setting and aligning built-in items. Build in conduit and piping so that they are not exposed. Do not break masonry bond to accommodate concealed built-in items.

.5 Grout solid with mortar all spaces around built-in items.

.6 Build in metal nailing plugs, grounds, inserts, anchor bolts, bearing plates, loose and miscellaneous items of steel and iron, isolated beams, lintels and shelf angles, sleeves, blocking and items furnished by other Sections.

.7 Do not shift or tap masonry units after mortar has taken its initial set.

.8 At masonry openings less than 450 mm wide, unless otherwise detailed, use mild steel plates, minimum 6 mm thick, of width 25 mm less than supported masonry thickness and with minimum 100 mm end bearing each side.

.9 Construct structurally reinforced masonry elements in accordance with requirements indicated on structural drawings.

3.2 CHASES, OPENINGS AND HOLES

.1 Chases and openings shall be built in during erection of masonry work, and purpose-made chased units shall be built into proper position.

.2 Openings in masonry work exceeding 450 mm shall be provided with lintels in accord with lintel schedule.

.3 Chasing of completed walls or formation of holes shall only be carried out with Consultant's prior approval, and then only with a tool designed to cleanly cut masonry units.

.4 Chases shall be plumb and shall be minimum of one unit length from jambs of openings.

.5 No horizontal or diagonal chases will be permitted.

3.3 MASONRY BEARING

.1 Masonry bearing shall extend full thickness of wall.

.2 Unless otherwise indicated, provide at least 200 mm of bearing for lintels and beams.

.3 Bearings of block masonry walls: use minimum 2 courses of solid or grouted block units except where concrete bearing pads are required.

.4 Bearings in brick masonry walls: use solid face brick where exposed to view.

.5 Build masonry neatly around beam, and lintel bearings.

3.4 CONSTRUCTION JOINTS

.1 Where fresh masonry joins partially or totally set masonry, clean exposed surfaces of set masonry and remove loose mortar and foreign material prior to laying fresh masonry.

.2 If necessary to stop off a horizontal run of masonry, rack back one-half masonry unit length in each course. Toothing will not be permitted unless approved by the Consultant.

3.5 BLOCKWORK

.1 Blockwork shall be laid up in running bond except where shown otherwise. Unless otherwise indicated, blocks shall be of thickness required to produce total wythe thickness.

.2 Do not wet blocks before laying.

.3 Units shall be laid with webs aligning one over the other in full bed of mortar over entire laying surface including webs.

.4 Exposed faces shall be full units laid out to minimize cutting with not less than 100 mm any at vertical edge or corner.

.5 Top course of block walls shall be laid with solid blocks at door and window sills, at wall changes to brick and where shown.

.6 Use solid block for at least two courses under all point bearing loads.

.7 Provide bullnose block at all exposed block corners, except where directed by Consultant.

.8 Provide minimum 400 mm solid or grouted block for jambs of openings and at ends of walls.

.9 Cut with power saw exposed units to accommodate flush mounted electrical outlets, grilles and other components. Leave maximum 5 mm clearance. Cover plates and flanges must cover cut edges.

.10 Blockwork scheduled to be left exposed or painted shall be laid and pointed with utmost care. Distribute units of varying colour and texture evenly to achieve homogeneous blend. Replace at no extra cost to Contract, block units which in the opinion of the Consultant are too contrasting in appearance for satisfactory blending.

.11 Take special care to prevent mortar or other substances from staining exposed block faces. Replace stained blocks as directed by the Consultant at no extra cost to Contract.

3.6 BLOCK LINTELS

.1 Build block lintels; install reinforcement and concrete fill. Unless otherwise detailed make lintels 200 mm high.

.2 Lintels shall have minimum 200 mm bearing, with care taken in layout of wall to ensure that lintel jointing coincides with regular bond of wall.

.3 Provide building paper in joint at bearings and at vehicle joint at ends of block lintels to break bond.

3.7 BRICKWORK

.1 Lay face brick in running bond except where shown otherwise. Provide header, soldier, rowlock and special band courses, where indicated. Provide solid soldier course units at outside corners; 45° cut units will not be accepted.

.2 Lay exposed face brick in full horizontal modules only, except where Consultant has approved use of cut units. Make small adjustments in width of vertical mortar joints to maximize use of full modules. Cut units, where permitted by Consultant, shall be located as directed by Consultant.

.3 Completed brickwork shall appear uniform and well blended, free of contrasting areas. Replace at no cost to Contract, brickwork which does not meet this requirement.

.4 Brick with an absorption rate of over 1 g/min./1000 mm^2 when tested in accordance with ASTM C67 shall be dampened before laying.

.5 Tops of walls which have been left exposed for any period of time shall be dampened before work is commenced again, if required.

.6 Brickwork at different levels shall be stepped in regular proportions between levels.

.7 Brickwork shall be laid up with the shove joint method in full bed of mortar with vertical and horizontal joints filled flush. Slushing mortar into joints after brick is laid, is not permitted.

.8 All joints in brickwork, including bed and collar joints, shall be filled flush as each course is laid. Pull down and rebuild walls/partitions which do not meet this requirement as directed by Consultant and at no extra cost to Contract.

.9 Variations in size of brick shall be evenly distributed in wall so that mortar joints are uniform throughout.

.10 At first brick course over steel lintels place brick directly on membrane flashing without mortar.

.11 At external corners other than 90° provide special custom shape corner units.

3.8 CAVITY WALLS

.1 Erect interior wythe masonry and co-ordinate with Sections 07 21 00 and 07 27 13 for installation of insulation and air barrier.

.2 Ensure that air barrier and insulation are complete and have been inspected and accepted by Consultant prior to installation of exterior wythe masonry.

.3 After the first course of exterior masonry units is laid install one continuous row of mortar dropping control device at bottom of cavities and veneer air space; place device on top of membrane flashing, with "zig-zag" side up. Where cavity/air space is larger than 25 mm

use multi-layer mortar dropping control device of thickness designed to fill space completely.

.4 Keep the cavity clean and free from mortar droppings or projections. Bevel the "cavity" edge of the mortar bed immediately after "stringing" the mortar.

.5 Reinforce back up masonry with continuous metal reinforcement at maximum 400 mm o.c. vertically. Provide additional reinforcing at openings as specified hereinafter. Provide first row of reinforcing at first joint above support. Place reinforcement in alternate courses to cavity wall connectors, except where connectors are integral with reinforcement.

.6 Provide cavity wall connectors at maximum 400 mm o.c. horizontally and vertically, unless other spacing, supported by manufacturer's engineering analysis is accepted by jurisdictional authorities. Locate first row of connectors/ties at 200 mm above foundations and loose lintels and at maximum 400 mm above shelf angles; install connectors/ties above through wall metal flashings. Locate last row of connectors/ties maximum 200 mm below openings and below top of parapets. Locate connectors/ties maximum 300 mm from inside and outside corners and at maximum 200 mm each side of expansion and control joints.

3.9 JOINT WORK

.1 Make joints uniform and 10 mm thick unless otherwise shown.

.2 All joints including joints in walls above ceilings and areas behind wall mounted and built-in fixtures, shall be tooled when thumbprint hard with a 25 mm o.d. plastic tool to produce a concave joint.

.3 Joints in unparged masonry below grade shall be pointed tight with a trowel.

.4 Joints directly behind resilient base, rigid insulation, ceramic tile and gypsum board shall be struck flush.

3.10 ANCHORING, BONDING & REINFORCEMENT

.1 Anchor or bond walls and partitions at points where they intersect.

.2 Except where stack bond is required bond each wythe or masonry walls and partitions at corners by alternately bonding 50% of units of each wall and partition at corner intersection.

.3 Bond non-loadbearing walls and partitions to loadbearing walls with ties spaced at 400 mm o.c. vertically. Provide one tie for each 100 mm thickness, or part thereof, of wall or partition.

.4 Anchor masonry walls and partitions to concrete and steel elements with anchors spaced at 400 mm vertically.

.5 Unless otherwise indicated reinforce all walls and partitions with continuous horizontal metal reinforcement, installed at 400 mm o.c. vertically.

.6 At wall openings place continuous reinforcement in first and second mortar joints above and below openings. Additional reinforcement at openings shall extend 610 mm beyond both sides of openings.

.7 Install prefabricated corner assemblies at corners.

.8 Lap continuous reinforcement 150 mm at splices. Cut reinforcement at control joints.

.9 Tie brick veneer to exterior wall steel studs and to concrete back-up in accordance with requirements of CSA A370-04.

.10 Provide lateral support angles at top of non-loadbearing masonry walls/partitions. Anchor angles to structural deck or beam at 10x partition/wall thickness each side of partition. Locate lateral support angles at maximum 0.6 m from partition ends or corners.

3.11 CONTROL JOINTS AND EXPANSION JOINTS

.1 Provide control joints in masonry walls supported by foundation walls at approximately 7.5 m o.c. and in masonry walls supported on framed slabs at approximately 4 m o.c., and where shown. Confirm actual locations of control joints with Consultant before starting work.

.2 Provide control joints at intersection of bearing and non-bearing walls.

.3 At cavity walls, offset control joints at outer and inner wythe as shown.

.4 Construct control joints as shown. Unless otherwise shown make control joints 10 mm wide. Interrupt masonry reinforcement at control joints.

.5 Control joints must be constructed during erection of masonry, and may not be sawcut later.

.6 Construct expansion joints in accordance with details shown. Provide metal flashing built into masonry wall.

3.12 MEMBRANE FLASHINGS / DAMPPROOF COURSE

.1 Install dampproof course on top of foundation walls above grade.

.2 Install membrane flashing at bottom of cavity walls; where shown, and at the following locations:

- .1 Door heads
- .2 Window heads
- .3 Immediately above horizontal interruptions within exterior walls.
- .4 Below precast concrete components.

.3 Lap membrane flashing 100 mm at joints; seal lap with adhesive.

.4 In all cases extend membrane flashing 13 mm beyond outside face of wall or outside edge of steel lintel. Trim as required to Consultant's later instructions.

.5 Unless otherwise indicated carry membrane flashing up behind exterior wythe masonry units min. 200 mm and turn into concrete block back-up. Mechanically secure top edge at concrete back-up.

3.13 WEEP & VENT HOLES

.1 Form weep holes by inserting weep/vent hole inserts into exterior wythe mortar joint immediately above all membrane flashings, and at other locations where shown. Space weep holes at 800 mm o.c. horizontally.

.2 Form vent holes by inserting weep/vent hole insert into exterior wythe mortar joint near top of each cavity compartment and at other locations, where indicated. Space vent holes at 800 mm o.c. horizontally.

.3 Keep face of weep/vent hole inserts back from face of brick minimum 6 mm. Keep weep holes free of mortar.

3.14 STEEL DOOR FRAMES

.1 Install steel frames in masonry walls. Build in frames rigid, true and plumb. Fill voids between frames and masonry with mortar grout. Fill fixed door centre mullions with grout.

.2 Brace frames solidly in position while being built in. Provide temporary horizontal wood spreader at mid-height of frames to ensure maintenance of required frame width until masonry work is completed. For frames over 1200 mm width provide temporary vertical support at centre of head.

.3 Comply with installation requirements specified under Section 08 11 00.

3.15 GROUTED MASONRY

.1 Provide grouted masonry at loadbearing walls in accordance with requirements shown on structural drawings.

.2 Meet requirements of CSA S304.1-04 and CSA A371-04, except where indicated otherwise.

3.16 MISCELLANEOUS

.1 Where non-loadbearing, non-fire rated partitions extend to underside of structural deck, terminate partitions as detailed. Where not detailed allow for structural deflection and fill space with premoulded joint filler. Refer to Section 07 84 00 for firestopping requirements at fire rated partitions. Recess joint filler to permit installation of caulking by Section 07 92 00.

.2 Provide continuous 0.1 mm thick polyethylene or glass fibre reinforced kraft paper - asphalt laminate bond breaker at base of partitions and walls which bear on concrete slabs.

.3 Provide paper backed galvanized steel lath as required for support of grout and mortar fill within masonry elements.

.4 Build in date stone and document box in location indicated (after Project completion at a date determined by Owner).

3.17 PARGING

.1 Provide parging at locations shown.

.2 Parging mix: 1 part Portland cement and 3 parts sand by volume, mixed with sufficient water to produce workable mix.

.3 Bond coat mix: 24 kg Portland cement and 4L parging bonding agent and 4L water.

.4 Prepare substrate and apply bond coat in accordance with bonding agent manufacturer's recommendations. Apply parging while bond coat is still moist and tacky. Apply parging minimum 6 mm thick, trowelled to smooth surface.

3.18 PATCHING AND CLEANING

.1 At completion of work, holes and other defects in masonry joints shall be repaired, and masonry surfaces shall be thoroughly cleaned.

.2 Holes in masonry joints shall be filled with mortar and suitably tooled. Cut out and repoint defective joints. Use coloured mortar to match existing.

.3 Dry brush masonry surfaces at end of each day's work and after all final pointing.

.4 Remove mortar smears and droppings from concrete block masonry surfaces after such smears and droppings have dried. When mortar joints are dry and hard, clean block masonry surfaces by rubbing down with abrasive blocks and stiff fibre brushes.

.5 Remove mortar particles from clay masonry surfaces with wood paddles. Remove stains from clay masonry surfaces by wet cleaning in accordance with manufacturer's recommendations.

.6 Upon completion of work, clean blockwork by brushing and washing. In extreme cases a 5% solution of muriatic acid may be used preceded and followed by a copious bath of clean water. Clean blockwork to be painted to suit requirements of Section 09 91 00.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Unit Masonry

.2 Section 05 41 00: Structural Metal Stud Framing

.3 Section 05 51 00: Metal Stairs

.4 Section 06 10 00: Rough Carpentry

.5 Section 08 41 13: Aluminum Framed Entrances and Storefronts

.6 Section 08 44 13: Glazed Aluminum Curtain Walls

.7 Section 09 21 16: Gypsum Board Assemblies

.8 Section 09 91 00: Painting

1.3 WORK SUPPLIED BUT NOT INSTALLED

.1 Supply following items for installation under other Sections of work: anchor bolts, bearing plates, sleeves and other inserts to be built into concrete and masonry elements and required for anchorage and support of metal fabrications.

.2 Supply other Sections with instructions, and if required, templates, necessary for accurate setting of inserts and components.

1.4 QUALITY ASSURANCE

.1 All Codes and Standards referred to in this Specification shall be current editions including all latest revisions and addenda.

.2 Conform to requirements of CSA-S16, Design of Steel Structures and CAN/CSA-S136, Cold Formed Steel Structural Members.

.3 Architectural metals work shall be of the highest architectural quality, free of scratches, pitting, roughness, marring, discolouration, staining and other imperfections.

.4 Work of this Section to be executed by firm thoroughly conversant with laws, by-laws and regulations which govern, and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturer's specializing in this work.

.5 Work of this Section shall be executed by workers especially trained and experienced in this type of work. Have a full time, senior, qualified representative at the site to direct the work of this Section.

.6 Qualifications of Welders: certified under CSA W47.1 for appropriate class of work.

.7 Upon completion of installation of ladders, stairs, platforms, pit covers, balustrades and railings submit certification by professional engineer responsible for design of these components, verifying that they have been installed in accordance with reviewed shop drawings.

.8 Sizes of structural members, such as stair stringers shall be taken to be a minimum size and shall not be decreased without Consultant’s approval.

1.5 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00, bearing stamp or seal and signature of the Professional Engineer responsible for the design of the work of this Section.

.2 Shop Drawings:

.1 Make thorough examination of drawings and details, determine the intent, extent, and materials, and be fully cognizant of requirements when preparing shop drawings.

.2 Submit shop drawings showing and describing in detail all work of this Section including large scale detail of members and materials, of connection and interfacing with work of other Sections, jointing details, and of anchorage devices, dimension, gauges, thicknesses, description of materials, metal finishing, as well as other pertinent data and information.

.3 Digital files of design drawings shall not be used in the preparation of shop drawings.

1.6 STORAGE, DELIVERY, HANDLING AND PROTECTION

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off the ground, under cover storage locations. Do not load any area beyond the design limits.

.2 Adequately protect and crate all components against damage, dirt, disfigurement and weather during delivery and storage. Damaged materials shall not be used and shall be replaced by approved material.

.3 Cover and protect the work of other Sections in the area of work from damage. Make good all damage to the satisfaction of the Consultant.

.4 Protect the installed work of this Section and on completion the work shall be examined and damage shall be remedied to the complete satisfaction of the Consultant.

2 PRODUCTS

2.1 MATERIALS

.1 Structural Steel Sections and Steel Plate: New stock (not weathered or rusted); to conform to CAN/CSA-G40.21, Grade 300W (44W) and Grade 350W (50W) for wide flange shapes.

.2 Hollow Structural Sections (HSS): New stock; to conform to CAN/CSA-G40.21, Grade 350W (50W), Class C, stress relieved.

.3 Sheet Steel (Structural Quality): Conforms to ASTM A1011/A1011M.

.4 Sheet Steel (Commercial Quality): Conforms to ASTM A653/A653M, stretcher levelled or temper rolled.

.5 Square steel tube: CAN/CSA-G40.21-04, Grade 350W.

.6 Steel Pipe: Hot-dip galvanized, zinc coated, welded and seamless type steel pipe conforming to ASTM A53/A53M.

.7 Galvanized Sheet Steel (Commercial Quality): Galvanized coating G90 (Z275) in accordance with ASTM A653/A653M, minimized spangle, stretch levelled or temper rolled. Specially treat by phosphate conversion process conforming to CGSB 31-GP-105Ma ready to receive prime paint finish.

.8 Stainless Steel Sheet, Strip, Plate, and Flat Bars: In accordance with ASTM A666, Type 304.

.9 Stainless Steel Bars and Shapes: In accordance with ASTM A276, Type 304.

.10 Welding materials: CSA W59.

.11 Shop primer: CAN/CGSB-1.40-97.

.12 Zinc rich shop paint:

.1 Shop coat: Inorganic reinforced zinc rich paint: Devoe Catha-Coat 302.

.2 Field touch up: CAN/CGSB 1.181-02.

.13 Non-Shrink Grout: Premixed, high strength, maximum bearing, impact resistant, non-shrink non-metallic aggregate grout having minimum 76 Mpa 28 day compressive strength and conforms to ASTM C939 and ASTM C1107/C1107M, 'Embeco Premixed Grout' by Master Builders Technologies Ltd., or 'Tartan Grout Iron' by Webster & Sons Ltd., or 'Sika Grout 212 HP' by Sika Canada Inc.

.14 Bolts, Nuts, Washers: Conforms to ASTM A325.

.15 Metal Filler: Polyester based type. 'M45' by Dura Chemical Ltd., Hamilton, Ontario

.16 Painting:

.1 Shop Applied Structural Steel Primer: Steel Spec Universal Primer (B50RV6227 Red), by Sherwin Williams Company of Canada Ltd., or approved equal. Apply a minimum of 2 mils dft./coat. Grey coloured primer is acceptable.

.2 Zinc Rich Paint For Touch-up of Galvanized Metals: Ready mixed, zinc-rich primer conforming to CAN/CGSB-1.181, Sealtight Galvafroid Zinc-Rich Coating by W.R. Meadows of Canada Limited or Zinc Clad No. 5 Organic Zinc Rich Primer by Sherwin Williams Company of Canada Ltd., or approved equal.

.3 Touch-up Primer (On Site): Procryl Universal Acrylic Primer by Sherwin Williams Company of Canada Ltd, or approved equal. Touch-up primer shall be no less than 3 mil dft.

.4 Refer to Section 09 91 00, and coordinate with the above.

.17 Bituminous Paint: WR Meadows or approved equal.

.18 Building Paper: Conforms to CAN/CGSB-51.32.

.19 Butyl Tape: Extruded, high grade, macro-polyisobutylene tape of size, width and shore hardness to suit conditions.

2.2 FABRICATION - GENERAL

.1 Fabricate components in the shop in largest size practicable to minimize field jointing.

.2 Fabricate components square, straight, true, free from warpage and other defects. Accurately cut, machine file and fit joints, corners, copes and mitres.

.3 Reinforce fabricated components to safely withstand expected loads.

.4 Make joints in built-up sections with hairline joints in least conspicuous locations and manner.

.5 Make allowance for thermal expansion and contraction when fabricating exterior work.

.6 Joints shall be welded unless otherwise indicated and unless details of construction do not permit welding. Exposed welds shall be continuous and shall be ground smooth.

.7 Close exposed open ends of tubular members with welded on steel plugs.

.8 Where work of other Sections is to be attached to work of this Section, prepare work by drilling and tapping holes, as required to facilitate installation of such other work.

.9 Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation by: drilling, countersinking and tapping holes, forming shapes and cutting to required sizes.

.10 Grind off mill stampings and fill recessed markings on steel components left exposed to view.

2.3 FINISHES

.1 Thoroughly clean steel of loose scale, rust, oil, dirt and other foreign matter. Suitably prepare steel surfaces by power tool cleaning to receive specified finishes.

.2 Grind smooth sharp projections.

.3 Remove oil and grease by solvent cleaning.

.4 Apply coatings in the shop and before assembly. Where size permits, galvanize components after assembly.

.5 Shop apply coat of primer to interior components after fabrication except where stainless steel, galvanized or zinc rich paint finish is required.

.6 Exterior components except where required to be hot dip galvanized: blast clean metals to "Near White Grade" (SSPC-SP-10) and spray apply a coat of zinc rich paint maximum 3 mils thick.

.7 Hot dip galvanize (unpassivated) components where so indicated after fabrication in accordance with requirements of CAN/CSA-G164-M92, minimum coating weight 600 g/m^2.

.8 Apply coat of bituminous enamel to contact surfaces of metal components in contact with cementitious materials and dissimilar metals.

3 EXECUTION

3.1 INSTALLATION

.1 Install components plumb, square, straight and true to line. Drill, cut and fit as necessary to attach this work to adjoining work.

.2 Provide temporary supports and bracing required to position components until they are permanently anchored in place.

.3 Securely anchor components in place; unless otherwise indicated, anchor components as follows:

- .1 To concrete and solid masonry with expansion type anchor bolts.
- .2 To hollow construction with toggle bolts.
- .3 To thin metal with screws or bolts.
- .4 To thick metal with bolts or by welding.
- .5 To wood with bolts or lag screws.
- .6 Fill space between railing members and sleeves with non-shrink grout.

.4 Install trench drain in accordance with manufacturer's instructions. Coordinate with Division 15 for drain connection.

.5 Provide all components required for anchoring. Make anchoring in concealed manner wherever possible. Make exposed fastenings, where approved by Consultant, neatly and of same material, colour, texture and finish as base metal on which they occur. Keep exposed fastenings evenly spaced.

.6 Dissimilar metals and metals in contact with cementitious elements shall have contact surfaces coated with bituminous paint or be isolated by other means as approved by Consultant.

.7 After installation, clean and refinish injured finishes, welds, bolt heads and nuts. Refinish with zinc rich paint or primer to match original finish.

.8 Upon completion of work, or when directed by Consultant, remove protective coverings from stainless steel components.

3.2 SCHEDULE

.1 Provide all metal fabrications required whether listed hereunder or not, unless clearly covered by another Section.

.2 Unless otherwise shown provide:

.1 Interior components: prime coated steel

.2 Exterior components: zinc rich paint coated steel.

.3 Other metal fabrications required.

.4 Bollards

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED WORK

.1 Section 06 20 00: Finish Carpentry

.2 Section 06 41 00: Architectural Wood Casework

1.3 QUALITY ASSURANCE

.1 Lumber shall bear the grading stamp of an agency certified by The Canadian Lumber Standards Administration Board.

.2 All lumber shall be sound, straight, dressed all sides and kiln dried, and moisture content at any time during shipment and storage shall not exceed 19%.

1.4 WORK SUPPLIED BUT NOT INSTALLED

.1 Supply to other Sections anchors, bolts, rough hardware and other items required to be built into work of other Sections to receive, accommodate, secure work of this Section.

.2 Provide other Sections with instructions to ensure accurate setting of built-in items.

1.5 PRODUCT HANDLING

.1 Store materials on site to prevent deterioration, loss or impairment of their structural and other essential properties. Prevent excessive moisture gain of materials.

2 PRODUCTS

2.1 MATERIALS

.1 Framing Lumber:

.1 Lumber for structural components shall be of species and grade specified, well seasoned, processed and stamped at same mill with appropriate grade markings. Conform to requirements of Standard Grading Rules for Canadian Lumber of National Lumber Grades Authority the (NLGA) with latest supplements, approved by the Canadian Lumber Standards Administrative Board.

.1 Treatable Species: No. 2 and better - S4S, Dry, 19%.

.2 Lumber:

.1 Except as indicated or stated otherwise, lumber to be softwood, S4S, moisture content 19% or less, in accordance with the following standards:

.1 CAN/CSA O141-05 (R2009) - “Softwood Lumber”.

.2 NLGA - “Standard Grading Rules for Canadian Lumber” (latest supplement).

.2 Blocking, Copings, Nailers, Curbs: NLGA 122c "Standard" S-P-F.

.3 Plywood:

.1 All locations except backboards: Douglas Fir to CSA 0121-M1978 Unsanded Exterior Sheathing Grade.

.2 Backboards: Douglas Fir to CSA 0121-M1978, Sanded grade, solid two sides, fire retardant pressure treated.

.3 19mm thick and/or thickness as indicated on drawings

.4 Plywood Roof Sheathing:

.1 Minimum 13mm thick, exterior grade Douglas fir plywood, veneer core, tongue and groove edges, Select Sheathing - Tight Face, unsanded with non-slip surface one side, 'B' faces and conforming to CSA 0121-08.

.5 Fasteners and Connecting Hardware:

.1 Nails: to CSA B111-1974, hot dip galvanized steel for exterior work including components located in exterior walls and roofs; bright finish steel in all other locations. Unless otherwise indicated use common spiral flathead nails.

.2 Bolts, nuts, washers: ASTM A307, hot dip galvanized steel.

.3 Connectors, anchors, brackets, spikes: hot dip galvanized structural quality steel.

.4 Screws: to CSA B35.4-1972 zinc, cadmium or chrome plated.

2.2 WOOD TREATMENT

.1 Surface cut, bore and trim components to sizes required as much as possible prior to pressure treatment.

.2 Pressure Preservative Treated Lumber:

.1 Lumber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Accreditation Board in accordance with CAN/CSA O80 Series -08.

.1 Species: Pine or Spruce-Pine

.2 Grade: No.2 or better structural posts and lumber, pieces may be grade stamped or shipment certified by letter of compliance.

.3 Grading authority: NLGA, paragraph 131CC

.4 Material having twisted grain or structural defects affecting integrity of lumber will not be acceptable for this project.

.5 Use only material with radius edges, minimum 6 mm.

.6 Kiln dry lumber materials to 8% moisture content or less.

.2 Pressure Preservative Treated Plywood: Treated in accordance with CAN/CSA O80 Series -08 using water-borne preservative to obtain minimum net retention of 4 kg/m³ of wood. Plywood or laminated materials shall be manufactured with exterior grade adhesives. After treatment, plywood shall be kiln dried to moisture content of 8% or less.

.3 Fire Retardant Pressure Treated Components:

.1 Treat by pressure impregnation with fire-retardant chemicals in accordance with CAN/CSA O80 Series -08 to provide classification for flame spread of not more than 25, smoke developed of not more than 75 in accordance with CAN4 S102.

.2 All fire retardant wood must comply with the requirements in AWPA Standard C20 for lumber and C27 for plywood.

.1 AWPA C20: Structural Lumber, Fire-Retardant Pressure Treatment, lumber materials shall only be of species listed. After treatment, lumber 50 mm or less in thickness shall be kiln dried to moisture content of 8% or less.

.2 AWPA C27: Plywood, Fire-Retardant Pressure Treatment, plywood or laminated materials shall be manufactured with exterior grade adhesives. After treatment, plywood shall be kiln dried to moisture content of 8% or less.

.3 All species to comply with CAN4 S102 for surface-burning characteristics and shall bear identification showing classification and type of fire retardant.

.3 Each piece or bundle of fire-retardant treated material or panel to bear ULC inspection label or stamp attesting to FRS rating indicating flame spread, smoke developed, and fuel contributed classification meeting AWPA standard C20 and C27 for Type A Use.

.4 Fire retardant chemicals used to treat lumber must comply with FR-1 of AWPA Standard P17 and shall be free of halogens, sulphates and ammonium phosphate.

.5 Acceptable materials: Plywood and lumber materials treated by licensed applicators with fire retardant materials from the following:

.1 Hickson Corporation – Dricon FRTW

.2 Hoover Treated Wood Products Inc. – Pyro-Guard

.3 Chemical Specialties Inc. – D-Blaze

3 EXECUTION

3.1 GENERAL

.1 Erect work plumb, level, square and to required lines. Ensure that materials are rigidly and securely attached to each other and to adjacent building elements and will not be loosened by work of other Sections.

.2 Where other materials and components are to be applied directly over wood members recess heads of fastening devices below wood surfaces.

.3 Where work remains exposed to view, fasteners shall be uniformly and evenly spaced and neatly installed.

3.2 NAILERS, BLOCKING, COPINGS, GROUNDS, CURBS

.1 Provide wood nailers, blocking, copings, strapping, bucks, grounds and other rough carpentry components to sizes and in locations required for satisfactory support of fabricated items and other work. Provide wood blocking at steel stud framed gypsum board partitions for support of wall mounted components.

.2 Unless otherwise indicated, provide minimum 38 mm thick materials. Grounds may be 21 mm thick material unless otherwise indicated.

.3 Provide built-up wood curbs for rooftop mounted equipment. Unless otherwise detailed, provide 90 mm thick curbs extending minimum 300 mm from top of roof membrane to top of curb.

.4 Provide minimum 12 mm thick plywood back-up for fastening of curtain tracks and blinds at head of windows, where curtains or blinds are required.

3.3 ANCHORS AND FASTENERS

.1 Provide rough hardware including nails, screws, bolts, washers, brackets, hangers, and fastening devices of all types.

.2 Unless otherwise indicated, attach wood members at maximum 600 mm o.c. as follows:

.1 To concrete and solid masonry with expansion or friction type anchor bolts.

.2 To hollow masonry with toggle bolts.

.3 To heavy gauge metal with bolts.

.4 To light gauge metal with screws or bolts.

.5 To wood with nails, screws or bolts as required to ensure stability.

.3 Bucks and plates shall be anchored to masonry walls with 13 mm galvanized steel bolts or with approved type screw anchors.

.4 Fasten wood copings to supporting masonry elements with 13 mm galvanized steel bolts minimum 450 mm long spaced maximum 600 mm o.c. Where width of coping plate exceeds 100 mm, stagger bolts off centre.

3.4 PLYWOOD PANELS

.1 Provide plywood panels required for electrical/telephone mounting of equipment and in other locations as indicated on drawings.

3.5 ROOF SHEATHING

.1 Install roof sheathing with surface grain at right angles to the roof framing underneath with 3/32" gap between adjacent panels to allow for expansion.

.2 All roof sheathing panel edges that are not tongue and groove require supports of minimum 1-1/2" x 1-1/2" wood blocking securely fastened between roof framing members or use 'H' clips in conformance with O.B.C. article 9.23.15.1 and .2.

.3 Install roof sheathing to prefabricated wood trusses and framing using minimum 2" long annular or spiral type nails spaced 6" O.C. at edges and 12" O.C. along intermediate supports.

.4 Install roof sheathing to cold formed metal joist trusses and framing using minimum 6 x 1-5/8" long "bulge head" type drywall screws spaced 6" O.C. at edges and 12" O.C. along intermediate supports.

3.6 BACKBOARDS

.1 Where required by Division 16 and by telephone system supplier, provide minimum 19 mm thick plywood backboards mounted on strapping if required.

.2 Size backboards to adequately accommodate equipment to be mounted. Secure boards with countersunk fasteners to supporting walls in manner which will carry equipment load without damaging wall.

3.7 PRESSURE PRESERVATIVE TREADED WOOD INSTALLATION

.1 Comply with AWPA M4.

.2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation. Allow first coating to fully soak into grain before applying second coating in accordance with manufacturer’s instructions.

.3 Remove with fine sandpaper, chemical deposits on treated wood to receive applied finish.

.4 Use only hot-dipped galvanized, corrosion resistant nail or screw fasteners. Staples are not acceptable for installation of preservative treated materials.

.5 Use water-borne preservative treated wood for:

.1 Wood in contact with masonry or concrete,

.2 Wood within 450 mm of grade,

.3 Wood decking and fence boards,

.4 Wood in contact with flashings,

.5 Wood in contact with waterproofing membranes, confirm compatibility with membrane manufacturer prior to application.

.6 Use oil-borne preservative treated wood for:

.1 Wood in contact with the ground,

.2 Wood in contact with freshwater,

.3 Landscaping timbers,

.4 Retaining walls,

.5 Piers or docks,

.6 Pilings,

.7 Bases of utility poles,

.8 Bases of fence posts.

3.8 PRESSURE FIRE RETARDANT TREATED WOOD INSTALLATION

.1 Field Cuts:

.1 Do not rip, mill or conduct extensive surfacing of fire retardant treated lumber, label will be voided.

.2 Only end cuts, drilling holes and joining cuts are permitted.

.3 All cuts on plywood will be considered end cuts.

.4 Fire-retardant lumber and plywood can be given a light sanding for cosmetic cleaning after treatment.

.5 Pre-cut to the greatest extent possible before treating.

.2 Fire retardant treated plywood used in structural applications shall be graded or span-rated material.

.3 Use only hot-dipped galvanized, corrosion resistant nail or screw fasteners. Staples are not acceptable for installation of fire resistant treated materials.

.4 Where humidity conditions are such that moisture may condense between hardware and treated wood, hardware shall be back-primed with a corrosive-inhibitive paint.

.5 Back-prime at contact points and fasteners to prevent electrolysis when fire retardant framing members are used in metal buildings.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED WORK

.1 Section 05 50 00: Metal Fabrications

.2 Section 06 10 00: Rough Carpentry

.3 Section 06 41 00: Architectural Wood Casework

.4 Section 09 91 00: Painting

1.3 QUALITY ASSURANCE

.1 Reference Standards: unless otherwise specified, carry out finish carpentry work in accordance with requirements of "Quality Standards for Architectural Woodwork" (latest issue) of Architectural Woodwork Manufacturer's Association of Canada (AWMAC).

1.4 SUBMITTALS

.1 Submit two samples of each type of solid wood and plywood used in exposed work scheduled to receive transparent finish.

1.5 PRODUCT DELIVERY, HANDLING & STORAGE

.1 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16°C, and relative humidity 25% to 55%.

.2 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather.

.3 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent moisture gain of kiln dried materials.

1.6 PROTECTION

.1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

2 PRODUCTS

2.1 MATERIALS

.1 Solid Wood:

.1 Unless otherwise indicated, provide AWMAC Premium Grade.

.2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.

.3 All wood shall be kiln dried to a maximum moisture content of 12% for exterior work and 6% to 8% for interior work.

.4 Hardwood: Species as indicated; where no species is indicated, provide Birch.

.5 Softwood: to CAN/CSA 0141-05, dressed all sides used in concealed locations only except where shown otherwise. Unless otherwise indicated use No. 1 White Pine at interior locations.

.2 Panel Materials:

.1 Hardwood plywood: to CSA 0115-M1982, Type II Veneer: AWMAC Architectural Grade Maple or Select White Birch; use veneer core or multi-core plywood.

.2 Softwood plywood: to CSA 0151-04 Sanded Grade, Solid Two Sides. Use in concealed locations only; use veneer core or multi-core plywood only.

.3 Fasteners and Adhesives:

.1 Nails and staples: CSA B111-1974, galvanized.

.2 Screws: zinc, cadmium or chrome plated steel.

.3 Adhesive: waterproof type as approved by Consultant.

2.2 FABRICATION

.1 General Requirements:

.1 Exposed joints and edges:

.1 Uniformly space exposed joints unless otherwise indicated.

.2 Edge grain shall not be visible; mitre external corners, house internal corners. Secure corners with corrugated metal fasteners. Glue mitred corners.

.3 All exposed edges of plywood shall have solid wood edging, pressure glued.

.2 Mechanical fasteners:

.1 Inconspicuously locate mechanical fasteners. Wherever possible conceal fastenings.

.2 Countersink nail heads.

.3 Unless otherwise indicated, countersink screw and bolt heads and fill holes with matching wood plugs.

.3 Cutting and fitting: make cutouts in work of this Section as required to accommodate work of other Sections.

.2 Standing & Running Trim:

.1 Fabricate trim and base of softwood where paint finish is designated and of hardwood where transparent finish is required.

.2 Length: standing trim shall be in one piece. Running trim shall be in longest practicable lengths.

.3 Thickness: unless otherwise indicated, minimum 13 mm.

.3 Rails, Slats, Caps, Base:

.1 Fabricate components to profiles shown and in longest practicable lengths.

.2 Slightly round exposed edges, sand smooth all surfaces.

.3 Unless otherwise indicated fabricate members of hard- wood. Use the same species of wood throughout, except where specifically indicated otherwise.

3 EXECUTION

3.1 INSTALLATION

.1 Install finish carpentry components plumb, true and level and securely fasten in place. Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.2 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.3 Provide mechanical fastening devices such as nails, screws and bolts required for fastening wood components. Unless permitted provide concealed fastening of components.

.4 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.5 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.6 Install caps, rails, base, casings and trim in longest practicable lengths; accumulation of short pieces not permitted. No edge grain shall be visible; mitre corners. Slope cut intermediate joints.

.7 Provide interior wood trim where indicated and where required to complete work.

.8 Select components within any area to produce well blended, uniform appearance. Avoid use of components with starkly contrasting colours. Replace components which in Consultant's opinion are not of satisfactory appearance.

.9 Install room name and number sign plates, supplied under Section 08 71 00.

3.2 FINISHING

.1 Sand finished wood surfaces thoroughly as required to produce uniformly smooth surface, always sanding in direction of grain run. Coarse grained sandpaper marks, hammer marks, or other similar imperfections in finished work are not acceptable.

3.3 SCHEDULE

.1 Unless specifically indicated otherwise, all finish carpentry components shall receive transparent stain and varnish finish by Section 09 91 00.

.2 Provide the following:

.1 Bench and shelf slats (maple)

.2 Other finish carpentry components required.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED WORK

.1 Section 05 50 00: Metal Fabrications

.2 Section 06 10 00: Rough Carpentry

.3 Section 06 20 00: Finish Carpentry

.4 Division 22: Sinks, faucets

1.3 DEFINITION

.1 "Exposed" when referred to in this Section shall mean all parts that can be viewed and shall include interiors of cupboards, cabinets and counters, backs of doors, shelving, gables, drawers.

1.4 QUALITY ASSURANCE

.1 Reference Standards: unless otherwise specified, carry out finish carpentry work in accordance with requirements of "Quality Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.

1.5 SUBMITTALS

.1 Submit detailed shop drawings for cabinetwork showing proposed assembly, connections, anchorage, materials, dimensions, thickness and finishes.

.2 Shop drawings shall be originated and produced by fabricator and may not be copied or reproduced from Consultant's drawings. Each item shall be shown in plan, section and elevation, detailed in appropriate scale, clearly displaying all required information. Single line diagrams are not acceptable.

.3 Submit duplicate samples of each type of solid wood and plywood used in exposed work prior to fabrication of cabinetwork.

1.6 PRODUCT DELIVERY, HANDLING & STORAGE

.1 Protect cabinetwork against damage, including damage by excessive changes in moisture content. Maintain minimum storage temperature of 16^{o}C, and relative humidity 25% to 55%.

.2 Cover plastic laminate faces at shop with heavy kraft paper.

.3 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather.

.4 From time of fabrication until installation, store handle and transport materials so as to prevent deterioration or loss or impairment of essential properties. Prevent moisture gain of kiln dried materials.

1.7 PROTECTION

.1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.8 WARRANTY

.1 At no cost to Owner remedy any defects in work of this Section due to defects in materials and workmanship, including but not necessarily limited to delamination, warping, and other defects detrimental to appearance and/or performance for a period of 2 years from date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

.1 Solid Wood:

- .1 Unless otherwise indicated, provide AWMAC Premium Grade.
- .2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.
- .3 All wood shall be kiln dried to a maximum moisture content of 6% to 8%.
- .4 Hardwood: White Birch Premium Grade.
- .5 Softwood: to CAN/CSA-0141-05, dressed all sides used in concealed locations only except where shown otherwise. Concealed framing: No. 1 Grade White Pine.

.2 Plywood Panel Materials:

- .1 Hardwood plywood: to CSA 0115-1982, Type II, veneer: AWMAC Architectural Grade Select White Birch; use veneer core or multi-core plywood only.
- .2 Softwood plywood: to CSA 0151-04 Sanded Grade, solid two sides. Use in concealed locations only; use veneer core or multi-core plywood only.

.3 Plastic Laminated Components:

- .1 Plastic laminate facing sheet: ANSI/NEMA LD3-2005 Grades HGS, VGS, HGP; colours, gloss and texture will be selected by Consultant from full range of products by Formica, Arborite, Nevamar, Wilsonart, Pionite.
- .2 Backing sheet: BKL Grade by manufacturer of facing sheet.
- .3 Core: veneer core plywood.
- .4 Laminating adhesive: urea formaldehyde type meeting requirements of CAN3-0112 Series M1977.
- .5 Core sealer: clear water resistant synthetic resin sealer.

.4 Fasteners & Adhesive:

- .1 Nails and staples: CSA B111-1974, galvanized.
- .2 Screws: zinc, cadmium or chrome plated steel.
- .3 Adhesive: CAN3-0112 Series - M1977, waterproof type.

.5 Solid Core Doors: to CSA 0132.2-M1977, flush doors, 35 mm thick, face veneer and edge banding matching adjacent cabinetwork.

.6 Cork for display cases: 6 mm thick fine grained natural cork by Architectural School Products or Global.

.7 Display Case Liner: ribbed, non-woven acoustically absorbent material: Quiet Wall Carpet by Modernfold; colour selected by Consultant. Liner shall not exceed the following flammability requirements when tested in accordance with ASTM E84:

- .1 Flame spread: 15

.2 Fuel contributed: 5

.3 Smoke developed: 25

.8 Cabinet Hardware: products listed below are a standard of acceptance. Products by other manufacturers, of equal quality and similar appearance may also be provided subject to review and approval by Consultant.

.1 Hinges for 19 mm door Blum 91-650, 170^{o} with self-closing spring.

.2 Hinges for 35 mm thick doors: Hager 1279 76 x 76.

.3 Door and drawer pull: GSH 302 x 100 mm, CTC 7.5 mm o.d. brushed stainless steel.

.4 Drawer slides: KV 1429 full extension for 45 kg load.

.5 Drawer locks: Olympus 078 or National Cabinet Lock C8702 or Corbin CCL 02066, keyed as directed by Consultant.

.6 Cabinet locks: Olympus 078 or National Cabinet Lock C8702 or Corbin CCL 02067, keyed as directed by Consultant.

.7 Automatic door bolt for double doors: Hafele 245.58.754.

.8 Door locks for 35 mm doors: by Section 08 71 00.

.9 Pilaster and clips: KV 255, 256.

.10 Coat hooks: GSH 307 x 115 mm brushed stainless steel.

.11 Coat rod: GSH 138-2, 32 mm x 2 mm wall thickness chrome plated.

.12 Cable grommets: plastic countertop fitting for computer / telephone / power cables. 2-part cable set with spring closure top, 60 mm diameter: by Hafele; colours selected by Consultant.

.13 Keyboard slides: K & V 8100, length to suit.

.14 Hardware finish: Unless otherwise indicated chrome or nickel plated.

2.2 FABRICATION

.1 General Requirements:

.1 Exposed surfaces:

.1 Provide wood members free from bruises, blemishes, mineral marks, knots, shakes and other defects, except as specifically permitted by grade rules.

.2 Select exposed surfaces in any one area for balanced overall appearance free of stark contrasts.

.3 Sand smooth all exposed surfaces to provide even and uniform finish free of defects detrimental to appearance.

.2 Exposed joints and edges:

.1 Uniformly space exposed joints unless otherwise indicated.

.2 No edge grain shall be visible; mitre external corners, house internal corners. Secure corners with corrugated metal fasteners. Glue mitred corners.

.3 All exposed edges of plywood and particle board shall have solid wood edging, pressure glued.

.3 Mechanical fasteners:

.1 Inconspicuously locate mechanical fasteners. Wherever possible conceal fastenings.

.2 Countersink nail heads.

.3 Where exposed to view, countersink screw and bolt heads and fill holes with matching wood plugs.

.4 Cutting and fitting: make cutouts in work of this Section as required to accommodate work of other Sections.

.2 Standing & Running Trim:

.1 Fabricate trim of hardwood.

.2 Length: standing trim shall be in one piece. Running trim shall be in longest practicable lengths.

.3 Thickness: unless otherwise indicated, minimum 6 mm.

.3 Plastic Laminate Components:

.1 Unless otherwise specified herein meet requirements of AWMAC “Quality Standards”.

.2 Assembly: bond plastic laminate to core with adhesive using pressure. Bond plastic laminate to both faces of core using same adhesive and same pressure.

.3 Core: unless otherwise indicated: 19 mm thick veneer core plywood.

.4 Balanced construction: plastic laminate covered components shall be of balanced construction, with plastic laminate on both faces of core. Seal core edges not covered with plastic laminate.

.5 Use largest practicable plastic laminate sheet size.

.6 Provide joints symmetrically; provide joints at corners and at changes in superficial areas; provide concealed draw bolt anchors at joints. All butt joints shall have a blind spline.

.7 Construct countertops with preformed front edge and square corner splashback. Chamfer edges uniformly at approximately 20^{o}C; do not mitre.

.8 At L-shaped corners mitre plastic laminate to outside corner. Accurately fit members together to provide tight and flush butt joint.

.9 Apply self-edged minimum 1.1 mm thick plastic laminate to exposed ends of countertops.

.10 Construct splashbacks minimum 100 mm high or higher where indicated. Return splashback at ends except where indicated otherwise.

.11 Openings and cutouts:

.1 Radius internal corners at least 3 mm and chamfer edges.

.2 Where core edge is to remain exposed, cover with plastic laminate edging.

.3 Where core edge is to be concealed, seal with sealer.

.4 Cabinetwork:

.1 As far as practicable, assemble work in shop and deliver to site ready for installation. Leave ample allowance for fitting and scribing in place.

.2 Except where otherwise detailed use "flush overlaid” construction. Where shown or required use "exposed case" construction. Tenon, dado, dowel or rabbet interior construction with all parts well glued along full length/height. Use glue blocks where necessary. Shoulder mitre all exposed corners. Open ends or skeleton frames against walls are not permitted.

.3 Construct all cabinetwork, counters, cupboards, including tops, bottoms, backs and shelves from hardwood faced veneer core plywood or solid hardwood. Use same species of hardwood throughout, unless a specific species is called up, shown or specified for a particular unit or area. Select hardwood plywood for

each cabinetwork unit so as to produce well blended uniform appearance. Avoid use of starkly contrasting veneer colours within any one unit. Replace components which in Consultant's opinion are not of satisfactory appearance.

.4 Design and fabricate work to accommodate expansion and contraction of components. All connectors and fasteners shall be concealed unless permitted by Consultant to be exposed. Fabricate work to produce tight joints. Locate prominent joints where directed. Prevent opening up of joints and glue lines in finished work.

.5 Unless otherwise indicated provide the following thicknesses:

.1 Doors: 19 mm

.2 Drawer fronts: 19 mm

.3 Gables: 19 mm

.4 Cabinet backs (floor supported): 12 mm

.5 Cabinet backs (wall hung): 19 mm

.6 Shelves: 19 mm

.7 Drawer bodies: 12 mm

.6 Rout gables for pilaster strips where adjustable shelving is required.

.7 Limit shelf span to 900 mm.

.8 Construct doors and drawer fronts of 19 mm hardwood faced plywood. Where height of door exceeds 1200 mm provide 35 mm thick solid core doors, unless otherwise shown.

.9 Provide running members in maximum length obtainable. Provide thickness of members in maximum dressed size of standard lumber. Where width or thickness indicated is not available, use glue laminations to obtain sizes required.

.10 Install cabinet hardware in accordance with hardware manufacturer's directions. Unless otherwise indicated, provide each drawer and door with pull, each drawer with extension hardware and each door with minimum two hinges, (2 hinges for door height up to 900 mm, 3 hinges for door height up to 1350 mm and 4 hinges for door height up to 1800 mm); provide additional hinges where recommended by hinge manufacturer based on door size and weight. Provide locks at all doors and drawers unless otherwise shown.

.11 Unless otherwise indicated, factory finish all cabinetwork with a stain and polymerizing two component catalytic conversion varnish system; colour and sheen to be selected by Consultant. All surfaces shall be carefully prepared and sanded before and between coats to provide final finish which shall be smooth, even and uniform free of machine marks, hammer marks, depressions and imperfections.

.12 Apply moisture repellent sealer to concealed backs of cabinetwork.

3 EXECUTION

3.1 INSTALLATION

.1 Install cabinetwork components plumb, true and level and securely fasten in place. Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.2 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.3 Provide mechanical fastening devices such as nails, screws and bolts required for fastening wood components. Unless permitted provide concealed fastening of components.

.4 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.5 Install plastic laminate components using concealed fastening devices.

.6 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.7 Where cabinetwork abuts other building elements provide wood trim matching cabinetwork except where otherwise detailed.

.8 Prepare work of this Section to receive services, fittings and fixtures provided by Division 15 and 16.

.9 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required and secure with four brass screws.

.10 Install display case cork and liner in accordance with manufacturer's recommendations. Bond to substrates with adhesive free of bubbles and tears, with joints neat and tight and with exposed surfaces free of adhesive and stains.

.11 Check operation of all movable parts and, if necessary, adjust to ensure proper and smooth function.

.12 Upon completion of installation, inspect work of this Section and touch up, where required, minor or damaged surface finish to restore it to original condition. Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section includes requirements for supply and installation of a fully adhered conventional installation using 4-plys of asphalt coated fibreglass felts in a built-up bituminous membrane roofing system.

.2 Section Includes:

- .1 Preparation of Metal Deck Surface
- .2 Deck Sheathing Board
- .3 Vapour Retarder
- .4 Roof Insulation
- .5 Insulation Overlay Board
- .6 Asphalt coated fibreglass felt base and top plies
- .7 Accessory Items
- .8 Sheet Metal Flashings related to roofing, including parapet and cap flashings.

1.3 DEFINITIONS

.1 Roofing Terminology: Refer to ASTM D1079-10 and glossary as dictated by CRCA Manual.

1.4 RELATED WORK SPECIFIED ELSEWHERE

.1	Section 04 20 00:	Masonry
.2	Section 05 50 00:	Metal Fabrications
.3	Section 06 10 00:	Rough Carpentry
.4	Section 07 21 00:	Thermal Insulation
.5	Section 07 40 13:	Preformed Metal Roofing and Siding Panels
.6	Section 07 92 00:	Joint Sealants
.7	Division 20:	Mechanical; Roof Drains

1.5 REFERENCE STANDARDS

.1 Execute roofing work in accordance with Canadian Roofing Contractors' Association (CRCA) Roofing Specifications Manual, for class "A" roofs, CRCA roofing system SOI-1, and as specified herein.

1.6 SYSTEM PERFORMANCE

.1 Roofing System: Prevent water migration from entering building through the roof membrane.

.2 Supply roofing materials from a single manufacturer, from roof deck to roof membrane, to ensure all system components are compatible and warranties can be achieved.

.3 System must meet or exceed FM Class 1-60 or be endorsed with Manufacturer's Wind Speed Warranty for the given Wind Zone location in Canada and all applicable codes. Provide proof by membrane manufacturer as listed in Roofnav.

.4 Comply with and verify requirements that this system satisfies FM wind uplift requirements, Roofing Manufacturer's recommendations and all applicable codes. Contractor is responsible for obtaining applicable FM wind isotachs and Building Code hourly wind velocity pressure for 1 in 50 year return value, necessary for the selection of the proper roof system design specific to this project as follows:

.1 For projects located where the hourly wind velocity is less than 0.60 kPa, the maximum membrane sheet width shall be 3048 mm (10'). Provide roof system that meets FM 1-60 wind uplift rating. Provide a membrane manufacturer warranty with minimum wind speed warranty of 72-mph.

.2 For projects located where the hourly wind velocity pressure is equal to or greater than 0.60 kPa, but less than 0.80 kPa, the maximum membrane sheet width shall be 2440 mm (8'). Provide roof system that meets FM 1-90 wind uplift rating. Provide a membrane manufacturer warranty with minimum wind speed warranty of 72-mph.

.3 For projects located where the hourly wind velocity pressure is equal to or greater than 0.80 kPa, but less than 0.95 kPa, the maximum membrane sheet width shall be 2440 mm (8'). Additional membrane securement is required at mid span of the 2440 mm (8') wide field sheets. Fasten a 254 mm (10") wide pressure-sensitive reinforced securement strip beneath the field sheets in lieu of plates and fasteners installed through the roof membrane. Provide roof system that meets FM 1-105 wind uplift rating. Provide a membrane manufacturer warranty with minimum wind speed warranty of 80-mph.

.4 For projects located where the hourly wind velocity pressure is equal to or greater than 0.95 kPa, the maximum membrane sheet width shall be 2440 mm (8'). Additional membrane securement is required at mid span of the 2440 mm (8') wide field sheets. Fasten a 254mm (10") wide pressure-sensitive reinforced securement strip beneath the field sheets in lieu of plates and fasteners installed through the roof membrane. Provide roof system that meets FM 1-135 wind uplift rating. Provide a membrane manufacturer warranty with minimum wind speed warranty of 90-mph.

1.7 QUALITY ASSURANCE

.1 Roofing and sheet metal work shall be performed by a qualified roofer having minimum of five (5) years membership in good standing, of the CRCA, employing skilled experienced workers working under competent supervision. Submit proof of membership in good standing of the CRCA upon Consultant's request.

.1 Provide a certificate or letter of authorization issued by roofing system manufacturer stating Contractor is registered, approved, authorized or licensed by roof system manufacturer to apply their Products and furnish manufacturer’s warranties if required.

1.8 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00.

.2 Shop Drawings:

.1 Submit tapered system layout shop drawings showing and describing in detail tapered materials, drainage patterns and slopes of tapered materials forming hips, valleys, saddles and crickets.

.3 Samples:

.1 Submit samples of materials to the Consultant prior to purchase.

.2 Samples shall be in size and quantities as required for testing and visual approval directed by the Consultant.

.3 Prepare prototype sample approximately 610 mm (24") long, of counter flashing, and upon Consultant's request, other flashing components.

.4 Materials and jointing shall match approved samples. Approval of samples shall not be construed as acceptance of work subsequently executed.

.4 Safety Data Sheets:

.1 Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on site for reference by workers.

1.9 STORAGE, DELIVERY, HANDLING AND PROTECTION

.1 Co-ordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location. Do not load any area beyond the design limits.

.2 Handle and store materials carefully to prevent damage. Keep manufacturer's labels and seals intact. Store bitumen containers in any upright position and store roofing rolls on end to prevent flattening.

.3 Protect sheet metal materials from bending, scratching and exposure which would cause corrosion or damage their appearance.

.4 Protect roofing materials from inclement weather. Keep insulation and roofing felts absolutely dry and remove only as much from storage as can be applied, made weathertight and covered with roofing in same day. Materials found to be damp at time of installation or showing signs of having been damp or exposed to moisture shall be rejected.

.5 Protect the work of other sections from soiling or damage during the application of the roofing materials and make good any damage caused by these operations, all to the approval of the Consultant at no additional cost to the Owner.

.6 Protect reglets from filling up with bitumen by masking same before work begins.

.7 Store roofing felts for at least 24 hours in a room with temperature kept at 21 deg C and remove for application with as little exposure as possible to low ambient temperatures. Keep felts absolutely dry, stored off ground, on end and well ventilated.

.8 In addition to the above, store modified bituminous sheet membrane flashings as follows:

.1 Store rolls of membrane on end, in vertical position without leaning with selvage end up.

.2 Store materials away from direct heat or open flame.

.3 For installation in cold weather, store rolls of membrane in heated storage shed/area for minimum of 24 hours with the temperature kept at 21 deg C and remove for application with as little exposure as possible to low ambient temperatures.

.4 Do not store aggregate on roof ahead of demand. Bring aggregate to roof only as required for spreading on roof as work proceeds.

.9 Do not use bitumen direct from bulk bitumen tankers without Consultant's prior approval. Conform with Consultant's instructions governing use of bitumen direct from tanker.

.10 Hang tarpaulins to protect walls where hoisting is necessary. Locate kettles and tankers so that smoke will not discolour building or adjacent buildings. Keep walls and finished surfaces clean and free from bitumen sealants, and mastic.

1.10 PRE-INSTALLATION CONFERENCE

.1 Convene a pre-installation conference at the site, one (1) week prior to commencing work of this section. Require attendance of parities directly affecting work of this section, including, but not limited to, the Owner's representative, Consultant, Contractor, Roofing Inspector, Roofing Applicator and Job Foreman, Plumber and Roofing Manufacturers Representative.

.2 Contact Consultant two (2) weeks prior to pre-installation conference to confirm schedule.

.3 Review preparation and installation procedures and coordinating and scheduling required with related work.

.4 Record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including the following:

.1 Tour, inspect and discuss condition of substrate, roof drains, roof drain final location, curbs, penetrations and preparatory work performed by other trades.

.2 Review structural loading limitations of deck and inspect deck for loss of flatness and for required mechanical fastening.

.3 Review structural loading requirements of roofing system for future phased work being installed on the roofing system.

.4 Review roofing system requirements (drawings, specifications and other contract documents).

.5 Review required submittals, both completed and yet to be completed.

.6 Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

.7 Review required inspections, testing, certifying and material usage accounting procedures.

.8 Review weather and forecasted weather conditions, and procedures for coping with unfavourable conditions, including possibility of temporary roofing (if not a mandatory requirement).

.9 Review manufacturers written design review recommendations.

1.11 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply roofing system during inclement weather.

.2 Do not apply roofing system to dirty, dusty, wet, damp or frozen deck surface.

.3 Review Wind Zone/Uplift Pressure/Wind-Uplift/Wind Design requirements.

1.12 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver materials in manufacturer's original, unopened containers with manufacturer's labels intact and legible.

.2 Carefully unload in a manner to prevent damage.

.2 Storage and Handling Requirements:

.1 Refer to Product MSDS for precautionary measures during storage and handling.

.2 Keep pail goods and membrane materials dry, stored in rolls standing on end, selvage edge up, elevated from contact with moisture, at temperatures not less than 4 deg C or more than 49 deg C and pre-conditioned before installation. Handle rolls with care to avoid crushing, puncturing or other damage. Ensure selvage edge is not damaged during handling and banding strips are removed before application of membrane. Do not use wet or damp membrane or flattened rolls.

.3 Protect materials from damage by elements, weather and other activities on raised platforms and covered with breathable tarpaulins.

.4 Ensure pail-goods have tight fitting lids when not in use. Store on end in up-right position.

.5 Ensure materials stored on roof stay within designated live load limits of roof construction. Provide ample bases under equipment and materials to distribute weight to conform to these live-load limits. Do not store materials on, or transport materials across, completed roof areas.

.6 Do not expose insulation and roof sheathing to wet weather. Store and handle insulation to prevent broken edges and corners, punctures, indentations or other damage. Remove damaged insulation from site.

.7 Ensure bitumen delivered in form of cartons has manufacturer's material identification labels intact on each carton; if in form of bulk tanker delivery, each shipment to be accompanied by written certificate from manufacturer confirming material identification including following:

.1 Softening Point as per CSA A123.4-04 (R2008).

.2 Minimum FP per ASTM D92-12.

.3 EVT.

.4 FBT.

.8 Protect sheet metal materials from bending and scratching.

.9 Store materials at site within secure temporary sheds or trailers; such facilities must be well sealed and kept at least 3 deg C warmer than exterior ambient temperature to ensure materials remain dry in terms of roofing. Do not use wet, damp, frozen or damaged materials. Stack rolls of felt on end.

.10 Do not store more than 1 day's supply of materials on roof at any time. On roof, stack materials on pallets and completely cover with incombustible waterproof tarpaulin whenever work is interrupted, or when there is precipitation of any kind. Securely tie covering to pallets in such way as to be weather tight. Plastic covers and shrinkwrap covers by manufacturers are not acceptable for site storage and be removed upon delivery to roof.

.11 Store combustible materials away from heat and open flames. Protect and store materials in dry, ventilated area away from elements or harmful substance.

.12 Do not lift rigid insulation in slings which will damage edges. Remove damaged insulation and replace with new material at no cost to Owner.

1.13 WARRANTY

.1 Warrant work of this Section for a period of ten (10) years against roof leaks as a result of material defects in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to; leaking, buckling, opening of seams, bond failure and extensive colour fading.

.2 In addition to above, provide to Owner a OIRCA written warranty covering defects of workmanship for a period of two (2) years commencing from date of Substantial Performance of the Work and agree to Make Good promptly any defects which occur or become apparent within warranty period in conjunction with membrane manufacturer's warranty.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design Products: Products named in this Section were used as the basis-of-design for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products, and provided that they can offer system warranties indicated in above.

.2 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 IKO industries Ltd.

.2 Johns Manville

.3 Firestone Building Products

.3 Take care to ensure compatibility when selecting adjacent materials. Consult the manufacturers representative for system warranty prior to bidding/ordering materials not indicated in system warranty.

2.2 MATERIALS

.1 Adhesives: Manufacturers recommended adhesives specifically formulated for installation of materials outlined below, tested and listed by ULC and Factory Mutual, and meeting the wind resistance rating indicated in this Section.

.2 Deck Sheathing Board: Glass mat faced, mould resistant roof sheathing boards having a treated gypsum core manufactured in accordance with ASTM C1177/C1177M-08, and as follows:

.1 Thickness: 13 mm (1/2")

.2 Long Edges: Square.

.3 Location: Roof substrates over steel decks and sheathing for parapets.

.4 Acceptable Materials:

.1 Georgia Pacific DensDeck

.2 CGC Securock Glass-Mat Sheathing

.3 CertainTeed GlasRoc Roof Board

.3 Pre-manufactured Vapour Barrier: Modified bituminous, self adhering vapour barrier, designed specifically for installation to deck sheathing board; and having a non-slip surface, as recommended by the roofing manufacturer.

.4 Roof Insulation:

.1 Primary Flat Insulation: Polyisocyanurate closed cell rigid foamed plastic boards conforming to CAN/ULC-S704-11, Type 2, Class 3, faced with glass reinforced organic felt paper, perforated, maximum board size 1220 mm x 2440 mm (4' x 8')

for mechanically attached application, maximum board size of 1220 mm x 1220 mm (4’ x 4’) for hot asphalt application. In accordance with CAN/ULC-S770-09, having square edges, minimum LTTR Value 5.6/1", total thickness as indicated on Drawings, perpendicular from edge of roof to a minimum thickness of 50 mm (2”); manufactured to a tolerance not exceeding 3 mm (1/8”) from nominal size in any dimension:

.1 Acceptable Materials:

.1 IKO Industries Ltd - IKOTherm III

.2 Johns Manville ENERGY 3 AGF

.3 Firestone ISO95+GL

.4 Carlisle HP-CG

.5 Atlas ACFOAM II

.2 Tapered Insulation Acceptable Materials: Tapered to maximum 13 mm (1/2") low edge.

.2 Drain Sump:

.1 One-piece, pre-manufactured, polyisocyanurate, 1220 mm x 1220 mm (4’ x 4’) Gemini Drain Set, with minimum 13mm (1/2") per foot of slope, by Atlas Roofing Corporation and represented by Building Resource Inc. Install at all drains.

.3 Tapered Edge Strip:

.1 Pre-manufactured, polyisocyanurate, tapered from 0 to 50 mm (0 to 2") in a 610 mm x 2440 mm (2' x 8') board by Atlas Roofing Corporation and represented by Building Resource Inc. Install at all parapets, and other areas as needed and shown on the drawings.

.5 Insulation Overlay Board: Fibreboard cover board for normal traffic roofs and slopes less than 6%; cellulosic cover board for roof slope less than 6%: 13 mm (1/2") asphalt coated fibreboard conforming in accordance with CAN/ULC S706, fully adhered to primary insulation.

2.3 BUILT-UP MEMBRANE SYSTEM

.1 Fibreglass Felt: Asphalt coated fibreglass felt in accordance with CSA A123.17-05 (R2009) and ASTM D2178 - 04, Type IV, and as follows:

.1 Acceptable Materials:

.1 Johns Manville, Glass Ply IV

.2 IKO, IKOGLASS IV

.3 Firestone, Ply IV (4) M

.2 Base Sheet: Asphalt coated glass fibre felt, to ASTM D4601 - 04, Type II, factory coated, nominal 1.1 kg/m²; and as follows:

.1 Acceptable Materials:

.1 Johns Manville, Perma Ply 28.

.2 IKO No. 28 Glass Base Sheet

.3 Firestone, MB Base M

2.4 BITUMINOUS MATERIALS

.1 Asphalt: Conforming to CSA A123.4 – 04 (R2008), Type 3 on cants and vertical surfaces; Type 2 elsewhere.

.2 Asphalt Primer: Unfilled asphalt conforming to CGSB 37-GP-9Ma.

.3 Roofing Cement: Cut back asphalt plastic cement conforming to CAN/CGSB-37.5.

.4 Bituminous Primer for SBS Membranes: As recommended by membrane manufacturer.

2.5 ACCESSORIES

.1 Metal Flashing: Refer to Section 07 62 00.

.2 Strip Flashing Base Sheet: Styrene butadiene styrene (SBS), modified asphalt membrane 1/8" thickness reinforced with 180g/m^2 non-woven polyester, coated on both sides with SBS polymerized asphalt in accordance with in accordance with CGSB 37-GP-56M, classification Type 2, Class C, Grade 2; for mopped application and as follows:

.1 Acceptable Materials:

.1 Johns Manville, DynaMop PR 2.2 P/S

.2 IKO Industries Ltd., Modiflex MP-180-FS-Base

.3 Firestone, SBS PolyBase

.3 Strip Flashing Cap Sheet: Styrene butadiene styrene (SBS) modified asphalt membrane 1/8" thickness with 180 g/m^2 non-woven polyester reinforcement, coated on both sides with SBS polymerized asphalt in accordance with CGSB 37-GP-56M classification Type 2, Class C, Grade 2; for torch application; top side self protected with coloured granules and as follows:

.1 Acceptable Materials:

.1 Johns Manville, DynaMop 180 Cap

.2 IKO Industries Ltd., Torchflex 180 Cap

.3 Firestone, SBS Torch

.4 Aggregate Ballast: aggregate ballast in accordance with CGSB 8.2-M88 or ASTM D448-08 of the following type and size:

.1 1/4" to 5/8" size, water washed pea gravel, well graded, opaque, non-porous material, free of fines, moisture, ice, snow or long splinters.

.5 Sealant:

.1 Multi-component, chemical curing epoxidized polyurethane conforming to ASTM C920-11, 'Dymonic' by Tremco (Canada) Ltd. Colour as selected later by Consultant.

.2 Primers: As recommended by sealant manufacturer to suit applicable conditions.

.6 Fasteners:

.1 Roofing Nails:

.1 Large head galvanized steel roofing nails of sufficient length to penetrate a minimum of 25 mm (1") into wood nailers and conforming to CSA B111, Table 12.

.2 Sheet Metal Fasteners:

.1 Galvanized steel screw with a hex-head, colour to match sheet metal flashing.

.3 Washers:

.1 Of same material as sheet metal, 0.040" thick with rubber packings. Colour of metal washers to match metal fastener heads and sheet metal flashing.

.7 Roof Penetration Sealing System:

.1 Modular Curb: Precast, grey polyester resin curb, 50 mm (2") high and sized to leave a minimum of 25 mm (1") between the curb and the penetration. Basis of Design Product: ChemCurb by ChemLink.

.2 Adhesive and Sealant: One component polyether based, meeting ASTM C920, Type S, Grade NS, Class 25. Basis of Design Product: ChemLink M1 Structural Sealant.

.3 Pourable Sealer: One component polyether based, 1-Part; ASTM C-920, Type S, Grade S, Class 25, ASTM C-719, 25%+/- (movement), ASTM D-412 175 PSI (tensile), ASTM C-661 30 +/- 3 (hardness), ASTM D-679 45 minutes (tack free). Basis of Design Product: ChemLink One Part Pourable Sealer.

.8 Walkway Pavers and Insulation Pads:

.1 Precast Concrete Paving Slabs:

.1 610 mm x 610 mm x 50 mm (24” x 24” x 2”) thick precast concrete paving slabs having 5% to 7% air-entrainment, minimum 6,500 psi compressive strength, passing the salt scaling test, standard diamond texture finish, chamfered edges, patio quality and conforming to CSA A231.1-06/A231.2-06 (R2010), by Brooklin Concrete Products Limited, or approved equal.

.2 Insulation Pads:

.1 508 mm x 508 mm x 52 mm (20”x 20” x2”) thick rigid, extruded polystyrene insulation, minimum compressive strength of 35 psi and conforming to CAN/ULC-S701, Type 4, 'Roofmate' by Dow Chemical Inc., or 'Foamular 350' by Owens Corning Canada, Inc.

3 EXECUTION

3.1 CONDITION OF SURFACES

.1 Inspect completed roof deck and ensure that any defect of level or construction is corrected before proceeding with the work.

.2 Do not apply any roofing to surfaces which are dusty, rusty or covered in loose material, snow, water, ice or any other substance which might impair the bond of roofing materials.

.3 Verify that roof drains have been properly set and installed by the mechanical trade. Report any discrepancies to the Consultant so that they may be corrected.

.4 Ensure items projecting through roof are solidly set and reglets and nailing strips are in place.

.5 Inspect wood blockings, curbs and cants. Do not install roofing over such items if method of attachment is inadequate to withstand stresses imposed by thermal movement of roofing components.

3.2 PREPARATION

.1 Asphalt shall not be heated over 240 deg C and shall be applied at temperature between 180 deg C – 210 deg C for type 1 bitumen and 210 deg C – 240 deg C for type 3 bitumen. Heating kettles shall be equipped with built in thermometers.

.2 Keep an accurate thermometer suspended in the heating kettle while the work is in progress and provide a similar thermometer to test bitumen temperature at point of application.

.3 Thoroughly clean all surfaces which are to receive the roofing and flashings by whatever means necessary to remove laitance, frost, snow, ice, water, debris, extraneous matter and other substances which may affect the proper performance of the work.

3.3 PRIMING VERTICAL SURFACES

.1 Prime vertical surfaces with asphalt primer commencing at the top of the cant strip to the reglet or highest point as detailed. Allow sufficient time for the asphalt primer to cure and ensure that primer does not run into the building or stain wall faces.

3.4 DECK SHEATHING BOARD

.1 Adhere gypsum deck sheathing board onto the upper rib surfaces of steel decks as recommended by roofing manufacturer.

.1 Cut boards so edges rest on centre of upper ribs. Cut straight lines with adequate tools.

.2 Cut boards cleanly where slopes change directions; avoid breaking boards to acquire deck form.

.3 Place boards perpendicular to deck ribs for continuous support at extremities.

.4 Stagger board joints in half lengths, tightly butted.

3.5 VAPOUR RETARDER FOR STEEL DECK

.1 Install premanufactured membrane vapour retarder in accordance with manufacturer's written instructions.

.2 Overlap side laps by 100 mm (4") and end laps by 150 mm (6") with laps staggered a minimum of 12" and fully sealed with adhesive. Begin work at bottom of slopes.

.3 Install roof vapour retarder to meet and overlap air and vapour retarder membrane from adjoining walls to ensure total continuity.

.4 Install vapour retarder membrane at insulation perimeters and around each element piercing the insulation to ensure sealed connections with base sheet at up stands.

3.6 ROOF INSULATION AND INSULATION OVERLAY

.1 Insulation shall be installed immediately after installation of vapour retarder.

.2 Install the roof insulation over vapour retarder with roof insulation fasteners and plates as recommended by the manufacturer.

.3 End joints of each course shall be staggered with adjoining courses. Edges shall be butted to provide moderate contact but not deformed. Accurately cut and fit roof curb insulation as required at vertical surfaces, curbs, and other deck conditions to form continuous thermal barrier.

.4 Do not leave roof insulation exposed overnight or during rain, snow or heavy dew, all exposed edges shall be strip mopped and covered with two 200 mm (8") wide felt strips, remove same at resumption of work. Reject felts or insulation which shows signs of having been wetted.

.5 Keep roof insulation and overlay dry at all times.

.6 Install tapered insulation boards, drain sump and tapered edge strips as indicated on drawings to create positive drainage. Install tapered edge strips to form hips, valleys, crickets and where it abuts vertical surfaces.

.7 Immediately after the installation of the roof insulation, install overlay in asphalt following roofing system manufacturer's recommendations.

.8 End joints of each overlay board shall be staggered with adjoining overlay boards in the same plane. Edges shall be butted to provide moderate contact, but not deformed. Accurately cut and fit overlay boards as required at vertical surfaces, curbs and other deck conditions.

3.7 ROOFING MEMBRANE

.1 Roofing membrane shall be a 4-ply, class A in accordance with CRCA roofing system SOI-1 (for steel deck).

.2 Temporarily block drain pipes during the application of roofing gravel or other materials which might block the drains. Remove blocking when work is not in progress to prevent flooding.

.3 Install base ply in accordance with manufacturer's recommendations.

.4 Apply three plies of glass felt, on top of base ply, with bitumen following manufacturers recommendations.

.1 Lay felts, shingled in, free of wrinkles, air pockets, prominent lap joints, tears, fishmouths, and with end joints of felts staggered and lapped a minimum of 150 mm (6"). Lay plies so that flow of water to drains is with or parallel to laps as much as possible.

.5 Extend membrane to top of cant strips and cut off to neat, even line. Solidly mop felts to cants with hot bitumen.

.6 Extend roofing membrane onto flanges of roof drain body and trowel on a coat of roofing cement. Place collar over edges of felts and secure with bolts, clamping felts securely all around.

.7 Be responsible for making watertight joints to all items projecting through or located on the roof, all to the approval of the Consultant. Refer to Mechanical and Electrical to determine extent required of flashing flanges and the like specified.

.8 Over entire surface of roofing felt, pour bitumen at rate of 65 lbs./100 sq.ft. and embed full covering of thickness of aggregate at rate of 400 lbs./100 sq.ft.

.9 Keep gravel 305 mm (12") clear of cants until flashing has been installed.

.10 Do not leave felts uncovered at conclusion of work day, but cover with mop coat of bitumen or apply top pour and gravel.

.11 Mop in and seal flashings and flanges of items projecting through membrane.

3.8 BITUMINOUS FLASHINGS

.1 Application of SBS Membrane Flashings: Install flashing concurrently with roof membrane as work progresses, and as follows:

.1 No temporary flashing shall be allowed without the prior written approval of the Contractor and manufacturer; approval will only be for specific locations on specific dates; if any water is allowed to enter under the new roofing due to incomplete flashing remove and replace the affected area at roofing contractor's expense.

.2 Maximum lengths of membrane flashing shall equal the roll width.

.3 Install membrane flashing base sheet, as recommended by the manufacturer, starting on the flat surface of the roof, install the membrane flashing base sheet up and onto the side of the curb. Extend the base sheet ply onto the top, flat portion of the curbs wherever possible.

.4 Along parapets start membrane flashing base sheet on the flat surface of the roof a minimum of 100 mm (4") from the toe of the cant, install up onto the inside face of the parapet, onto the top of the parapet, and 50 mm (2") beyond the top outside edge. Fold base sheet down outside face and mechanically fasten using large head galvanized nails at 305 mm (12") O/C.

.5 Complete the installation of the membrane cap sheet at curbed items; terminate the membrane cap sheet at the top of cant.

.6 Using a propane torch to install the membrane flashing cap sheet to curbed items, fully adhere this ply to the roof surface a minimum of 150 mm (6") from the toe of the cant, up the slope of the cant, and extend onto the side of the curb. Press membrane flashing cap sheet firmly into place using a damp cloth; remove air pockets.

.7 The top of all parapet walls must be covered with a one ply of membrane flashing cope sheet which shall be bonded to and extend down the outside vertical a minimum of 75 mm (3").

.8 Stagger joints of membrane flashing cap sheet and the membrane cap sheet a minimum of 305 mm (12") wherever possible.

.9 Bevel "T" joints.

.10 Lap all joints in membrane flashing a minimum of 75 mm (3") and seal properly.

3.9 ROOF PENETRATION SEALER

.1 Preparation:

.1 Remove all surface contaminants until the top felt plies are exposed. Remove all roof cement, coatings or resaturants that may have been applied to the application area. Sweep, vacuum or brush away all dust dirt and debris.

.2 Clean off the surfaces of the penetration using a wire brush and scraper to clean and remove all loose roof cement, mastics, coatings, scaled rust and caulking that may be adhered to the penetrations. Remove any fresh roof cement completely.

.2 Application:

.1 Apply a bead of structural sealant around the base of all penetrations that are inside the manufactured curb to form a watertight seal. Apply additional sealant to sides of penetration to a point 75 mm (3") above the roof or 13 mm (1/2") above where previous sealants may have been installed. Tool the sealant smooth, covering the entire circumference of the penetrations.

.2 Set all manufactured curb sections into place "dry" to ensure a proper fit. Where necessary, cut sections to fit. The inside dimensions of the installed curb must be a minimum of 25 mm (1") larger than the penetration.

.3 Apply sealant to entire underside of curb and place on prepared surface. Place sealant to edges and install additional pieces of curb until complete.

.4 Apply a 6 mm (1/4") round continuous bead of sealant around the outside base of the curb.

.5 Fill curb with pourable sealer until flush with top of curb.

3.10 WALKWAY ROOF PAVERS AND GAS LINE SUPPORTS

.1 After gravelling, install precast pavers on top of insulation pads. Place gravel around pavers so as to cover insulation pads completely. Refer to drawings for layout.

3.11 FIELD QUALITY CONTROL

.1 An independent inspection and testing company appointed and paid for by the Owner may carry out inspection and testing in accordance with the General Conditions and Division 01. Arrange site meeting with roofing inspector three weeks prior to commencement of work on site to review work and procedures specified in this section.

.2 Co-operate with the inspector and afford all facilities necessary to permit full inspection of the work and testing of materials prior to their use.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Unit Masonry

.2 Section 07 92 00: Joint Sealants

1.3 DESCRIPTION

.1 Include in work of this Section all firestopping required except for firestopping and smoke seals within mechanical assemblies (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside bus ducts) which shall be provided as part of work of Divisions 15 and 16 respectively. Firestopping and smoke seals around outside of such mechanical and electrical assemblies, where they penetrate fire rated separations, shall be part of work of this Section.

.2 Firestop and seal (draft-tight) gaps, control joints, expansion joints and penetrations in fire rated assemblies, including assemblies with a zero rating, against passage of fire, smoke, gasses, firefighter's hose stream and, where designated, passage of liquids. Smoke seal at angle support at fire dampers.

1.4 QUALITY ASSURANCE

.1 Work of this Section shall be carried out by a firm specialized in the type of work specified herein. Use competent installers, experienced, trained and approved by material or system manufacturer for application of materials and systems being used. Installers shall have minimum 5 years experience in installation of firestopping materials.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site in manufacturer's sealed and labelled containers.

.2 Store materials in protected location prior to use, in accordance with manufacturer's directions.

1.6 ENVIRONMENTAL CONDITIONS

.1 Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for storage, mixing, application and curing of firestopping materials.

1.7 SUBMITTALS

.1 Prior to start of work submit list of proposed firestopping and smoke seal materials together with suitable documentation to verify that specified requirements will be met. Provide the following information as applicable to this Project:

- .1 ULC assembly number certification
- .2 required temperature rise and flame rating
- .3 hose stream rating (where applicable)
- .4 thickness
- .5 proposed installation methods
- .6 material of firestopping and smoke seals, primers, reinforcements, damming materials, reinforcements and anchorages/fastenings

.7 size of opening

.8 adjacent materials

.2 Upon Consultant's request submit samples of materials.

.3 Upon completion of work submit written certification that work of this Section has been carried out in accordance with specified requirements.

1.8 MOCK-UPS

.1 At locations directed by Consultant prepare mock-ups of each type of firestopping/smoke seal required.

.2 Provide linear firestopping/smoke seal mock-ups minimum 1 m long. Provide mock-up of each type or penetration firestopping.

.3 Mock-ups may be incorporated into finished work if approved by Consultant.

2 PRODUCTS

2.1 SYSTEMS

.1 Firestopping and smoke seal systems shall be:

.1 tested in accordance with CAN/ULC-S115-05.

.2 listed by ULC or other fire testing agency approved by jurisdictional authorities.

.3 capable of providing fire resistance rating not less than that required by surrounding assembly.

.4 comply with F, T and H rating required.

.2 Firestopping and smoke seals for vertical fire separations shall meet ULC Designation PJ, JF and HW as required for respective location.

2.2 MATERIALS

.1 Firestopping and smoke seal materials:

.1 Provide materials which are:

.1 PCB and asbestos-free

.2 of easily identifiable colour, except where used in exposed location

.3 suitable for intended application

.4 compatible with adjacent materials.

.2 Provide elastomeric type materials at locations requiring future re-entry (such as cable) and at penetrations for ducts and other mechanical items requiring sound and vibration control.

.3 Sealant type materials shall be non-sagging for vertical surfaces and self-levelling for level floors.

.2 Primer: as recommended by firestopping material manufacturer for specific substrate and use.

.3 Damming and back-up materials, support and anchoring devices: non-combustible, in accordance with tested assembly and as recommended by manufacturer.

2.3 MIXING

.1 Mix materials at correct temperature and in accordance with manufacturer's directions.

3 EXECUTION

3.1 PREPARATION

.1 Remove combustible material and loose material detrimental to bond from edges of penetration. Clean, prime or otherwise prepare substrate material to manufacturer's recommendation.

.2 Do not apply firestop material to surfaces previously painted or treated with sealer, curing compound, water repellent to other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.3 Verify openings, dimensions and surfaces conform to fire and smoke seal assembly.

.4 Protect adjacent surfaces from marring or damage.

.5 Prime surfaces in accordance with manufacturer's directions.

.6 Remove insulation from area of insulated pipe and duct where such pipes or ducts penetrate fire separation unless ULC certified assembly permits such insulation to remain within assembly.

.7 Provide temporary damming, forming, packing and bracing materials necessary to contain firestopping. Upon completion, remove forming and damming materials not required to remain as part of system.

.8 Examine sizes, anticipated movement and conditions of opening and penetration to establish correct system and depth of backup materials and of firestopping material required.

3.2 INSTALLATION

.1 Seal penetrations through and gaps in fire rated separations in accordance with ULC listing for tested system selected.

.2 Apply firestopping materials in accordance with manufacturer's instructions and tested designs. Apply wit sufficient pressure to properly fill and seal openings to ensure continuity and integrity of fire separation. Tool or trowel exposed surfaces as required.

.3 Remove excess compound promptly as work progresses and upon completion.

.4 Unless otherwise indicated or permitted by Consultant recess firestopping and smoke seals in exposed locations to permit installation of decorative sealant by Section 07 92 00.

.5 Do not cover materials until full cure has taken place.

.6 Provide firestopping and smoke seal systems at following locations, without being limited to:

.1 At all openings, voids and penetrations through all floor slabs except openings within shafts constructed with a fire resistance rating and slabs on granular fill.

.2 At all openings, voids, control joints and penetrations through fire rated masonry, concrete and gypsum board walls, partitions and shaft walls.

.3 At all openings, voids and penetrations installed for future use through fire rated masonry, concrete and gypsum board walls, partitions and shaft walls.

.4 Around mechanical and electrical assemblies penetrating fire rated assemblies.

.5 Between perimeter of all floor and roof slabs and exterior wall construction.

.6 Between curtainwall and adjacent assemblies.

.7 Between tops of all fire rated walls and partitions and underside of floor or roof slabs.

.8 At building expansion joints.

.7 Curing: cure materials in accordance with manufacturer's directions.

3.3 FIELD QUALITY CONTROL

.1 Upon Consultant's request, manufacturer's representative shall inspect work of this Section and confirm in writing that it complies with specified requirements.

.2 Request Consultant's review of installed systems before they are covered by other work.

.3 Owner may arrange and pay out of cash allowance included in Section 01 21 00 for inspection and testing of work of this Section by independent agency as directed by Consultant.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1	Section 07 62 00	Sheet Metal Flashing and Trim
.2	Section 08 41 13	Aluminum Framed Entrances and Storefronts
.3	Section 08 44 13	Glazed Aluminum Curtain Walls
.4	Section 08 51 13:	Caulking related to aluminum windows
.5	Section 08 81 00:	Caulking between glass and glass framing members
.6	Section 09 21 16	Gypsum Board Assemblies

1.3 DEFINITION

.1 Caulking = Sealant.

1.4 QUALITY ASSURANCE

.1 Sealants must be installed by qualified caulking contractor with minimum five years experience and proven record of being able to produce good quality work.

.2 Upon Consultant's request arrange for sealant manufacturer's technical representative to visit the site, investigate conditions and make recommendations in connection with work of this Section.

1.5 PRODUCT HANDLING

.1 Deliver sealants to site in sealed containers bearing manufacturer's name, brand name of sealant and reference standard to which sealant complies.

.2 Store materials in a dry area having an ambient temperature within limitations recommended by material manufacturer.

1.6 JOB CONDITIONS

.1 Unless otherwise specified, apply sealants when air temperature is between 10°C and 25°C. When air temperature is above 25°C or below 10°C follow sealant manufacturer's recommendations regarding application.

1.7 WARRANTY

.1 At no cost to Owner remedy any defects in work, including work of this and other Sections, due to faults in materials and workmanship provided under this Section appearing within a period of 2 years from date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

.1 Sealants:

.1 Exterior use: one part, low modulus silicone: Dow Corning 790 Building Sealant or Spectrem 3 by Tremco.

.2 Interior use: one part silicone mildew resistant to CAN/CGSB-19.22-M89 and one-part polyurethane: Vulkem 116C by Mameco or Sika 1a, and one component acrylic emulsion type to CAN/CGSB-19.17-M90.

.3 Colours: selected by Consultant, not necessarily from manufacturer's standard colours.

.2 Primers, thinners, cleaners: as recommended by sealant manufacturer, non-staining type.

.3 Premoulded backup for sealant: compressible non-gassing foam rope: Sof-Rod by Tremco.

.4 Bond breaker: closed cell polyethylene or vinyl foam tape, self-adhering one side.

3 EXECUTION

3.1 EXAMINATION

.1 Examine joints to be caulked and report in writing to the Consultant any defects in work of other Sections which would impair installation, performance and warranty of sealants.

.2 Do not commence installation of sealants until conditions are acceptable.

.3 Start of work implies acceptance of conditions.

3.2 PREPARATION

.1 Clean and prepare joints to be caulked to produce clean sound surfaces for sealant adhesion.

.2 Remove dust, oil, grease, water, frost, loose mortar and other foreign matter. Remove loose particles by blowing joint out with compressed air.

.3 Chemically clean non-porous surfaces such as metal and glass, taking care to wipe solvents dry with a clean cloth. Use solvents recommended by sealant manufacturer.

.4 Clean porous surfaces such as masonry, concrete and stone by mechanical abrading.

.5 Surfaces adjacent to joints to be primed and which may be stained by primer shall be masked with tape before primer is applied.

.6 Prime joints in accordance with sealant manufacturer's recommendations. Apply primer before installing premoulded backup.

.7 Install premoulded backup in joints 6 mm and more in width. Roll rope type backup into joint, do not stretch or braid. Install bond breaker in joints less than 6 mm in width.

.8 Protect adjacent surfaces from stains and contamination. Make good any damage caused.

3.3 APPLICATION

.1 Apply sealants under pressure using suitable equipment. Gun nozzle shall be of proper size to fit, and seal joint.

.2 Force sealant into joints in full bead, making certain that void free contact is made with sides of joint. Tool joints to produce a slightly concave surface.

.3 Caulking must appear as a concave recessed joint, free of ridges, wrinkles and embedded foreign matter. Caulking shall not spread or bulge beyond surfaces on each of joint.

.4 Apply sealants in accordance with following table:

Joint Width	Sealant Depth
5 mm	5 mm
10 mm	5 mm
15 mm	7 mm
20 mm	10 mm
25 mm	12 mm

.5 Vent exterior joints in accordance with Consultant's directions.

3.4 CLEANING

.1 As work progresses, remove sealant smears and stains from adjacent surfaces. Use cleaning method recommended by sealant manufacturer.

.2 Leave adjacent surfaces in neat and clean condition.

3.5 SCHEDULE

.1 Apply sealant at the following exterior locations:

- .1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.
- .2 Control joints in masonry elements.
- .3 Between precast concrete elements and between precast elements and adjacent work.
- .4 Below door thresholds (double bead).
- .5 Perimeter of door, screen and louvre frames.
- .6 Penetrations through exterior building elements.
- .7 Where indicated.

.2 Apply sealant at the following interior locations:

- .1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.
- .2 Perimeter of exterior door, louvre and screen frames.
- .3 Perimeter of interior door frame, where gap between frame and wall exceeds 2 mm, or where width of gap is inconsistent.
- .4 Control joints in masonry elements, and joints between bearing and non-bearing masonry walls.
- .5 Ceramic tile control joints.
- .6 Perimeter of firehose cabinets, access panels, and control panels.
- .7 Between vanities/countertops and wall.
- .8 Where shown.

.3 At interior locations use acrylic emulsion sealant except:

.1 At floor control joints use polyurethane.

.2 At vanities/countertops and at ceramic wall tile control joints use silicone sealant.

.3 Where expected joint movement exceeds movement capability of sealant, provide sealant specified for exterior use as directed by Consultant.

END OF SECTION

1 General

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this section.

1.2 SUMMARY

.1 This Section includes requirements for supply and installation of the following:

.1 Exterior and Interior Steel Doors

.2 Exterior and Interior Steel Door Frames

.3 Sidelight Frames

.4 Fire rated door and frame assemblies

.5 Fire rated window frames

1.3 RELATED REQUIREMENTS

.1 Section 07 92 00: Joint Sealants

.2 Section 08 71 00: Door Hardware

.3 Section 08 81 00: Glass and Glazing

.4 Section 09 91 00: Painting

1.4 DEFINITIONS

.1 Base Metal Thickness: Thickness dimensions are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic coated steel sheets.

.2 Opening Sizes: Standard metric door sizes indicated on Drawings are considered nominal dimensions, measured from frame rabbet width and height, with allowances for nominal clearances between head, jamb and door bottom in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames.

1.5 REFERENCES

.1 American National Standards Institute (ANSI):

.1 ANSI/SDI A250.8-2014, Specifications for Standard Steel Doors and Frames (SDI-100)

.2 ANSI/SDI A250.11-2012, Recommended Erection Instructions for Steel Frames.

.2 American Society for Testing and Materials (ASTM):

.1 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 ASTM A879/A879M-12, Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface

.3 ASTM A924/A924M-14a, Standard Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process.

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 1.132-M90, Primer, Zinc Chromate, Low Moisture Sensitivity

.2 CAN/CGSB 41-GP-19Ma-78(1984), Rigid Vinyl Extrusions for Windows and Doors

.3 CAN/CGSB 82.5-M88, Insulated Steel Doors

.4 Canadian Standards Association (CSA):

.1 CSA W59-13, Welded Steel Construction (Metal Arc Welding)

.5 Canadian Steel Door Manufacturers Association (CSDMA):

.1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2007

.2 Fire Labelling Guide, 2009

.6 National Fire Protection Association (NFPA):

.1 NFPA 80-2016, Standard for Fire Doors and Other Opening Protectives

.2 NFPA 252-2012, Standard Methods of Fire Tests of Door Assemblies

.7 Underwriters Laboratories Canada (ULC):

.1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies

.2 CAN/ULC S105-09, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC S104

.3 CAN4 S106-1980 (R1985), Standard Method for Fire Tests of Window and Glass Block Assemblies

1.6 SUBMITTALS

.1 Provide requested information in accordance with Section 01 33 00 - Submittals.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data:

.1 Submit product data for each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, fire resistance ratings, and finishes.

.2 Shop Drawings:

.1 Show each type of frame, door, hardware blanking, reinforcing, tapping and drilling arrangements, metal gauges, thicknesses and finishes.

.2 Show details of doors including vertical and horizontal edge details.

.3 Submit door and frame schedule identifying each unit. Each unit shall bear a legible identifying mark corresponding to that listed in the door and frame schedule.

.3 Samples:

.1 Supply for Consultant's review, if requested, sample of frame corner showing construction, workmanship and finish.

.4 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Source Quality Control Submittals: Submit information on zinc coating treatment and primer spot treatment, including instructions for surface treatment before site painting and any restrictions or special coating requirements.

.5 Certificates: Submit the following certificates or letters of compliance:

.1 Oversize Compliance: Submit oversize construction evidence indicating compliance with fire labelling for door and frame assemblies required to be fire protection rated and exceeding size limitations of labelled assemblies.

1.7 QUALITY ASSURANCE

.1 Manufacturer: Obtain hollow metal doors and frames from single source of supply and from a single manufacturer, and as follows:

.1 Fabricate work of this Section to meet the requirements of the Canadian Steel Door and Frame Manufacturer's Association, Manufacturing Specification for Doors and Frames as a minimum, and as further modified in this section.

.2 Fabricator shall be a member in good standing of the Canadian Steel Door and Frame Manufacturer's Association.

.2 Supplier: Obtain hollow metal doors and frames from single source of supply and from a single manufacturer.

.3 Installer: Use installers who are experienced with the installation of hollow metal doors and frames of similar complexity and extent to that required for the Project.

.4 Testing Agencies: Provide doors produced under label service program of a testing agency acceptable to Authorities Having Jurisdiction, and as follows:

.1 Steel Fire Rated Doors and Frames: Labelled and listed by an organization accredited by Standards Council of Canada for ratings specified or indicated.

.2 Provide fire labelled frame products for those openings requiring fire protection ratings, as scheduled:

.1 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.

.2 Fabricate all rated doors, frames and screens to labelling authority standard.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.

.2 Adequately protect units against rust and damage during manufacture, delivery and storage.

.3 Store materials on planks in a dry area and cover to protect from damage. Make good immediately any damage done. Clean scratches and touch-up with rust-inhibitive primer.

1.9 SITE CONDITIONS

.1 Site Measurements: Verify actual dimensions of openings by site measurements before fabrication and indicate measurements on shop drawings; coordinate fabrication schedule with construction progress to avoid delaying the Work.

.2 Established Measurements: Establish dimensions and proceed with fabricating doors and frames without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual site dimensions correspond to established dimensions.

2 Products

2.1 MATERIALS

.1 Sheet Steel:

.1 Exterior Doors and Frames: Galvanized, AS120, steel sheets in accordance with ASTM A924/M924-14; coated to meet requirements of ASTM A653/A653M, Commercial Steel (CS), Type B; stretcher levelled standard of flatness where used for face sheets.

.2 Interior Doors and Frames (Normal Humidity): Electrolytic zinc coated steel sheets in accordance with ASTM A879/A879M-12, Commercial Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher levelled standard of flatness.

.2 Gauges:

.1 Door and Screen Frames:

.1 Gauge: 16 msg

.2 Doors (Honeycomb or Polystyrene Core):

.1 Door Faces:

.1 Gauge: 18 msg.

.3 Top and Bottom End Channels:

.1 Gauge: 18 msg.

.4 Reinforcements:

.1 Lock and Strike Reinforcements:

.1 Gauge: 16 msg.

.2 Hinge Reinforcements:

.1 Gauge: 10 msg.

.3 Flush Bolt Reinforcements:

.1 Gauge: 16 msg.

.4 Door Closer or Holder Reinforcements:

.1 Gauge: 12 msg.

.3 Anchors:

.1 As required to suit condition.

.4 Rubber Bumpers:

.1 3 per door.

.5 Weatherstriping - Exterior Doors:

.1 Extruded aluminum with vinyl insert for head and jambs and for pairs of doors without mullions, manufactured by KN Crowder Limited, or approved alternate.

.6 Door Cores:

.1 Interior doors, except fire rated doors: Structural small cell; 1" maximum, kraft paper honeycomb; minimum weight 36 kg/ream; minimum density 16.5 kg/m^3; sanded to required thickness.

.2 Exterior doors: Rigid extruded, closed cell insulation, fire retardant treated meeting the requirements of ULC S701-11, Type 4, minimum thermal resistance R-Value 4.5/1" thickness.

.7 Adhesives:

.1 Core Adhesive: Heat resistant, single component adhesive recommended by manufacturer.

.8 Touch-Up Primer: Rust inhibitive primer meeting CAN/CGSB 1.132, touch up zinc coatings using shop applied primer; grey or red coloured primer, clear primer not acceptable; provide additional primer for site touch-up to repair damaged zinc and shop applied coatings.

.9 Accessories:

.1 Glazing Stops:

.1 Glass mouldings: Formed steel having 1/32" metal core thickness, screw fixed.

.2 Accurately fit and butt at corners glazing trim and stops; located on secure side of door, or interior of room window frame.

.2 Sealant: As specified in Section 07 92 00.

.3 Glass and Glazing: As specified in Section 08 81 00.

.4 Door Silencers (Bumpers or Mutes): Manufacturer's standard black or grey neoprene silencers; three silencers on strike jambs of single door frames; two silencers on heads of double-door frames; stick on bumpers are not acceptable.

.10 Materials for fire rated doors shall conform to ULC or ULI requirements.

2.2 FABRICATION AND MANUFACTURE

.1 Gauges of metal shall be as specified. No deviations or substitutions will be accepted

.2 Reinforcing specified is the minimum acceptable. Provide additional reinforcement where required to ensure a permanent, rigid, trouble free installation able to withstand the stresses of heavy commercial usage.

.3 Cut, shear, straighten and work the steel in manner to prevent disfigurement of the finished work.

.4 Punch frames for rubber door bumpers.

.5 Fill seams, joints and weld depressions with epoxy metal filler, disc sand to a smooth, flat, uniform scratch-free surface, with all arrises sharp and true to line. Drilled and punches holes shall be reamed and have all burrs removed.

.6 Finished work shall be free of warp, open seams, buckles, weld and grind marks and other surface defects detrimental to the production of a good paint finish.

.7 Fastenings shall be concealed except those required for loose glazing stops.

.8 Welding shall conform to CSA W59-03 (R2008).

.9 Hardware Requirements:

.1 Blank, mortise, reinforce, drill and tap doors and frames to receive templated hinges and other hardware as required. Check hardware lists for requirements.

.10 Frames:

.1 Fabricate frames to profiles shown. Frames shall be fabricated to suite the header conditions of masonry work. Mitre corners of frames. Cut frame mitres accurately and weld continuously on inside of frame. Fabricate header frame to suit. Where site welding or splicing is required due to size of unit, the location of field joints shall be shown on the shop drawings and strictly adhered to.

.2 Protect strike and hinge reinforcements and other openings with mortar guard boxes welded to frame.

.3 Cutouts in doors for mortise lock sets shall be fitted with leaf spring clips and back limit stop to facilitate easy positioning and setting of locksets.

.4 Weld floor clip angles to inside of each jamb profile, two holes in each for anchorage to floor. Where required provide adjustable type floor clip angles.

.5 Fit frames with channel or angle spreaders, two per frame, to ensure proper frame alignment. Install stiffener plates or spreaders between frame trim where required, to prevent bending of trim and to maintain alignment when setting and during construction.

.6 Where frames occur in masonry provide and adjustable T-strap type or wire type anchor for every 2'-0" of jamb length. Special anchors for frames to be set in concrete shall be as detailed.

.7 Construct door frames of labelled fire doors as approved by ULC or ULI. Ratings for frames shall match doors. Locate label on the frame jamb midway between the top hinge and the head of door frame so that it is concealed when the door is closed.

.8 Provide continuous weatherstripping at head and jambs of exterior door frames. Properly secure in place with screws and adjust as required.

.9 Insulate exterior frames to provide continuous thermal barrier in exterior frames.

.11 Doors:

.1 Fabricate doors to present one continuous face free from joints, tool markings and abrasions.

.2 Reinforce, stiffen honeycomb doors with small cell honeycomb core laminated to the inside faces of panels. The core shall completely fill the inside hollow of the door.

.3 Reinforce around frame openings required for glazing or louvres. Provide glazing stops with countersunk oval head screws.

.4 Exterior doors shall be completely filled with polystyrene foam core.

.5 Reinforce door edges with channel reinforcing. Bevel stiles 1/8". Assemble by tack welding and fill.

.6 Provide flush top edge on exterior doors.

.7 Fabricate fire rated door assemblies in accordance with ULC or ULI requirements. Provide labels for all fire rated doors. Locate label on the door midway between the top hinge and the head of the door so that it is concealed when the door is closed.

.8 Provide cutouts in doors for glazed lites as indicated on drawings and schedules. Glazing stops shall be square formed steel in single piece lengths sized to suit. Accurately mitre corners and finish in proper plane. Secure stops in place with flush, countersunk screws.

.12 Finishing

.1 Shop apply zinc rich primer to repair damaged zinc coatings arising from fabrication; cure primer fully before shipping to site; include compatible primer for site finishing and correction of surface abrasions to zinc coatings and factory applied primer.

.2 Remove weld slag and splatter from exposed surfaces.

.3 Fill and sand smooth tool marks, abrasions and surface blemishes to present smooth uniform surfaces.

3 Execution

3.1 EXAMINATION

.1 Examine substrates, door swing arcs, areas of installation and conditions affecting installation for compliance with requirements for manufacturers installation tolerances and other conditions affecting performance of work of this Section.

.2 Verify roughing-in for embedded and built-in anchor locations before installing frames.

.3 Verify door and frame size, door swing and ratings with door opening number before installing frames.

.4 Installation of hollow metal doors and frames will denote acceptance of site conditions.

3.2 INSTALLATION

.1 Install steel doors, frames, and accessories in accordance with reviewed shop drawings, ANSI A250.11, CSDMA Installation Guide, manufacturer's data, and as specified in this Section.

.2 Door Frames:

.1 Remove temporary spreaders before installing door frames, leaving exposed surfaces smooth and undamaged.

.2 Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set; limit of acceptable frame distortion 1/16” out of plumb measured on face of frame, maximum twist corner to corner of 1/8”; align horizontal lines in final assembly.

.3 Brace frames rigidly in position until adjacent construction is complete; install wooden spreaders at third points of frame rebate to maintain frame width, install centre brace to

support head of frames 4’ and wider in accordance with ANSI A250.1; do not use temporary metal spreaders for bracing of frames.

.4 Install glazing materials and studded door silencers.

.5 For frames over 1220mm (4’) in width, provide vertical support at the centre of head.

.3 Frame Tolerances: Install frames to tolerances listed in ANSI A250.11, and as follows:

.1 Squareness: Maximum 0.8mm (1/32”) measured across opening between hinge jam and strike jamb.

.2 Plumbness: Maximum 0.8mm (1/32”) measured from bottom of frame to head level.

.3 Alignment: Maximum 0.8mm (1/32”) measured offset between face of hinge jamb and strike jamb relative to wall construction.

.4 Twist: Maximum 0.8mm (1/32”) measured from leading edge of outside frame rabbet to leading edge of inside frame rabbet.

.4 Doors:

.1 Fit hollow metal doors accurately in frames within clearances required for proper operation; shim as necessary for proper operation.

.2 Install hardware in accordance with manufacturers' templates and instructions.

.3 Adjust operable parts for correct clearances and function.

.4 Install glazing materials and door silencers.

.5 Install fire rated doors within clearances specified in NFPA 80-2010.

.6 Install louvers and vents.

.5 Adjusting and Cleaning

.1 Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of air-drying primer compatible with factory applied primer, and as follows:

.1 Clean exposed surfaces with soap and water to remove foreign matter before site touch-up.

.2 Finish exposed site welds to a smooth uniform surface and touch-up with site applied rust inhibitive primer.

.3 Site apply touch-up primer on exposed surfaces where zinc coating or factory applied primer has been damaged during installation or handling.

END OF SECTION

1 GENERAL

1.1 GENERAL

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section of the contract includes all wood doors and accessories indicated on the Drawings, as required to provide a complete installation.

.2 The work includes but is not limited to the following:

.1 Interior wood doors

.2 Interior fire-rated wood doors

1.3 RELATED REQUIREMENTS

.1 Section 08 11 00: Metal Doors and Frames

.2 Section 08 71 00: Door Hardware

.3 Section 08 81 00: Glass and Glazing

.4 Section 09 91 00: Painting

1.4 REFERENCES

.1 AWMAC (Architectural Woodwork Manufacturers' Association of Canada) - Quality Standards Illustrated (QSI), latest edition.

.2 CAN/CGSB-11.3-M87, Hardboard

.3 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies

.4 CAN/ULC-S113-07, Standard Specification for Wood Core Doors Meeting the performance Required by CAN/ULC-S104 for Twenty Minute Fire Rated Closure Assemblies.

.5 NFPA 252, Standard Methods of Fire Tests of Door Assemblies

1.5 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00.

.2 Shop Drawings:

.1 Submit shop drawings showing types of cores and construction details, glazing and stops, openings required, material designation and door schedules.

.3 Samples:

.1 Submit for Consultant's review, if requested, two 12" x 12" corner samples of each type of door specified herein showing construction, workmanship and finish including face veneers, core materials, edge strips and stops.

1.6 QUALITY ASSURANCE

.1 Except where otherwise specified, meet requirements of CAN/CSA-0132.2 Series and applicable provisions of AWMAC Quality Standards Illustrated (QSI), Custom Grade.

.2 Fire rated doors shall conform to NFPA for fire rated class and bear label of an approved testing agency.

1.7 REGULATORY REQUIREMENTS

.1 Submit certification that fire rated doors have been tested in conformance to CAN/ULC-S104 and NFPA 252 to ratings indicated on Door Schedule.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location.

.2 Do not permit delivery of work to job site until building is sufficiently dry, wet trades are completed and the moisture readings of surfaces in proposed storage area is less than 18%.

.3 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Store doors flat on level surface. Protect materials with suitable non-staining waterproof coverings, but allow air circulation at sides.

.4 Label each door with manufacturers' name, product identification, door size and type.

1.9 EXTENDED WARRANTY

.1 Submit written warranty that doors will be free from defects in materials or workmanship in accordance with General Conditions but for a period of three (3) years.

.2 Make good defects promptly during warranty period by replacing defective doors.

.3 Defects shall include, but not be limited to delamination of edges, warp, twist, bow exceeding 1/4". "Replace" as used herein includes installing hardware, finishing, hanging and fitting.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Wood doors shall be flush, solid particle core with reinforced styles and rails to CAN/CSA 0132.2-M1990.

.2 Acceptable products and corresponding manufacturers shall be as follows:

.1 Cambridge Doors Ltd. Series 7300 - Fire rated doors as required.

.2 Bailargeon Doors Inc. Series 8300 - Fire rated doors as required.

.3 Doors of equal quality and construction are also acceptable subject to conformance to specifications and door schedule.

2.2 MATERIALS

.1 Conform to CAN/CSA-0132.2 Series for wood flush doors.

.2 All wood doors to be supplied from same manufacturer.

.3 Door Construction

.1 Solid Particleboard Wood Flush Doors

.1 Construction: 5 ply.

.2 Fire Rating: 20 or 30 minutes.

.3 Particle Board for Cores: CAN3-O188.1-M, extruded particle board having spruce particles in melamine based binder, minimum density of 480 kg/cu.m. (30 pcf).

.4 Mineral Cores (for fire-rated doors): Comply with the requirements of the label issuing authority for the scheduled fire ratings, as acceptable to the authorities having jurisdiction.

.5 Face Panels: Grade I, Premium, varnish grade, white birch plastic laminate, flat match, plain cut.

.6 Clear hardwood edges minimum 13 mm thick.

.7 Adhesive: Type I: Waterproof phenol, resorcinol and phenol - resorcinol resin adhesive.

.4 Face Veneer for Flush Wood Doors Scheduled to have Plastic Laminate Finish:

.1 Door facing finish to match existing school doors. Plastic laminated finish to be Formica 7286-58 Sliced Red Oak or acceptable alternates, Arborite W-230 VL Sliced Red Oak, Wilson Art 7928-38 Castle Oak or approve equal.

.5 Hardwood Face Veneer for Flush Wood Doors Scheduled to have Transparent/Stained Finish:

.1 Minimum 1/8" thick AWMAC Architectural Quality Grade, selected "Maple - Flat Cut, Grade A face and No. 1 back", and or other species, as indicated on drawings and conforms to requirements of AWMAC Custom Grade and NHLA Select Grade.

.2 Hardwood face veneers shall be selected for architectural quality, uniformity of colour, figure, grain, character, architectural "book matched" and all sheets numbered in sequence, parallel clipped, jointed by tapeless splicer and edge glued.

.3 Face veneers shall also have a high standard of finished appearance, including being free of, but not limited to the following; mineral streaks, discolouration, grain ruptures, loose texture, shakes, open joints, face depressions, glue stains, patches, plastic wood repairs, and any other manufacturing defects or irregularities.

2.3 FABRICATION

.1 Conform to Quality Standards for Architectural Woodwork published by Architectural Woodwork Manufacturers Association of Canada (AWMAC) for Architectural Grade Doors, except where specified otherwise.

.2 Size doors for 1.6 mm clearance of heads and jambs and 9 mm at bottom. Undercut doors for air intake where indicated on Door Schedule.

.3 Wood Stiles, Rails and Hardware Reinforcement: Low density hardwood species, kiln dried to 8% moisture content.

.4 Stiles and Rails: Hardwood. Stile thickness minimum 1-1/2" and rail thickness minimum 1-1/8".

.5 Bevel vertical edges of single acting doors 3 mm in 50 mm or lock side and 1.5 mm in 50 mm on hinge side.

.6 Radius vertical edges of double acting doors to 60 mm radius.

.7 Seal wood edges and edges of cut outs before units are placed in unheated storage areas.

.8 Fabricate doors using 5 ply hot press construction technology. Bond stiles and rails to core using Type I adhesive. Sand for uniform thickness. Laminate door facing, cross banding and assembled core in hot press.

.9 Factory cut glass light openings. Ensure openings are square with internal corners slightly rounded. Provide metal glass tops, paint finished to match face veneer for vision panels in unrated doors

.10 Factory fit doors for frame opening dimensions identified on shop drawings.

.11 Provide inner blocks at lock edge and top of door closer for hardware reinforcement.

.12 Completely seal wood top, bottom and edges and edges of cut-outs, before units are shipped from the manufacturer's mill or are placed in the open air or unheated storage areas at the mill which would allow change in the specified moisture content of the wood.

.1 Apply sealer in accordance with the manufacturer's printed instructions without dilution or alteration of any kind. Give particular attention to finish.

.2 Obtain approval of Consultant of the finishes before proceeding with sealing. Should this procedure not be followed replace all doors which have been improperly sealed.

.13 Provide blocking for closers, panic hardware, locksets and other door hardware as required.

2.4 FABRICATION - FIRE RATED FLUSH WOOD DOORS

.1 As listed by ULC, ULI or WHI, and bearing their label, as acceptable to authorities having jurisdiction.

.2 Fabricate fire-rated flush wood doors with scheduled facing material over cross banding.

.3 Fabricate fire-rated doors as required for rating indicated, with water resistant noncombustible mineral core, minimum 3/4" fire retardant treated hardwood stiles and minimum 1-1/2" fire retardant treated hardwood rails. Reinforce doors with minimum 1-1/4" solid wood blocking for finish hardware.

.4 Locate the label on the hinged edge of the door midway between the top hinge and the head of the door.

.5 Seal fire-rated doors as specified for non-rated doors.

2.5 FABRICATION - DOORS FOR NATURAL OR STAIN FINISH

.1 Fabricate doors for natural or stain finish with solid cores.

.2 Provide solid wood cross banding at right angles to door face, minimum 2.5 mm (1/10") thick.

.3 Provide face veneer minimum 0.91 mm (1/28") thick of species indicated on Door Schedule.

.4 Face veneer: complying with CAN/CSA O132.2.

2.6 FABRICATION - FACTORY FINISH

.1 Complete fabrication of doors before applying factory finishes including, but not limited to fitting doors for openings and machining for recessed hardware.

.2 Factory finish all four edges, edges of cut outs, and mortises the same as for faces, except that stains and fillers may be omitted on bottom edges, edges of cut outs, and mortises, and as follows:

.1 Finish doors at factory that are indicated to receive finish, other than paint finish.

.3 Steam out deep scratches and ease sharp edges by sanding before starting factory finishing; block sand using 150/180 grit in direction of grain on all surfaces to remove handling marks and fingerprints.

.4 Perform filling, sanding and finishing in horizontal position wherever possible.

.5 Do not use water based primers, stains or combination stain sealers as they raise natural wood grain and may cause veneer splitting and highlighting of veneer joints.

.1 Use caution when staining Birch, Oak, or any light wood to another colour; achieve uniform colour by thoroughly block sanding veneer faces to ensure consistent fibre raise; apply thin sealer coat prior to staining to prevent blotchiness and reduce the barber pole effect; do not use penetrating stains.

.2 Use caution when working with Oak to prevent blue stain, caused when natural tannic acid in the wood comes into contact with iron and moisture:

.1 Do not use steel wool on bare wood.

.2 Do not store transparent finish in unlined metal containers.

.3 Remove blue stain prior to finishing using a solution of oxalic acid made by dissolving one part acid to 7 parts of lukewarm water; allow solution to work, rinse with clear water; dry and sand with 150/180 grit sandpaper.

3 EXECUTION

3.1 EXAMINATION

.1 Verify that frames are in accordance with indicated requirements for type, size, location, and swing characteristics and are installed with level heads and plumb jambs.

.2 Exam all doors thoroughly before installation or finishing; reject any defective doors and obtain replacements from manufacturer at no additional cost to the Owner or Project.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Install doors and hardware in accordance with manufacturer's instructions.

.2 Accurately fit doors into frames to ensure smooth operation without binding. Doors shall have 1.5 mm clearance at head and jambs and 6 mm over finished floor surfaces unless otherwise indicated.

.3 Undercut doors where shown, and as required to accommodate floor finish thickness.

.4 Install hardware in accordance with hardware supplier's instructions.

.5 Install mineral core fire doors in accordance with NFPA 80; install metal fire rating label to door, do not cover over with subsequent finishes; do not trim fire rated doors any greater than 1/8” in width from lock side only and 3/4” from bottom of door.

.6 Glaze doors at site with glass of type and thickness indicated, in accordance with Section 08 81 00 using elastomeric glazing sealant as specified in Section 07 92 00; secure glass in place with removable wood stops.

.7 Adjust operable parts to ensure proper door operation.

.8 Install louvres and glazing stops where required.

3.3 CLOSEOUT ACTIVITIES

.1 Deficient Work: Replace, rework or refinish work that does not meet AWS requirements as directed by Consultant.

.2 Adjusting and Cleaning: Readjust doors and hardware just prior to completion of building to function freely and properly and as follows:

.1 Re-hang or replace doors that do not swing or operate freely.

.2 Replace doors that are damaged or that do not comply with requirements of this Section; doors may be repaired or refinished where work complies with requirements and shows no evidence of repair or refinishing in completed work.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1	Section 06 41 00:	Architectural Wood Casework
.2	Section 08 11 00:	Metal Doors and Frames
.3	Section 08 14 00	Wood Doors
.4	Section 08 71 13	Automatic Door Operators
.5	Division 26	Electrical power supply for automatic door operators

1.3 QUALITY ASSURANCE

.1 Meet requirements of Ontario Building Code and other applicable regulations.

.2 Upon completion of finish hardware installation, hardware supplier's qualified representative shall inspect work and shall certify in writing that all items and their installation are in accordance with requirements of Contract Documents and are functioning properly. This document shall be included in maintenance manuals.

1.4 SUBMITTALS

.1 Upon Consultant's request submit samples of finish hardware.

.2 Prepare and submit digital copy of a detailed hardware schedule and cut sheets based on the drawings

.3 Furnish other Sections with templates required for hardware preparation and installation. Issue templates when requested so as not to cause any delays but not before hardware list has received final review by Consultant.

.4 The Board will provide the keying schedule.

.5 Contractor will be required to carry Rivet Hardware Ltd., refer to attached Hardware schedule (Door Listing)

1.5 PRODUCT DELIVERY, HANDLING & STORAGE

.1 Deliver each hardware item packaged separately in individual containers with necessary screws, keys, instructions and installation templates.

.2 Mark each container with item number corresponding to number shown on hardware schedule with respective door number.

.3 Store hardware in dry, lockable area.

2 PRODUCTS

2.1 FINISH HARDWARE - GENERAL

.1 Type: heavy duty commercial grade.

.2 Hardware shall comply with requirements of jurisdictional authorities.

.3 Provide swing clear door hinge Model HT4A3795 by Mckinney (or equal) where indicated on the drawings

.4 Hold open devices to be provided by electrical contractor.

.5 All door closers shall have back checking features and shall be of proper size to operate door efficiently.

.6 Confirm all kick plate and threshold sizes before ordering them.

.7 Do not use wall stops on drywall.

.8 Exposed screws for installing hardware shall have Phillips or Robertson heads.

.9 Confirm degree of swing for door holders, closers.

.10 The following products may be used. Include for preparation of doors and frames accordingly.

.1 Butt hinges: full mortise type; 4 hinges per door

.2 Locks and latch sets: Cylinder type with through-bolted trim.

.3 Exit devices: rim type, flat bar push and pad style; dead latch feature at exterior doors.

.4 Door closers: surface mounted. by LCN 4040XP X 689

.5 Overhead stop: where wall stops cannot be used, surface mounted except where door closer necessitates concealed mounting.

2.2 KEYING

.1 Locks shall be keyed by the Owner.

.2 Locks and cylinders shall be temporary construction grade only.

.3 P Locks and cylinders will be updated by owner near the end of construction

.4 For existing doors the cylinders are to be kept and reused unless other wise noted on the drawings.

3 EXECUTION

3.1 INSTALLATION

.1 Meet requirements of ANSI/DHI A115.1G-94 “Installation Guide for Doors and Hardware”.

.2 Confirm locations and mounting heights of finish hardware with Consultant.

.3 Install finish hardware in accordance with hardware suppliers directions. Ensure that hardware is installed correctly. Issue instructions if required to Sections concerned.

.4 Unless otherwise directed by the Consultant, or unless otherwise dictated by glass height or rail location, install finish hardware at the following heights above finish floor:

Locksets and Latchsets	1025 mm to centre of strike
Deadlocks	1200 mm to centre of strike
Panic Bolts	1025 mm to underside of push bar
Push Plates	1025 mm to centre of plant
Guard Bars	1065 mm to centre of bar
Door Pulls	1065 mm to centre of pull

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 Furnish glazing materials and accessories to complete the fabrication and installation of:

- .1 Hollow Metal Doors, Frames and Sidelights
- .2 Wood Doors
- .3 Aluminum Swing Doors
- .4 Storefront Glazing
- .5 Curtain Wall Glazing
- .6 Custom Washroom Mirrors

1.3 RELATED REQUIREMENTS

.1	Section 06 10 00:	Rough Carpentry
.2	Section 07 92 00:	Sealants
.3	Section 08 11 00:	Metal Doors and Frames
.4	Section 08 41 13:	Aluminum Framed Entrances and Storefronts
.5	Section 08 44 13:	Glazed Aluminum Curtain Walls
.6	Section 08 51 13:	Aluminum Windows
.7	Section 08 87 13:	Solar Control Film

1.4 REFERENCES

.1 American Society for Testing and Materials (ASTM):

- .1 ASTM C542-05(2011), Standard Specification for Lock-Strip Gaskets
- .2 ASTM C920-11, Standard Specification for Elastomeric Joint Sealants
- .3 ASTM C1172-09e1, Standard Specification for Laminated Architectural Flat Glass
- .4 ASTM C1503-08, Standard Specification for Silvered Flat Glass Mirror

.2 Canadian General Standards Board (CGSB):

- .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass
- .2 CAN/CGSB-12.3-M91, Flat, Clear Float Glass
- .3 CAN/CGSB-12.8-97, Insulating Glass Units
- .4 CAN/CGSB-12.9-M91, Spandrel Glass
- .5 CAN/CGSB-12.11-M90, Wired Safety Glass
- .6 CGSB-12.20-M89, Structural Design of Glass for Buildings

.3 National Fire Protection Association (NFPA):

- .1 NFPA 80-2013, Standard For Fire Doors and Other Opening Protectives

1.5 SUBMITTALS

.1 Submit submittals in accordance with the requirements of Section 01 33 00 Submittals

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit manufacturer's product data for each type of product specified. Data shall indicate compliance with specification and installation recommendations of manufacturer of products being used.

.2 Samples: Submit samples of materials if required by Consultant before commencing work of this section. Samples shall be clearly labeled with manufacturer's name and type.

.3 Shop Drawings: Submit shop drawings, to the Consultant for review prior to fabrication.

.4 Samples for Initial Selection: Submit samples for initial selection by Consultant:

.1 Submit samples of spandrel glass coating for review and acceptance by Consultant prior to ordering.

.5 Samples for Verification: Submit samples for verification including sample sets showing the full range of variations expected where products involve normal colour variations.

.6 Maintenance Data: Upon completion of installation, supply instructions covering re-glazing, adjustments and other relevant maintenance data.

1.6 QUALITY ASSURANCE

.1 Conform to the requirements of the Flat Glass Marketing Association Glazing Manual, latest Edition.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: Deliver packaged materials in their original containers with manufacturer's labels and seals intact.

.2 Storage and Handling Requirements: Store vertically, blocked off the floor in a weatherproof enclosure in original containers with manufacturers labels and seals intact until read for installation, and as follows:

.1 Install glass as soon as possible after delivery to site.

.2 Handle glass carefully to its place of installation.

.3 Prevent damage to glass, adjacent materials and surfaces.

1.8 SITE CONDITIONS

.1 Ambient Conditions: Maintain temperature, humidity and solar exposure conditions of Glass Glazing materials during shipping, storage and site installation as required by manufacturer to maintain warranty and performance of installed products.

1.9 WARRANTY

.1 Provide manufacturers warranty for the following types of glass listed, against defects in materials and workmanship for the period indicated, commencing from the date of Substantial Performance of Work:

.1 Seal Failure: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and

practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions.

.2 Evidence of Failure: Obstruction of vision by dust, moisture, or film on interior surfaces of glass.

.3 Allowable Specific Exclusions: Breakage resulting from thermal stress will be accepted as a limitation to the warranty in accordance with CAN/CGSB 12.20.

.4 Warranty Period: Ten (10) Years.

2 PRODUCTS

2.1 MATERIALS

.1 Float Glass: In accordance with CAN/CGSB-12.3, glazing quality and as follows:

.1 Clear Glass: No tint

.2 Tempered Glass:

.1 Minimum 1/4" thick, clear, conforming to CAN/CGSB-12.1, Type 2, Class 'B'. Tempering shall be performed using horizontal tong free method. Provide 1/2" where indicated on drawings.

.1 Provide Category "I" Heat Strengthened tempered glass for spandrel panel applications.

.3 Laminated Safety Glass: In accordance with CAN/CGSB-12.1 and ASTM C1172 as follows:

.1 Glass: Clear, tempered glass.

.2 Type: 1 - Laminated.

.3 Class: B - Float Glass.

.4 Category: II - Fully Tempered.

.4 Mirrors, Silvered: to ASTM C1503 and as follows:

.1 Type: 1B - Float glass for high humidity use.

.2 Tint: Clear

.3 Edges: Pencil polished edge. Seal edges to prevent chemical or atmospheric penetration of backing.

.4 Mirror Clips: – C26 (polished chrome) finished steel, or stainless steel edge clips, with fastening concealed behind mirror.

.5 Fire Rated Glass Performance:

.1 Fire Rated, Clear and Wireless Glass: Material used in door and screen applications with fire rating requirements of 45 minutes or as indicated in door and frame drawings with hose stream test; and provides protection by reducing the radiant and conductive heat transfer through the assembly in locations where aesthetics are of prime importance.

.1 Fire Rated Glass: Comprised of multiple layers of tempered glass ceramic, laminated with transparent intumescent material, providing distortion free viewing through pane and as follows:

.1 Thickness: As required by manufacturer to meet structural requirements for performance range specified

.2 Fire Rating: As indicated in door and frame schedule.

.3 Labelled: Permanent logo listing name of product, manufacturer, testing laboratory, fire rating period and safety requirements

.4 Basis-of-Design Materials:

.1 Technical Glass Products: FireLite NT, FireLite Plus or Pilkington Pyrostop

.2 InterEdge Technologies: PyroEdge 20

.3 SAFTI Fire and Safety Rated Glass: SuperLite II-XL

.4 Saint-Gobain Glass Solutions: Keralite or Contraflam

.6 Gaskets:

.1 Neoprene/EPDM thermoplastic rubber type gaskets of sufficient thickness to be compressed 25% when installed, having 2,000 psi tensile strength, with 50 durometer shore A hardness plus/minus 5, maximum 30% resistance to permanent set, resistance to ozone without cracking, minimum elongation at break of 300% and conforming to ASTM C542.

.2 Colour - "Black".

.7 Sealant:

.1 One component, silicone base, solvent curing sealant conforming to ASTM C920. Colour as selected Later by Consultant.

.8 Glazing Compound:

.1 Non-hardening modified oil type glazing compound.

.9 Setting Blocks:

.1 Neoprene/EPDM rubber type, 4" long, with 40 to 50 durometer shore A hardness plus/minus 5; resistant to sunlight, weathering, oxidation and permanent deformation under load and wide enough to extend from fixed stop to opposite face of glass of thickness suitable to glazing condition to provide adequate glazing "bite".

.10 Spacer Shims:

.1 Neoprene/EPDM rubber type, with 40 to 50 durometer shore A hardness plus/minus 5; resistant to sunlight, weathering, oxidation and permanent deformation under load and of adequate thickness to provide correct glass to face clearance at least 1/8".

.11 Glazing Tape:

.1 Macro-polyisobutylene preformed glazing tape, 'Polyshim' or 'Vision Strip' by Tremco Ltd., division of RPM Company, or approved equal.

2.2 INSULATING GLASS

.1 Insulating Glass Units: Provide sealed insulating glass units in accordance with CAN/CGSB-12.8 in configurations indicated, and as specified herein.

.2 Manufacture sealed insulating glass units without edge channels or tape, that is, with bare glass edges.

.3 Use two stage seal method of manufacture, as follows:

.1 Primary Seal: polyisobutylene sealing compound between glass and metal spacer/separator.

.2 Secondary Seal: polyurethane, silicone or polysulphide base sealant, filling gap between the two lites of glass at the edge up to the spacer/separator and primary seal.

.4 Install stainless steel capillary breather tubes to equalize pressure differentials between insulating glass fabricating location and insulating glass installation location; crimp tube immediately prior to installation in accordance with glass fabricators written instructions.

.5 Sealants for Insulating Glass Units:

.1 Primary Seal: Polyisobutylene; colour black.

.2 Secondary Seal: Structural silicone based; colour black.

.6 Insulating Glass Units:

.1 Unit Composition - up to 3' above finish floor or grade:

.1 Exterior Lite: Clear tempered glass.

.2 Air Space: ½" Air Filled

.3 Interior Lite: Clear tempered glass having standard performance Low E coating on #3 surface.

.2 Unit Composition – between 3' and top of glazing unit – Unless otherwise indicated on the Drawings:

.1 Exterior Lite: Clear float glass.

.2 Air Space: ½" Air Filled

.3 Interior Lite: Clear float having standard performance Low E coating on #3 surface.

.3 Low Emissivity Coating:

.1 Basis of Design Product: Solarban 60 by PPG Industries.

.7 Spandrel Insulating Glass Units: In accordance with CAN/CGSB-12.9 and as follows:

.1 Unit Composition:

.1 Exterior Lite: Type: 2 - Heat Strengthened complete with applied silicone elastomeric coating, minimum thickness 1/64". Colour: As selected by the Consultant from the manufacturers standard product line.

.1 Basis of Design Materials:

.1 Opaci-Coat 300

.2 Span-Kote

.2 Insulation: Rigid glass fibre insulation held in place with manufacturers standard fixing system to back face of back pan.

.3 Back Pan – Concealed: Galvanized metal sheet, 1/16" thickness, formed into a pan shape to fit into glazing throat with back of pan flush with inside face of back section. If back pan is exposed to view, attach aluminum sheet to galvanized metal back pan by adhesive, finished to match mullions.

2.3 FABRICATION AND MANUFACTURE

.1 Label each light of glass with the registered name of the product and the weight and quality of the glass.

.2 Check dimensions on site before cutting materials.

.3 Minimum bite or lap of glass on stops and rabbets as recommended by glass manufacturer. Finish surfaces shall be free of tong marks.

.4 Cut glass true to dimensions, square, plumb and level. Verify all dimensions prior to fabrication.

.5 Distortion, pock marking or defects detrimental to appearance and/or performance, as determined by the Consultant, will be rejected.

.6 Fabricate mirrors to fit measurements of finished spaces, made at the site. Use one piece for mirrors 4' or less in width. Make no horizontal joints except where indicated.

2.4 GLAZING COMPOUND FOR FIRE RATED GLAZING MATERIALS

.1 Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2%, designed for compression of 25% to effect an air and vapour seal.

.2 Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50% in both extension and compression (total 100%); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.

.1 Acceptable materials:

.1 Dow Corning Corp., Dow Corning 795

.2 General Electric Co., Silglaze-II 2800

.3 Tremco Inc., Spectrum 2

.3 Setting Blocks: Hardwood, glass width by 4"x ¼" thick.

.4 Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.

.5 Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.5 FABRICATION: FIRE RATED GLASS

.1 Fabricate glass and other glazing products in sizes required to glaze openings indicated for project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standards as required to comply with system performance requirements.

3 EXECUTION

3.1 EXAMINATION

.1 Examine areas of work affecting the work of this section. Report in writing all defects, errors and discrepancies immediately to the Consultant.

.2 Commencement of work implies acceptance of surfaces and conditions.

3.2 PREPARATION

.1 Openings shall be free from moisture, frost, rust, dirt and foreign matter.

.2 Clean surface to receive sealant with a clean cloth dampened with xylol or a 50-50 mixture of acetone and xylol. Wipe dry with a clean, dry cloth.

3.3 INSTALLATION

.1 Conform to the recommendation of the glazing manual, Flat Glass Marketing Association, latest edition and as specified herein.

.2 Unless otherwise indicated on drawings otherwise, provide tempered glass at all doors, transoms, sidelights and vision lites within 2'-6" of grade and/or finished floor.

.3 Glaze doors scheduled to be glazed.

.4 Set sheet glass with draw lines horizontal.

.5 Glaze interior openings using compound or glazing tapes or gaskets.

.6 Install removable stops. Insert spacer shims between glass and stops at 24" O.C. and not less than 1/4" below "sight lines". Fill remaining voids with sealant or glazing compound to "sight lines" and trim sealant/glazing compound to produce clean, sharp, straight lines without voids or depressions.

.7 Replace loose stops in their original positions, tighten all screws.

.8 Refer to drawings and door and frame schedule for locations of each type of glass.

3.4 INSTALLATION – MIRRORS

.1 Secure mirrors with a minimum of 4 clips per piece. Provide pads to prevent direct metal-to-glass contact of clips or screws.

.2 Align mirrors (in multiple application) to a parallel and true plane surface to produce a true reflection across all sections.

.3 Place plumb and level.

3.5 FIRE RATED GLASS

.1 Comply with GANA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.

.2 Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.

.3 Place hardwood setting blocks located at quarter points of glass with edge block no more than 150mm (6") from corners.

.4 Glaze vertically into labelled fire rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described above.

.6 Do not remove protective edge tape.

.7 Install removable stop and secure without displacement of tape.

.8 Do not pressure glaze. Knife trim protruding tape.

.9 Provide minimum ¼” edge clearance.

.10 Install vision panels in fire rated doors to requirements of NFPA 80.

.11 Install so that appropriate fire rating labels and markings remain permanently visible.

3.6 CLEANING

.1 Repair all defects caused by the work of this section. Remove as work progresses, all excess or foreign materials or droppings which would set or become difficult to remove from surfaces at time of final cleaning.

.2 Immediately prior to acceptance of work of this section by Consultant, remove temporary protection, clean and polish exposed surfaces of all work of this section. Use proper cleaning materials and methods to prevent damage to surfaces, finishes, sealer or work of other trades. Make good such damage to Consultant's satisfaction.

.3 Do not use steel wool, wire brushes or steel scrapers on any finished surfaces.

.4 Replace or make good to Consultant's satisfaction, upon completion of work of this section, all defective, scratched or damaged work, at no extra cost to the Owner.

3.7 GLAZING SCHEDULE

.1 Aluminum Doors:

.1 Insulating glass unit, tempered safety glazing: – 1/4” tinted exterior light; 1/4” clear interior light.

.2 Hollow Metal Doors and Borrowed Lights:

.1 Single 1/4” clear tempered safety glazed light, as indicated.

.2 Single 1/4” clear wired glazed light, as indicated.

.3 Wood and Plastic Doors and Borrowed Lights:

.1 Single 1/4”clear tempered safety glazed light.

.4 Aluminum Entrances:

.1 Interior vestibules: Single 1/4” clear tempered safety glazing.

.2 Exterior entrances: Insulating glass unit tempered safety glazed doors and sidelights. – 1/4” tinted exterior light; 1/4” clear interior light.

.5 Exterior Windows:

.1 Insulating glass units, 1/4” tinted float exterior light; 1/4” clear float interior light.

.2 Spandrel Insulating glass unit, 1/4” [clear] [tinted] exterior light; 1/4” spandrel interior light.

.6 Aluminum curtain wall:

.1 Vision areas/spandrel areas; insulating glass units, 1/4” tinted float exterior, 1/4” clear float interior.

.7 Exterior Storefront Frameless Glazing

.1 Glass units, [1/2”] [1”] clear tempered safety glazing in U-Channels.

.8 Washroom Mirrors:

.1 Single 1/4” non-tinted float glass mirror.

.9 Glass [Railings] [Balustrades]:

.1 All glass balustrades shall be 1/2” thick clear tempered glass, edges flat ground.

.2 Where balustrade glass floor mounted set in recessed steel glazing channels provided, centre and support glass on setting blocks at quarter points.

.3 Align glass units plumb vertically and levelled with adjoining units, gapped as detailed. – Set shims at bottom of glazing channel, each side of glass, and at 3/8” below floor level. – Fill gap each side with dense resilient filler to within 3/8” of floor level.

.4 Fill remaining 3/8” space to floor level with compatible moisture resistant sealant, colour as selected by Consultant.

.5 Shim and caulk glass into handrails slot.

.10 Hollow Metal Doors:

.1 Single ¼" fire-rated glazing composed of wire glass.

.11 Other glass types as indicated on drawings.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1 Section 07 21 00: Thermal insulation

.2 Section 07 27 13 Modified Bituminous Sheet Air Barriers

.3 Section 07 84 00: Firestopping

.4 Section 07 92 00 Joint Sealants

.5 Section 08 11 00: Metal Doors and Frames

.6 Section 09 91 00: Painting

1.3 DEFINITION

.1 Drywall = gypsum board.

1.4 FIRE PROTECTION REQUIREMENTS

.1 Provide fire rated gypsum board components and assemblies as indicated.

.2 Where firehose cabinets, electrical panels or other fixtures or equipment are recessed into fire rated gypsum board partitions, provide fire rated backing to maintain required fire rating.

.3 Protect recessed fixtures in fire rated gypsum board ceilings in accordance with fire rated assembly design report and/or as indicated.

.4 Gypsum bulkheads/partitions in ceiling spaces above fire rated glazed screens, doors or other elements shall have same fire rating as screens/doors over which they occur.

.5 Fire rated bulkheads are required in first floor ceiling spaces where construction changes from fire rated floor assembly to non-fire rated roof assembly. Carefully examine Drawings to determine locations.

1.5 WORKMANSHIP STANDARDS

.1 Interior metal framing and furring: comply with applicable requirements of ASTM C754 and ASTM C840 unless otherwise shown.

.2 Gypsum board application and finishing: comply with requirements of ASTM C840, unless otherwise shown.

1.6 PRODUCT HANDLING & STORAGE

.1 Handle gypsum board panels to prevent damaged and broken edges.

.2 Store materials in dry place so as to preserve their quality and fitness for work.

1.7 JOB CONDITIONS

.1 Install and finish gypsum board when ambient temperature is between 14 and 22^{o}C. Maintain this temperature range in areas to receive gypsum board for 24 hours before and during application and until joint cement and adhesives are fully cured.

.2 Apply gypsum board after building has been completely enclosed. Ensure that work to be concealed by gypsum board has been installed, tested, inspected and approved before starting work.

2 PRODUCTS

2.1 FRAMING, FURRING AND TRIM

.1 Unless otherwise specified, provide framing members of minimum 0.5 mm core thickness steel hot dip galvanized (wipe coat) to ASTM A653.

.2 Studs, interior locations: channel shaped screw-on type: depth as indicated; with knurled supporting flanges at least 34 mm wide; with service pass-through holes at 610 mm o.c. in web. Provide minimum 0.9 mm thick studs where stud depth exceeds 92 mm and where cementitious board and abuse resistant gypsum board is supported.

.3 Top and bottom runners: channel sections, 35 mm legs. Depth to suit studs. Provide oversized top runner where required to accommodate deflection of structure.

.4 Rough framing members: 38 x 19 x 1.2 mm and 19 x 13 x 1.2 mm galvanized steel channels.

.5 Furring and strapping members to receive gypsum board: 19 mm deep channel shaped section with outstanding flanges and 35 mm wide knurled supporting face.

.6 Corner beads: beaded angle with perforated flanges.

.7 Casing beads: channel shaped; beaded corners.

.8 Hangers: minimum 3 mm galvanized steel wire.

.9 Tie wire: minimum 1.5 mm soft annealed galvanized steel.

.10 Metal control joint section: bellows shaped section with perforated flanges.

.11 Reveal mouldings: extruded aluminum, profiles as indicated, by Fry, Gordon or Pittcon Softforms.

2.2 GYPSUM BOARD

.1 Exposed gypsum board for interior use: tapered edge; ASTM C1396.

.2 Unexposed gypsum board for interior use: backing board: ASTM C1396.

.3 Fire rated gypsum board: Type 'X' board ASTM C1396.

.4 Moisture resistant gypsum board: ASTM C1396.

.5 Abuse resistant gypsum board: 16 mm thick fire rated with tapered edge: Fiberock VHI by CGC.

2.3 SHAFT WALL SYSTEM

.1 Gypsum board and metal framing system meeting fire rating requirements indicated, labelled by ULC: Shaft Wall System by CGC, Westroc or Domtar.

2.4 CEMENTITIOUS BOARD

.1 Board for paint finish:

.1 Board: polymer modified, fibreglass mesh reinforced lightweight concrete board, 12 mm thick, tapered edges: PermaBase by Unifix.

.2 Joint tape: 75 mm wide alkali resistant fibreglass mesh tape: Unitape by Unifix.

.3 Base coat reinforcing: Uniroll by Unifix.

.4 Joint compound and base coat: acrylic based: Acryjoint by Unifix.

.2 Board for textured finish or backing for ceramic tile: Durock by CGC 12 mm thick, or equivalent product by other manufacturer approved by Consultant.

2.5 FASTENING & FINISHING MATERIALS

.1 Drywall screws: self-drilling, self-tapping, case hardened. Use zinc, nickel or cadmium plated screws for fastening of gypsum sheathing and cementitious board.

.2 Laminating adhesive: CGC Durabond 90 compound by Canadian Gypsum Co.Ltd., or similar by Westroc or Domtar.

.3 Joint tape: 50 mm perforated type.

.4 Joint filler and topping cement: vinyl or latex base, slow setting.

2.6 ACOUSTICAL MATERIALS

.1 Acoustic Insulation: Acoustical Fire Batt by Roxul or equivalent product by Owens Corning or Fibrex.

.2 Caulking: to CAN/CGSB-19.21-M87: Acoustical Sealant by Tremco, or CGC Acoustical Sealant.

.3 Steel deck closures: Emseal 25V Expanding Foam Sealant, sized and shaped to fit flutes.

2.7 THERMAL BREAK

.1 Adhesive face rubberized cork 3 mm thick or self adhesive closed cell neoprene sponge tape "Permastik" 122X by Jacobs and Thompson Ltd., or foamed vinyl tape "Arnofoam" by Arno Adhesive Tape Inc.

3 EXECUTION

3.1 METAL FRAMING

.1 General:

.1 Framing and furring indicated is schematic and shall not be considered exact or complete. Location and spacing of members, bracing, supports and securement shall be in accord with referenced standards as required to provide complete and finished work.

.2 Make provision for supporting recessed and surface mounted fixtures and equipment. Provide additional framing, supports and stiffeners as required.

.3 Neatly frame around recessed fixtures and openings.

.4 Examine mechanical and electrical drawings and coordinate with Divisions 15 and 16 to determine openings required.

.2 Partitions:

.1 Unless specified or shown otherwise, extend steel studs to underside of structural slab or deck above. Make provisions to accommodate structural creep and deflection.

.2 All steel studs shall be spaced at 400 mm maximum, except where indicated otherwise. At curved walls/partitions space studs closer so as to maintain uniform curvature.

.3 Install runner channels at top and bottom of partition and secure to supporting building elements at maximum 610 mm o.c.

.4 At partition corners extend one runner channel to end of corner and butt other runner channel; allow clearance for gypsum board thickness; do not mitre runner channels.

.5 Install steel studs vertically; fix studs to runner channels by crimping or screwing on both sides of stud.

.6 Install additional studs as detailed and required at partition intersections, openings and terminations at dissimilar materials. Place studs not more than 50 mm from abutting walls, openings and each side of corners.

.7 Stiffen partitions over 3.6 m in height at mid-height with at least one 19 mm horizontal bracing channel extending full length of partition.

.3 Ceilings and Soffits:

.1 Erect suspension and furring system level with a maximum tolerance of $\pm$3 mm over a 3000 mm length.

.2 Suspension system shall support ceiling assemblies, with maximum deflection of L/360, L being span between supports.

.3 Hangers for suspended ceilings shall support grillage independent of walls, columns, pipe and ducts. Space hangers at maximum 1220 mm o.c. along rough furring members and not more than 150 mm from ends. Do not suspend framing from steel roof deck.

.4 Space rough furring members at maximum 915 mm and not more than 150 mm from perimeter walls.

.5 Space furring channels transverse to runner channels at maximum 610 mm o.c. except at exterior soffits, and secure to each support with clip or saddle tie with 2 loops of tie wire. Install furring channels so as not to contact perimeter walls.

.6 Where ductwork, piping and other elements within ceiling spaces interfere with direct suspension of ceiling from structure, install additional framing securely fastened to main structure to accommodate proper hanging of ceiling.

.7 Erect exterior soffit framing in accordance with reviewed erection drawings. Suspend soffit framing with metal studs and brace system to withstand positive and negative wind pressures without detrimental effects. Fasten furring members to surrounding walls. Use minimum 1.2 mm thick framing members.

.4 Bulkheads, Coves, Furring:

.1 Frame to profiles shown, rigid, square, true to line and securely fastened to supporting building elements.

.2 Space furring members to receive gypsum board at maximum 610 mm o.c.

.3 Provide rough framing and bracing members as required to ensure stability and accuracy of work.

3.2 GYPSUM BOARD INSTALLATION

.1 Unless otherwise specified, erect gypsum board vertically or horizontally, whichever results in fewer end joints.

.2 Locate board end joints over supporting members.

.3 Cut and fit gypsum board as required to accommodate other work.

.4 Unless otherwise shown or specified, extend gypsum board on both sides of partitions to underside of structural deck above. Fasten gypsum board to studs, not to top channel. Allow for 13 mm deflection.

.5 Do not install gypsum board until wood blocking or other back-up components are installed. Remove and reinstall gypsum board at no extra cost to Contract where this requirement is not complied with.

.6 Provide corner beads at external corners.

.7 Provide casing beads around openings and where gypsum board abutts dissimilar material and construction.

.8 Fasten gypsum board to supports with screws spaced at maximum 305 mm o.c.

.9 Install gypsum sheathing horizontally at outside of exterior wall steel studs. Fasten each board at each stud with minimum 3 screws.

.10 Adhesive bonded gypsum board; apply 13 x 13 mm ribbons of laminating adhesive to back side of board, parallel to long dimension; space adhesive ribbons at max.150 mm o.c. temporarily brace boards until complete adhesive bond develops.

.11 Where double layer is required screw fasten second layer through first into steel framing. Select screws of suitable length to ensure positive fastening. Offset joints in second layer.

3.3 SHAFT WALLS

.1 Install shaft wall systems in accordance with fire rated assembly design and so as to achieve required fire rating.

3.4 CEMENTITIOUS BOARD

.1 Screw fasten board to each supporting member at maximum 300 mm o.c.

.2 Prepare cementitious board surfaces to receive painting in accordance with board manufacturer's directions and as follows:

.1 Fill joints with joint tape and joint compound.

.2 Apply reinforced base coat over entire surface and trowel smooth.

3.5 GYPSUM BOARD FINISHING

.1 Tape and fill exposed joints, fastener heads, edges, corners, to produce an acceptable surface ready for decoration.

.2 Conceal exposed flanges of corner beads, casing beads and other trim sections with at least 3 coats of cement, feathered out minimum 200 mm.

.3 Fill depressions at fastener head with cement, then apply 2 additional coats of cement to produce smooth, level surface.

.4 Treat joints using 3 coat method as follows:

.1 Apply thin uniform layer of cement and embed joint tape.

.2 Immediately apply thin skim coat of cement over tape and allow to dry.

.3 Apply 2 additional coats of cement. Allow first coat to dry before applying second coat.

.5 Sand each coat of topping cement with fine sandpaper as required to produce smooth surface. Do not sand paper face of gypsum board.

.6 Finish concealed fastener heads at fire rated gypsum board elements in manner specified for exposed work.

.7 Finish concealed joints at fire rated and at acoustically insulated gypsum board elements in manner specified for exposed work.

3.6 CONTROL AND RELIEF JOINTS

.1 Control Joints:

.1 Provide control joints where shown and at maximum 8 m o.c.

.2 Break continuity of gypsum board and framing system at control joints; install continuous metal control joint section.

.2 Relief Joints:

.1 Provide relief joints where shown and where gypsum board assemblies abutt dissimilar construction.

.2 Stop gypsum board 6 mm from abutting construction at dissimilar building elements, unless otherwise indicated.

.3 Where gypsum board comes into contact with window frames or exterior door/screen frames install thermal break. Adhere self-sticking tape to casing bead and compress during installation of gypsum board.

.4 Where indicated, install reveal mouldings.

3.7 SOUND CONTROL

.1 Acoustical Insulation: Provide acoustical insulation in gypsum board partitions and ceilings as indicated. Unless otherwise noted provide 50 mm thick insulation. Extend acoustical insulation over full height of partition, including portions located above ceiling.

.2 Acoustical Caulking:

.1 Provide acoustical caulking at all partitions, bulkheads and ceilings scheduled to receive acoustical insulation as follows:

.1 At perimeter of gypsum board partitions and ceilings.

.2 Around objects penetrating gypsum board elements.

.2 Provide 2 bead caulking system around horizontal and vertical perimeters of partitions. Apply continuous sealant beads at each side of horizontal runner tracks and vertical end studs, between gypsum board and adjacent construction.

.3 Caulk around objects such as electrical outlets, light switches, electrical and mechanical panels and boxes, grilles, and other objects penetrating. Caulk behind metal control joint sections.

.3 Where acoustically insulated partitions meet steel deck running perpendicularly to partition, provide steel deck closures.

3.8 DOOR FRAMES / ACCESS DOORS

.1 Install access doors supplied by Divisions 15 and 16. Build doors into gypsum board elements flush and parallel to walls and securely fastened.

.2 Install steel door frames occurring in gypsum board partitions. Follow installation requirements specified in Section 08 11 00.

3.9 GYPSUM BOARD SCHEDULE

.1 Use Type 'X' gypsum board at fire rated elements.

.2 Use moisture resistant gypsum board where indicated.

.3 Use abuse resistant gypsum board where indicated.

.4 Provide shaft wall systems where indicated.

.5 Provide cementitious board where indicated.

.6 Unless otherwise specified or shown, provide 16 mm thick standard gypsum board.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1 Section 03 35 00 Concrete Finishing

.2 Section 07 92 00: Joint Sealants

1.3 QUALITY ASSURANCE

.1 Installer Qualifications: not used

1.4 SUBMITTALS

.1 Of each type of tile required, submit sample consisting of minimum 4 tiles bonded to rigid board back-up and joints filled with grout. Select tiles to show full range of tile to be used. Resubmit sample if required until tile range and group colour is approved by the Consultant.

.2 Submit list of mortar mixes and grouts to be used. In each case products proposed must be suitable for the purpose intended and they shall be capable to produce top quality work. Upon Consultant's request submit evidence of material manufacturer's endorsement of products proposed.

.3 Upon Consultant's request submit samples of bases, trim and fittings.

.4 Maintenance materials: provide an additional 2% of each type/colour tile required. Clearly identify each package and store where directed. Obtain receipt.

1.5 JOB CONDITIONS

.1 Maintain minimum air temperature of 10oC during installation and curing period.

.2 Exclude construction traffic from areas to receive tile during installation and curing period.

.3 Protect tile flooring subjected to construction traffic with non-staining protective covers.

2 PRODUCTS

2.1 MATERIALS

.1 Products by Laticrete listed herein are specified to establish a standard of acceptance. Equivalent products, subject to Consultant's review, by Mapei and H.B. Fuller (TEC) are also acceptable.

.2 Water: potable and non-staining.

.3 Portland cement: CAN/CSA-A5-03.

.4 Sand: CSA A82.56-M1976.

.5 Thick bed mortar: high strength latex-portland cement mix: Laticrete 226/3701/8510.

.6 Thin set mortar: latex-portland cement mix: Laticrete 211/4237.

.7 High strength mortar: 100% solids epoxy adhesive: Latapoxy 300.

.8 Organic adhesive: latex adhesive to ANSI A136.1: Laticrete 15 Multi-Mastic.

.9 Wall grout: Unsanded dry set, coloured: Laticrete 600 Series/1776; colours selected by Consultant.

.10 Control joints: Schlüter DILEX-BWB, height to suit tile thickness, colour selected by Consultant.

.11 Primer: ECO Prim Grip by Mapei.

.12 Wall Tile:100mm x 400mm glazed wall tile; Allow for two (2) colours, as selected by the Consultant from the manufacturer's standard product line.

.1 Colour and Dimension Collection by Olympia, or

.2 Metropolis by Royal Mossa, or

.3 Bright and Matte Glazed Wall Tile by American Olean

.13 Cleaning compound: TTMAC 1001

2.2 MIXES

.1 Mortar and grout: mix using suitable mechanical mixers in accordance with material manufacturer's directions.

.2 Place liquid into mixer, start mixer and add dry material. Mix only long enough to wet out batch; do not overmix. Dump mixed material from mixer promptly and clean out mixer with water after each batch.

3 EXECUTION

3.1 PREPARATION

.1 Substrates shall be clean and free of foreign matter and minimum 10°C.

.2 Clean substrates as required to produce acceptable surface.

.3 Where substrate conditions require it, apply levelling coat and allow to cure.

3.2 TILE INSTALLATION

.1 Unless otherwise specified, meet applicable requirements of TTMAC Tile Installation Manual 09°30°00; 2014 edition.

.2 Bond tiles to substrate in accordance with mortar / adhesive manufacturer's directions and as follows:

.1 All locations except where indicated otherwise: thin set mortar.

.2 Gypsum board substrate: organic adhesive.

.3 Cement board substrates: high strength mortar.

.3 Finished work shall be level, plumb, true, square and free of defective, chipped, broken, discoloured or blemished tiles. Maximum allowable finished surface variation shall be 3 mm in 3 m when measured, in any direction, with a 3 m straightedge.

.4 Lay out tile patterns symmetrically within each area and to patterns shown. Unless otherwise indicated provide stacked pattern. Provide checkerboard pattern at quarry tile floors.

.5 Joints shall be parallel, uniform, neat, straight, square and of width directed by Consultant.

.6 Fit tile neatly against and around interruptions, penetrations and abutting dissimilar surfaces. Wherever possible, drill holes for penetrating elements to ensure neat fitting.

.7 After setting, sound tiles and replace hollow backed tiles.

.8 Provide tile manufacturer's standard trim pieces at changes in direction and at terminations. Unless otherwise indicated provide the following corner and edge conditions:

.1 Internal horizontal corners: coved joint.

.2 External vertical and horizontal corners and edges: bullnose.

.3 Internal vertical corners and unexposed edges: square butt joint.

.4 At steps provide tread tiles complete with right and left angle corner tiles where required.

.9 Where tile abuts dissimilar flooring, install edge strip.

.10 Install CT.1 floor tile, of colour selected by Consultant, at elevator cab.

3.3 CONTROL JOINTS

.1 Provide control joints at substrate control joint locations, at abutting dissimilar materials and at maximum 8 m in tile field. Review control joint locations with Consultant prior to start of work.

.2 Install control joints as recommended by material manufacturer. Set control joints slightly lower than finish tile surface.

3.4 GROUTING

.1 Commence grouting not earlier than 24 hours after setting tiles unless otherwise directed by grout manufacturer.

.2 Force grout into joint so as to fill them flush, leaving no voids.

.3 Promptly as work progresses remove excess grout from adjacent tile surfaces before grout establishes tight permanent adhesion.

.4 Cure grout in accord with manufacturer's directions.

.5 Provide epoxy grout for all floor joints.

3.5 CLEANING

.1 Thoroughly clean and polish all ceramic tile surfaces in accordance with material manufacturer's recommendations.

.2 Remove grout haze from exposed tile surfaces; use acid wash if necessary.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section includes requirements for supply and installation of ceilings consisting of acoustic panels, complete with exposed suspension system and trim.

1.3 RELATED REQUIREMENTS

.1 Section 05 50 00: Metal Fabrications

.2 Section 09 21 16: Gypsum Board Assemblies

.3 Division 20: Mechanical fixtures

.4 Division 26: Electrical fixtures

1.4 QUALITY ASSURANCE

.1 The Contractor executing work of this Section shall have a minimum of five (5) years continuous Canadian experience in successful and installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.

.2 Comply with applicable requirements of ASTM C636.

1.5 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit product data for each type of product specified.

.2 Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling mounted items indicating the following:

.1 Ceiling suspension system members.

.2 Method of attaching suspension system hangers to building structure.

.3 Ceiling mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special mouldings at walls, column penetrations, and other junctures of acoustic ceilings with adjoining construction.

.3 Samples for Initial Selection: Manufacturer's colour charts consisting of sections of acoustic panels, suspension systems, and trim showing the full range of colours, textures, and patterns available for each type of ceiling assembly indicated.

.4 Samples for Verification: Full size units of each type of ceiling assembly indicated; in sets for each colour, texture, and pattern specified, showing the full range of variations expected in these characteristics:

.1 150mm (6") square samples of each acoustic panel type, pattern, and colour.

.2 Set of 305mm (12") long samples of exposed suspension system members, including trim, for each colour and system type required.

.5 Maintenance and Materials:

.1 Provide five percent (5%) of each type of acoustic ceiling panels and two percent (2%) of each suspension system and trim for future repairs. Identify cartons and place where directed by the Owner.

.2 Maintenance materials shall be of same production run as installed materials.

1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.

.2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.

.3 Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact.

1.7 SITE CONDITIONS

.1 Install ceiling systems after building has been completely enclosed and not before cementitious building elements are complete and cured and humidity levels are acceptable in the opinion of the Consultant.

.2 Ensure that work to be concealed by ceiling systems has been installed, tested, inspected and approved before starting work.

.3 Co-ordinate with Divisions 20 and 26 for work to be built into work of this Section.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include the following:

.1 Armstrong World Industries, Inc.

.2 Chicago Metallic

.3 CertainTeed

.4 CGC Ceilings, a USG Company

2.2 DESIGN CRITERIA

.1 Superimposed Loads: Determine superimposed loads applied to suspension systems by components of the building and verify that adequate hangers are installed to support additional loads in conjunction with normal loads of the ceiling system, and as follows:

.1 Maximum Deflection: Limit deflection to L/360 in accordance with ASTM C635 deflection test.

2.3 MATERIALS

.1 Acoustic Panels (ACT-1): Provide manufacturer's standard panels of configuration indicated in accordance with ASTM E1264 classifications as designated by the nominal values for types, patterns, acoustic ratings, and light reflectance class listed in this Section; with flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with CAN/ULC S102 and as follows:

.1 Physical Properties: Type: III; Form: 2; Pattern C, D

.2 Dimensions: 24" x 48" x 5/8"

.3 Edge Profile: Square Edge

.4 Colour: White.

.5 Acoustic and Visual Performance (Minimum Nominal):

.1 Noise Reduction Coefficient: 0.55

.2 Ceiling Attenuation Class: 35

.3 Light Reflectance: 0.82

.6 Basis of Design Material: Cortega 769 by Armstrong World Industries, Inc., or approved alternate, as accepted by the Consultant.

.2 Acoustic Panels (ACT-2): Provide manufacturer's fire rated panels of configuration indicated in accordance with ASTM E1264 classifications as designated by the nominal values for types, patterns, acoustic ratings, and light reflectance class listed in this Section; with flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with CAN/ULC S102 and as follows:

.1 Physical Properties: Type: III; Form: 2; Pattern C, E

.2 Dimensions: 24" x 48" x 5/8"

.3 Edge Profile: Square Edge

.4 Colour: White.

.5 Acoustic and Visual Performance (Minimum Nominal):

.1 Noise Reduction Coefficient: 0.55

.2 Ceiling Attenuation Class: 35

.3 Light Reflectance: 0.83

.6 Basis of Design Material: Radar Firecode 2315 by CGC Ceilings, or Cortega Fireguard 823 by Armstrong World Industries, Inc., or approved alternate, as accepted by the Consultant.

.3 Metal Suspension System - Acoustical Panel Ceilings: Manufacturer's standard direct hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C635 requirements and as supplied by same materials supplier as acoustic panels for intermediate duty, exposed tee bar and as follows:

.1 Tee Bar Grid Face Width: 15/16".

.2 Module: Sized as appropriate to acoustic panel size.

.3 Hangers, Braces and Ties: Nominal 14 ga. diameter steel wire, galvanized.

.4 Exposed Finish: Manufacturer's standard satin, white finish.

.5 Corrosion Resistance: Hot-dip galvanized or stainless steel components.

.6 Basis of Design Material: 15/16" Prelude XL by Armstrong World Industries, Inc.

.4 Tie Wire: 3/64" galvanized soft annealed steel wire.

.5 Accessories: Miscellaneous 'U' clips, splicers, screws, anchors, nails, wire, hold-down clips for complete installation.

.1 Wall moulding: prefinished exposed face galvanized steel angle.

3 EXECUTION

3.1 CEILING LAYOUTS

.1 Lay out ceilings in accordance with reflected ceiling plans and symmetrical within each area to obtain uniform borders. Where layout is not shown install ceilings as directed by Consultant.

.2 Finished work shall be plumb, level and square with adjoining work.

3.2 SUSPENSION SYSTEM

.1 Suspend ceilings directly from structural elements. Do not suspend from ducts, pipes, conduits, steel roof deck.

.2 Erect suspension systems level with a maximum tolerance of 3 mm over 3 m length.

.3 Install main tees in accordance with module size. Suspend at maximum 1220 mm o.c.

.4 Install cross tees perpendicular to main tees in accord with module size. Interlock with main tees.

.5 Hangers for suspended ceilings shall support grillage independently of walls, columns, pipes and ducts. Space hangers at maximum 1220 mm o.c. along supporting grillage and not more than 150 mm from ends.

.6 Make provisions for carrying fixtures occurring on and in suspended ceilings. Install additional hangers and reinforcing to ensure that loads being carried do not compromise integrity of system. Frame around fixtures and openings as required.

.7 Where ductwork, piping and other elements within ceiling spaces interfere with direct suspension of ceiling from structure, install additional framing securely fastened to main structure to accommodate proper hanging of ceiling.

.8 Exposed members shall be as long in length as practical to minimize joints. Distribute joints to prevent clustering in one area. Joints shall be made square, tight and flush so that exposed faces of intersecting members are on same plane.

.9 Joints in suspension system members shall be reinforced with splines or other suitable methods.

.10 Install perimeter moulding at abutting vertical surfaces.

.11 Provide aluminum channel trim at perimeter of freefloating ceilings. Suspend trim independently. Mitre corners.

.12 Where work of other Sections is fastened to acoustical ceilings, reinforce suspension system and/or acoustical panels in manner acceptable to Consultant.

3.3 ACOUSTICAL PANELS

.1 Install panels so that work is clean and unmarked.

.2 Neatly cut and fit panels as required to suit ceiling layout and to accommodate other work.

.3 Recessed items shall replace or be centred on panel unless otherwise indicated.

3.4 CLEANING

.1 After installation, clean and touch up minor surface defects on acoustical panels and gypsum board panels.

.2 Remove damaged and badly marked units and replace with new unmarked material.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section includes, but is not limited to, the following:

- .1 Resilient tile materials:
  - .1 Vinyl composition floor tile for classrooms
  - .2 Luxury vinyl floor tile for corridors
- .2 Resilient accessories:
  - .1 Resilient wall bases
  - .2 Resilient accessories for transition strips, area dividers

1.3 RELATED REQUIREMENTS

.1 Section 03 35 00: Concrete Finishing

.2 Section 09 30 00: Tiling

1.4 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM):

- .1 ASTM F1066-04(2014)e1, Standard Specification for Vinyl Composition Floor Tile
- .2 ASTM F1516-13, Standard Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended)
- .3 ASTM F1861-08(2012)e1, Standard Specification for Resilient Wall Base
- .4 ASTM F1869-11, Standard Test Method for Measuring Moisture Vapour Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- .5 ASTM F1913-04(2010), Standard Specification for Vinyl Sheet Floor Covering Without Backing
- .6 ASTM F2169-15, Standard Specification for Resilient Stair Treads

.2 Canadian General Standards Board (CGSB):

- .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Close spaces to traffic during flooring installation and until time period after installation recommended in writing by manufacturer; install flooring and accessories after other finishing operations, including painting and ceiling construction have been completed.

.2 Pre-Installation Conference: Conduct conference at Project site in accordance with requirements of Section 01 31 19 Project Meetings, to verify project requirements, substrate conditions, patterns and layouts, coordination with other Sections affected by work of this Section, manufacturer’s installation instructions and manufacturer’s warranty requirements.

1.6 SUBMITTALS

.1 Provide submittals in accordance with the General Conditions and Section 01 33 00 Submittals.

.2 Action Submittals:

.1 Product Data: Submit one copy of product data for each type of product specified.

.2 Shop Drawings: Submit shop drawings indicating:

.1 Location of seams and edges

.2 Location of columns, doorways, enclosing partitions, built-in furniture, cabinets, and cut-out locations

.3 Type and style of resilient transition strip used between adjacent flooring types

.3 Samples for Selection: Submit manufacturer's colour charts and samples for initial selection consisting of full range of colours and patterns available for each type of product indicated.

.4 Samples for Verification:

.1 Resilient Flooring: Submit samples of each different specified product for verification of colour and pattern in manufacturer's standard size, but not less than 6” x 6” in size for tile or sheet material, or 6” long for resilient accessories.

.3 Informational Submittals: Provide the following submittals during the course of the work:

.1 Site Quality Control Test Results: Submit results or moisture emission testing of concrete subfloors prior to installation of flooring. Results shall include comparison of manufacturer’s recommended moisture content to actual moisture vapour emission rate.

.4 Maintenance Data and Operating Instructions:

.1 Operation and Maintenance Data: Submit manufacturer’s written instructions for maintenance and cleaning procedures, include list of manufacturer recommended cleaning and maintenance products, and name of original installer and contact information in accordance with Section 01 78 00 Project Closeout.

.5 Safety Data Sheets:

.1 Submit WHMIS safety data sheets for incorporation into the Operation and Maintenance Manual. Keep one copy of WHMIS safety data sheets on site for reference by workers.

.6 Maintenance Materials:

.1 Provide 5% of each colour of vinyl composition tile and 30'-0" lineal feet coil stock of each colour of resilient base specified, boxed and labelled.

.2 Store maintenance materials on the premises as directed by the Owner.

1.7 QUALITY ASSURANCE

.1 Contractor executing work of this Section shall have a minimum of five (5) years continuous Canadian experience in successful and installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.

.2 Resilient Flooring Installer: Use an installer who is competent in heat welding and have a minimum of five (5) years documented experience in the installation of resilient sheet flooring and seams in accordance with manufacturer’s training or certification program.

1.8 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Coordinate deliveries to comply with Construction Schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.

.2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.

.3 Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact.

.4 Restrict traffic by other trades during installation.

.5 Provide adequate protection of completed tiled surfaces to prevent damage by other trades until final completion of this project. Minimum protection shall consist of kraftpaper.

1.9 SITE CONDITIONS

.1 Temperature of room, floor surface and materials shall not be less than 21 deg C for 48 hours before, during and for 48 hours after installation. Concrete floors shall be aged for a minimum of 28 days and shall be dry before application of the resilient floor tile.

.2 Moisture content of floor shall not exceed a maximum of 3 lbs. of water per 1,000 sq. ft. of concrete slab area over a 24 hour period as measured by one of the following methods, as approved by Consultant:

.1 Rubber Manufacturer's Association (RMA) moisture test using anhydrous calcium chloride.

.2 Does not exceed 3% as measured by Calcium Carbide Hygrometer procedure.

.3 Does not exceed 5% as measured by normal Protimeter.

.3 Avoid exposure to high humidity, cold drafts and abrupt temperature changes.

1.10 WARRANTY

.1 Warrant the work of this Section against defects in materials and workmanship in accordance with the General Conditions but for an extended period of five (5) years and agree to repair or replace faulty materials or work which become evident during warranty period without cost to the Owner.

.2 Defects shall include, but not limited to, bond failure, and extensive colour fading.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design Manufacturers: Manufacturers named in this Section were are approved to provide work specified in this Section. Additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements indicated and provided requests for substitution are provided in accordance with Section 01 33 00 Submittals, a minimum of five (5) days in advance of Bid Closing.

.2 Approved manufacturers:

.1 Johnsonite

.2 Armstrong Flooring

.3 Polyflor

2.2 TILE FLOORING MATERIALS

.1 Vinyl Composition Floor Tile (VCT): Asbestos free uniform in thickness with uniform colour and pattern through the full thickness, with straight, sharp and square edges and corners, accurately cut to size, conforming to ASTM F1066 and the following:

- .1 Classification: Class 2 – Through Pattern
- .2 Colour: To match #51899 Cool White.
- .3 Thickness: 1/8”
- .4 Size 12” x 12”
- .5 Basis of Design Material: Standard Excelon Imperial Texture by Armstrong Flooring.

.2 Luxury Vinyl Tile (LVT):

- .1 Classification: Class 2 – Through Pattern
- .2 Colour: As selected by the Consultant from the Manufacturers standard product line. Allow for two (2) colours.
- .3 Thickness: 1/8”
- .4 Size 12” x 12”
- .5 Basis of Design Material: Mystique PUR by Polyflor, or approved alternate by Johnsonite Flooring, or Armstrong Flooring.

2.3 RESILIENT ACCESSORIES

.1 Resilient Wall Base (RB): Smooth, buffed exposed face and ribbed or grooved bonding surface supplied in maximum practical length, with pre-moulded end stops and external corners to match base, conforming to ASTM F1861 and as follows:

- .1 Type: TP – Thermoplastic Rubber
- .2 Group: 1 – Homogeneous
- .3 Style: B – Cove
- .4 Height: 4”
- .5 Thickness: 1/8”
- .6 Colour: Black.
- .7 Length: Manufacturers standard maximum length
- .8 Basis of Design Manufacturer: Johnsonite Flooring.

.2 Resilient Transition and Edge Strips: Extruded vinyl shapes meeting or exceeding ADA Recommendations for change of level transitions for transition between floors finishes having different levels, i.e.: between resilient flooring on underlayment to carpet with no cushion or underlayment; acceptable materials as follows:

- .1 The following list is included to indicate the most commonly used transition and edge strip accessories; additional materials may be required where transition heights differ from the products listed and shall be included as a part of the Contract.
- .2 Transition Strip: TS4 – Resilient Flooring to Concrete Slab Transition: Johnsonite SSR-XX-B Transitional Moulding between materials having a thickness to materials having no thickness; colour: selected from manufacturer’s standard range.

.3 Primers, fillers, adhesives: those recommended by flooring manufacturer which will produce good and permanent bond between subfloor and flooring.

.1 Resilient Floor Tile Adhesive: Standard Tile: Waterproof, clear setting type and brands as recommended by the tile manufacturer.

.4 Cementitious underlayment: As indicated in Section 03 35 00 Concrete Finishing.

.5 Cleaning and finishing materials: as recommended by flooring material manufacturer.

.1 Sealer and Wax: Coordinated with Owners preferred long term maintenance program, sealer or wax as appropriate to flooring materials specified.

3 EXECUTION

3.1 EXAMINATION

.1 Surfaces to receive resilient flooring shall be dry, true, even and smooth, and free of paint, grease and oil.

.2 Perform moisture tests on concrete substrates where moisture content is uncertain. Perform tests in minimum ambient temperature of 18^{o}C. Do not install materials until test results are satisfactory.

.3 Concrete slabs shall be at least 28 days old before installation of resilient flooring.

.4 Inspect condition of concrete slabs scheduled to receive resilient flooring as soon as possible after completion and record in writing any deficiencies discovered or state, if no deficiencies are found, acceptance of floor conditions.

3.2 PREPARATION

.1 Level depressions, cracks and joints in subfloor with non-shrinking type filler compatible with bonding adhesive.

.2 If recommended by adhesive or tile manufacturer, prime substrates. Apply primer in accordance with manufacturer's directions.

3.3 UNDERLAYMENT

.1 Where resilient flooring abuts other flooring of different thickness, provide cementitious underlayment allowing for smooth and level transition between finished floor surfaces.

.2 Mix, apply and finish underlayment in accordance with latex admixture manufacturer's recommendations.

3.4 FLOORING INSTALLATION - GENERAL

.1 Install resilient flooring materials in accordance with material manufacturer's current printed directions. Keep a copy of manufacturer's installation manual on site during execution of work.

.2 Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints. Extend flooring into recesses and closets.

.3 Locate change to different floor finish or colour centred under doors.

.4 Provide reducing strip adhesive bonded to floor where floor covering terminates, exposing edge of floor. Install transition strip at junction with other types of flooring.

3.5 RESILIENT TILE

.1 Lay out each area to be tiled symmetrically square with axis of room to provide perimeter tiles at least one half tile in width.

.2 Distribute tiles having varying shades or pattern evenly over floor area to obtain uniform effect. Abrupt variations will not be permitted. Tile joints shall be flush, uniform, in moderate contact and in straight lines.

.3 Install tile with joints staggered half tile in one direction and with tile pattern running as directed by the Consultant.

.4 Immediately after installation, roll entire floor to ensure adhesion in accordance with tile and adhesive manufacturer's recommendations.

3.6 RESILIENT BASE

.1 Adhesive apply cove base to vertical surfaces so that gaps do not occur behind base, so that front lip of base cove bears firmly and uniformly on floor surfaces and so that good and permanent bond is produced between base and surface to which is it applied.

.2 Use full length pieces where practicable; accumulated short lengths not permitted. Wrap base around outside corners, mitre at inside corners; score back of coved base at outside corners. Use preformed end stops where base end is exposed. Butt joints flush without gaps.

3.7 CLEANING

.1 Cleaning, sealing and finishing of resilient tile flooring shall be performed using the cleaning, sealing and finishing materials specified of one manufacturer in accordance with the manufacturer's instructions and recommendations.

.1 Allow a minimum of four (4) days to elapse after completion of each resilient flooring installation before commencing cleaning, sealing, and finishing operations.

.2 Work shall be handed over to the Owner free of blemishes and in perfect condition.

.3 Promptly remove adhesive from surface of resilient materials as work progresses.

.4 Seal and wax floor immediately prior to turnover of building when required by flooring manufacturer. Owner reserves the right to reject resilient floors which show defects after completion of sealing and waxing.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SCOPE OF WORK

.1 This Section of the contract includes all terrazzo flooring called for or implied by the drawings and specifications, together with all necessary incidentals whether referred to or not, as will be required to complete the work to the full intent and meaning of the drawings and specifications. The work includes but is not limited to the following:

.1 Patching and making good existing terrazzo flooring damaged by the work

.2 Grind and make good any existing terrazzo affected by the repairs or installation of new terrazzo, to the owner's satisfaction.

.3 Precast Terrazzo Base at Terrazzo Flooring

1.3 RELATED REQUIREMENTS

.1 Section 07 92 00: Joint Sealants

.2 Section 09 30 00 Tiles

.3 Section 09 65 00: Resilient Flooring

1.4 REFERENCES

.1 CAN/CSA-A5/A8/A362-M88, Portland Cement/Masonry Cement/Blended Hydraulic Cement.

.2 CAN/CSA-A23.1/A23.2-M90, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.3 CSA G30.5-M1983 (R1991), Welded Steel Wire Fabric for Concrete Reinforcement.

.4 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.5 ASTM D2370-92, Test Method for Tensile Properties of Organic Coatings.

.6 Specifications, Details and Procedures of Terrazzo, Tile and Marble Association of Canada

.7 2002 Terrazzo Specification guide 09400.

1.5 SAMPLES

.1 Submit samples in accordance with Section 01 33 00.

.2 Submit duplicate 300 x 300 x 20 mm thick samples of each colour terrazzo.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle products in a manner to avoid damage.

1.7 MOCK-UPS

.1 Construct mock-up 2 m^2 of each type of portland cement terrazzo including door threshold.

.2 Construct mock-up where directed.

.3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.8 SITE CONDITIONS

.1 Examine the areas which the work of this Section is to be located.

.2 Do not place terrazzo until improper conditions have been corrected.

.3 Maintain air temperature and structural base temperature at terrazzo installation area above 12°C for 24 hours before, during and 24 hours after installation.

.4 Protect work during installation and protect all terrazzo surfaces exposed to construction operations and traffic.

1.9 CLOSEOUT SUBMITTALS

.1 Provide maintenance data as set out in TTMAC publication for terrazzo work for incorporation into manual specified in Section 01 78 00.

2 PRODUCTS

2.1 MATERIALS

.1 Cement: to CAN/CSA-A5, type 10.

.2 Sand: fine and course aggregates to CAN/CSA-A23.1.

.3 Water: potable.

.4 Marble Chips: soundness and abrasion resistance. Grade chips in accordance with TTMAC standard to match existing terrazzo flooring.

.5 Pigments: non-fading mineral pigments in selected colours to British Standard 1014.

.6 Divider Strips: 32 mm deep zinc provided with anchorage devices.

.7 Accessories: separator strips purpose made and of same material to match divider strips.

.8 Welded Steel Wire Fabric: to CSA G30.5, 50 x 50 x 1.6 x 1.6 mm wire, galvanized, in flat sheets only.

.9 Curing Compound: Type 11, nonstaining to CGSB specifications 90 GP-1.

.10 Cleaning Compound: to TTMAC standard 1001 or 1003.

.11 Sealing Compound: to TTMAC standard 2001.

.12 Finishing Compound: to TTMAC standard 3001.

2.2 MIXES

.1 Slurry Coat: cement and water mixed to creamy paste.

.2 Underbed: 1 part cement to 4 parts sand by volume.

.3 Mixture of marble chips and cement selected to match colour of terrazzo flooring in existing building. Blended in accordance with TTMAC specifications.

2.3 RUBBER BASE AT TERRAZZO FLOORS (AS SHOWN ON THE FINISH SCHEDULE)

.1 General Location: At all new terrazzo flooring locations

.1 Size: 3mm x 100 mm high

.2 Supplier: Refer to Resilient base section 09 65 00 - Colour: Black

2.4 SETTING ADHESIVES

.1 For dry areas, latex dry set mortar to be "Keracrete" as manufactured by Mapei, enriched latex additive which when mixed with a factory controlled "crete-mix" (1:1), conforms to ANSI A118.4 and CGSB71-GP-30M, Type 2.

2.5 GROUT

.1 Sanded Portland Cement Grout - "Keracolour/Floor" grout as manufactured by Mapei. Sanded commercial Portland Cement grout conforming to AINSI A118.6 standard mixed with "Plastijoints" acrylic grout additive. Use for all wall and floor tile grout. Colours to be selected from standard range.

3 EXECUTION

3.1 WORKMANSHIP

.1 Do terrazzo work in accordance with CSC Architectural Specification Study on Terrazzo Portland Cement, produced in co-operation with Terrazzo, Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

3.2 EXAMINATION OF SURFACES

.1 Examine surfaces upon which the work of this section is to be installed and report any defects to the Consultant.

3.3 PREPARATION

.1 Clean base slab and saturate with water. Remove free water. Apply a slurry consisting of a thick paste of cement and water immediately preceding application of underbed.

.2 Total thickness of Terrazzo floating system is 75mm, underbed with reinforced mesh, shall be not less than 62 mm. (ref 2002 Terrazzo Specification Guide 09400 411F-2002)

3.4 INSTALLATION

.1 Install terrazzo after concrete slabs have cured 28 days.

.2 Install underbed over prepared base slab and screed level making allowances for terrazzo topping. Permit underbed to cure minimum 24 hours prior to receiving terrazzo topping.

.3 Install divider strips in underbed while it is still in a plastic state. Set strips true and level to panel pattern as indicated.

.4 Install terrazzo topping in accordance with TTMAC Specification 09400.

.5 Surface terrazzo by machine rubbing and grout all voids when topping has set sufficiently hard.

.6 Allow grouted surface to cure for at least 48 hours and then resurface by machine.

.7 Scrub terrazzo thoroughly, rinse with clean water and dry thoroughly. Apply coat of sealer as soon after cleaning as possible. Apply sealer in accordance with manufacturer's written instructions.

.8 Apply second coat of sealer just prior to occupancy of building by Owner. Thoroughly clean surface prior to second coat of sealer. Apply two coats of surface finish.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Unit Masonry

.2 Section 06 41 00: Architectural Wood Casework

.3 Section 08 11 00: Metal Doors and Frames

.4 Section 08 14 00: Wood Doors

.5 Section 09 21 16: Gypsum Board Assemblies

.6 Section 32 12 16: Asphalt Paving

1.3 SUBMITTALS

.1 List of Materials:

- .1 Before ordering materials, submit written request in form acceptable to Consultant, for approval of paint materials. List each of the materials proposed and surfaces to be covered. State manufacturer's name and brand name of materials.
- .2 List of materials shall be endorsed by manufacturer as being the best material for the applicable condition.
- .3 Do not order material or commence work until list of materials is approved by Consultant.

.2 Samples:

- .1 Submit two 200 mm x 250 mm colour draw downs of each paint colour coated with manufacturer's paint system to confirm colour match with colour chips supplied by Consultant.
- .2 Submit sample of natural and stained finishes on each species and grade of wood to receive such finishes.
- .3 Prepare full size samples showing each type of door finish.
- .4 Prepare sample panels of each wall and ceiling paint system specified, as directed by Consultant.

.3 Maintenance Materials:

- .1 Upon completion of work provide one sealed and properly identified 1 L can of each type and colour paint used on this project.
- .2 Only top coating paints used in building interior are required.

1.4 MOCK-UP ROOM

.1 Prior to start of any painting, prepare a mock-up room designated by Consultant.

.2 Paint all surfaces including but not limited to walls, ceilings, doors and frames.

1.5 PRODUCT HANDLING

.1 Deliver paint materials to site in sealed original labelled containers bearing manufacturer's name, brand name, type of paint and colour designation.

.2 Store materials in strict accordance with manufacturer's recommendations.

.3 Store paints, stains, varnishes, equipment in designated area inside building. Maintain separate workshop / storage area for duration of work by this Section.

1.6 SITE CONDITIONS

.1 Environmental Conditions:

.1 Maintain temperature in interior areas to receive coatings between 15°C and 25°C for at least 24 hours before, during application and until coatings have cured after application. Apply exterior coatings only when temperature is above 10°C.

.2 Do not apply exterior coatings during periods of precipitation nor when precipitation is imminent.

.3 Do not apply coatings under direct sunlight during hot weather.

.4 Adequately ventilate areas where coatings are being applied. Maintain a reasonably dust-free atmosphere for duration of work.

.2 Protection:

.1 Protect adjacent surfaces not scheduled to receive coatings from damage.

.2 Remove electrical plates, surface hardware, fittings and fastenings prior to painting operations. These items shall be carefully stored, cleaned and replaced on completion of work in each area. No solvent shall be used to clean hardware that will remove permanent lacquer finish on these items.

.3 Mask labels and specification plates occurring on equipment to be painted.

.4 Post "wet coating" signs and "no smoking" signs while work is in progress and while coatings are curing.

.5 Keep oily rags, wastes and other combustible materials in closed metal containers and remove at end of each work day. Take every precaution to avoid spontaneous combustion.

.3 Work Schedule:

.1 Unless otherwise permitted, apply coatings only after all other Sections have completed their work.

.2 Co-ordinate work of this Section with that of Section 07 92 00 and review order of installation with Consultant where sealants are installed adjacent to painted surfaces.

.3 If it becomes necessary for the Owner to occupy areas of the building prior to their completion, schedule work of this Section to hours when occupants have vacated building.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Unless otherwise specified, materials shall be manufactured and supplied by one of the following:

.1 Benjamin-Moore

.2 or equal by Sherwin-Williams LLC or PPG Canada Inc.- Architectural Finishes.

2.2 MATERIALS

.1 Materials shall be "top line quality" products and shall be supplied by a single manufacturer except for specialty products not available from paint manufacturer.

.2 Materials wherever possible shall be low odour products, free or low in VOC content.

.3 Paints shall be factory mixed unless otherwise specified, except any coating in paste or powder form, or to be field-catalyzed shall be field-mixed in accordance with manufacturer's directions.

.4 Primers shall be as specified by manufacturer and fully compatible with finish coats.

.5 The contractor shall in all cases leave on-site in the property sealed can a minimum of one gallon of each colour and or type of paint used.

.6 Metal and Glazed Surfaces Primed with: Fresh start All-Purpose 100% (K023)

.7 Classrooms & all other areas not specified: Eco-Spec WB Semi-Gloss Finish (K376)

.8 Interior Doors & Trim: Eco-Spec WB Semi-Gloss Finish (K376)

.9 Millwork: Eco-Spec WB Semi-Gloss Finish (K376)

.10 Exterior Doors & Trim: Impervo Alkyd High Gloss Enamel (K133)

.11 Ceilings: Moores Latex Ceiling Paint (K258)

.12 Natural Wood: Stays Clear Acrylic Urethane Satin Finish (K422)

.13 Hallways: Eco-Spec WB Semi-Gloss Finish (K376)

.14 Concrete floor sealer: S.C. Johnson “Securethane”, Proseal “Prothane”, Euclid “Ecuo-Thane” or Tennant “420 System”.

.15 New conc. block: Prime with block filler (K160) – by Benjamin Moore.

.16 Basketball Court Line Marking: TRU-FLEX 100% Acrylic Line Marking Paint by Benjamin Moore; Colour: White.

.17 Driveway and Parking Line Marking: Super Spec HP Safety & Zone Marking Latex P58 by Benjamin Moore.

2.3 FINISHES

.1 Paint colours and other finishes will be selected by Consultant. Do not start work until after receiving colour schedule.

.2 Colours selected by the Consultant will not necessarily be from manufacturer's standard colours.

.3 A variety of colours may be used. Consultant may select different colours for different elements such as ductwork, bulkheads, exposed decks, slabs and structural steel. Include for up to 15 colours, not including mechanical room colours listed below. Of these colours, up to 50% may be deep tones.

.4 Confirm gloss levels for all surfaces with Consultant before starting work. Unless otherwise indicated, allow:

- .1 Walls: semi-gloss
- .2 Ceilings: semi-gloss
- .3 Frames, doors, trim: semi-gloss.

.5 Paint exposed piping, ductwork and conduits in mechanical and boiler rooms in colours directed by Consultant.

3 EXECUTION

3.1 CONDITIONS OF SUBSTRATES

.1 Sound, non-dusting, and free of grease, oil, dirt, and other matter detrimental to adhesion and appearance of coatings.

.2 Temperature: minimum 13°C.

.3 Moisture content: maximum 12%. Test for moisture content using moisture meter.

.4 Alkalinity: test cementitious substrates for alkalinity. Use method recommended by coating manufacturer.

3.2 PREPARATION OF SUBSTRATES

.1 All substrates: clean as required to produce an acceptable surface. If wood, metal or any other surface to be finished cannot be put in proper condition for finishing by cleaning, sanding and filling as specified, notify Consultant in writing or assume responsibility for an rectify any unsatisfactory finish resulting.

.2 Wood generally: clean soiled surfaces; sand smooth and dust off; putty nail holes, splits, scratches, after prime coat has been applied and dried; colour putty to match finish; putty stained wood after stain application.

.3 Wood for paint: clean knots, pitch streaks and sappy sections of residue and seal with sealer before applying prime coat.

.4 Wood for transparent finish: clean knots, pitch streaks and sappy sections of residue and seal with white shellac; seal after applying stain. Apply filler to open grained woods, prior to application of stain unless directed otherwise by Consultant. Do not apply satin varnish coat until Consultant has inspected and approved gloss varnish coat.

.5 Bare ferrous metal: remove rust and scale; wash with solvent; chemically clean; apply coat of metal primer.

.6 Previously primed metal: remove rust, oil, grease and loose shop paint by washing or wire brushing; make good shop coat; feather out edges of touch-up.

.7 Zinc coated metal: wash and etch to dull paint receptive surface using an approved crystalline zinc phosphate or vinyl pretreatment.

.8 Hot dip galvanized steel: light brush blast.

.9 Unit masonry & concrete: fill minor cracks, holes and fissures with Polyfilla and smooth to a flush surface. Texture filled areas to match surrounding surface.

.10 Plaster: fill minor cracks, holes and fissures with patching plaster, allow to dry, smooth to a flush surface and texture filled area to match surrounding surface.

.11 Gypsum board: fill minor cracks, holes and imperfections with patching plaster; allow to dry and sand smooth; sand taped joints and remove dust.

.12 Alkaline surfaces: wash and neutralize using proper type of solution compatible with paint to be used.

.13 Previously painted surface need to be cleaned with TSP prior to priming.

.14 Existing gloss surface shall be dulled down with wet sandpaper.

.15 Existing oil based surfaces to be primed with Fresh start by Benjamin Moore.

3.3 BACK PRIMING

.1 Back prime wood schedule for paint or enamel finish immediately on arrival at site with interior or exterior primer as applicable.

.2 Back prime wood scheduled for stain, varnish or natural finish immediately on arrival at site,with gloss varnish reduce 25% with mineral spirits.

3.4 APPLICATION OF COATINGS

.1 Apply paint by brush or roller, except on wood and metal surfaces where paint shall be applied by brush only.

.2 Spray painting may be permitted where deemed advantageous and shall be subject to Consultant's approval. When spray painting is permitted, use only airless spray guns. Consultant may prohibit use of spray painting at any time for such reasons as carelessness, poor masking or protective measures, drifting paint fog, disturbance to other trades or failure to obtain a uniform satisfactory finish.

.3 Applied and cured coatings shall be uniform in thickness, sheen, colour and texture and free of brush or roller marks, sags, crawls and other defects detrimental to appearance and performance.

.4 Regardless of the number of coats specified for any surface, apply sufficient paint to completely cover and hide substrate and to produce a solid uniform appearance.

.5 Thoroughly mix materials before application. Use same brand of paint for primer, intermediate and finish coats.

.6 Where two or more coats of same paint are to be applied, undercoats shall be tinted in lighter shades of final coat to differentiate from final coat.

.7 Touch up suction spots after application of first coat. Sand lightly between coats with fine sandpaper.

.8 Each coat of finish shall be dry and hard before succeeding coats are applied with a minimum of 24 hours between coats, unless manufacturer's instructions state otherwise. Do not proceed with any coat until the last preceeding coat is approved by the Consultant.

.9 Stained woodwork shall be covered with a uniform coat of stain and wiped off if required. Wood shall have uniform shade. Match stain so that dissimilar woods have uniform finished appearance.

3.5 PATCHING / TOUCH-UP

.1 Prior to takeover of project by Owner, inspect work of this Section and touch-up or refinish damaged finishes and finishes unsatisfactory to Consultant.

3.6 SCHEDULE OF FINISHES

.1 General Requirements:

.1 Paint or otherwise finish surfaces of building materials, building services and building accessories not otherwise protected or covered, as shown on Room Finish and Door Schedule, Drawings and as specified herein.

.2 In addition to finishing required by Room Finish and Door Schedules, Drawings and these Specifications, and unless otherwise specified, all work which is exposed to view and which is not prefinished shall be finished by this Section.

.3 In areas specifically designated as "unfinished" painting is not required except for bare, primed and zinc coated metal surfaces and insulated ductwork and pipes.

.4 Where exposed to view paint bare metals, previously primed metals and zinc coated metals unless specified otherwise.

.5 Paint behind surface mounted fixtures on walls and ceilings with full coats of paint.

.6 Paint walls behind wall mounted heating units with full coats of paint.

.7 Paint inside surfaces of light coves white.

.8 Finish tops of doors, trim, projections and other work as specified for surrounding work whether above site lines or not.

.9 Finish edges of doors to match face of door. Refinish edges of doors after fitting.

.10 Finish drawers on all sides, inside and outside. Unless otherwise indicated finish drawers with two coats of varnish.

.11 Paint tops, bottoms and edges of shelves with full specified coats, whether exposed to view or not.

.12 Paint interior of ducts at grilles and diffusers with two coats of flat black paint, so that duct interior is not visible when grilles and diffusers are installed.

.13 Paint piping, ducts and conduits in colours matching background wall or ceiling colours, unless otherwise directed by the Consultant. Ducts in mechanical rooms require only one finish coat in addition to primer. Other exposed ductwork to receive two finish coats.

.14 Paint all gas piping whether exposed to view or not, with high-visibility yellow-orange paint meeting CGSB Colour Code #1-GP-12, Code 505-101 or equal.

.15 Unless specifically indicated to be painted, all finish carpentry work shall receive transparent finish.

.16 Unless specifically indicated otherwise paint all rooftop equipment and components, regardless of material and finish, including but not necessarily limited to mechanical rooftop equipment, vent stack flashings, sleeve flashings window washing anchors, but not including prefinished sheet steel flashings.

.17 Where finishing formula for surfaces requiring painting is not included hereunder, follow recommendations of Canadian Painting Contractor's Association Architectural Painting Specification Manual, latest issue.

.2 Interior Finishing:

.1 Concrete and concrete block:

.1 2 coats block filler

.2 1 coat primer, latex or PVA based

.3 2 coats acrylic latex

.2 Metal, prime painted:

.1 spot prime with alkyd metal primer

.2 2 coats acrylic latex

.3 Metal, zinc coated:

.1 1 coat galvanized primer

.2 2 coats acrylic latex

.4 Woodwork, painted:

.1 1 coat alkyd enamel undercoat

.2 2 coats acrylic latex

.5 Woodwork, stained and varnished (transparent finish):

.1 1 coat stain

.2 1 coat sanding sealer, sand lightly
.3 1 coat alkyd or polyurethane varnish, gloss
.4 1 coat alkyd or polyurethane varnish, satin

.6 Gypsum board:
.1 1 coat drywall primer
.2 2 coats acrylic latex

.7 Exposed piping, wrapped:
.1 1 coat block filler
.2 2 coats acrylic latex

.8 Exposed piping and conduit, unwrapped:
.1 1 coat alkyd metal primer
.2 2 coats acrylic latex

.9 Exposed ductwork, insulated:
.1 1 coat block filler and primer
.2 2 coats acrylic latex

.10 Concrete floor (sealed)
.1 2 coats of sealer

.3 Exterior Finishing:

.1 Metal, zinc coated (hot dip galvanized):
.1 1 coat epoxy primer
.2 2 coats aliphatic polyurethane

.2 Metal, zinc coated (inorganic zinc rich primer):
.1 1 coat epoxy primer
.2 2 coats aliphatic polyurethane

.3 Wood:
.1 2 coats solid colour stain

.4 Asphalt or Concrete Basketball Court:
.1 1 coat 100% acrylic emulsion.
.2 Second coat is required. Allow first coat 3-4 hours drying prior to application of second coat.

.5 Asphalt Driveway and Parking Line Marking:
.1 1 coat fast-dry latex coating.

.4 Existing Interior Finishing:

.1 Previously painted Concrete and concrete block: (same finished colour)
.1 1 coat primer, latex or PVA based
.2 1 coat acrylic latex

.2 Previously painted Concrete and concrete block: (different finished colour)
.1 1 coat primer, latex or PVA based
.2 2 coats acrylic latex

.3 Previously painted Metal:
.1 1 coat acrylic latex primer
.2 1 coat acrylic latex

.4 Previously stained and varnished Woodwork, (transparent finish):
- .1 Sand lightly
- .2 1 coat sanding sealer, sand lightly
- .3 1 coat alkyd or polyurethane varnish, gloss
- .4 1 coat alkyd or polyurethane varnish, satin

.5 Previously painted Gypsum board:
- .1 1 coat primer
- .2 1 coats acrylic latex

.6 Previously painted Exposed piping:
- .1 1 coat acrylic latex primer
- .2 1 coat acrylic latex

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section includes requirements for visual display boards, tackboards, hardware, trim and accessories.

1.3 RELATED REQUIREMENTS

.1 Section 06 10 00: Rough Carpentry

.2 Section 09 21 16: Gypsum Board Assemblies

1.4 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM):

.1 ASTM E84, Test for Surface Burning Characteristics of Building Materials

.2 Underwriters Laboratories Canada (ULC):

.1 CAN/ULC S102, Standard Method of Test for Surface Burning Characteristics

.3 Porcelain Enamel Institute (PEI):

.1 PEI 501, Appearance Properties of Porcelain Enamel.

.2 PEI 502, Mechanical and Physical Properties of Porcelain Enamel

1.5 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting work of this section:

.1 Shop Drawings: Submit shop drawings for each type of visual display board required including, but not limited to, the following:

.1 Include dimensioned elevations.

.2 Show location of joints between individual panels where unit dimensions exceed maximum panel length.

.3 Include sections of typical trim members.

.4 Show anchors, grounds, reinforcement, accessories, layout, and installation details.

.2 Product Data: Submit product data for each type of visual display board indicated.

.3 Samples for Initial Selection: Provide Manufacturer's colour charts showing the full range of colours and textures for initial selection of materials for the following:

.1 Marker Boards and Tackboards: Actual sections of finish for each type of visual display surface specified in this Section.

.4 Samples for Verification: Provide samples for verification for the following products, showing colour and texture or finish selected; include sample sets showing the full range of variations expected where finishes involve normal colour and texture variations; prepare Samples from the same material to be used for the Work:

.1 Visual Display Boards: Sample panels not less than 200 mm x 300 mm, mounted on the substrate indicated for the final Work. Include a panel for each type, colour and texture required.

.2 Aluminum Trim and Accessories: Samples of each finish type and colour, on 150 mm long sections of extrusions and not less than 100 mm squares of sheet or plate. Include Sample sets showing the full range of colour variations expected.

1.6 PROJECT CLOSEOUT SUBMISSIONS

.1 Provide operations and maintenance information in accordance with Section 01 78 00.

.2 Submit data for cleaning of finishes and maintenance, and of operational hardware.

1.7 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by the Consultant:

.1 Source Limitations: Obtain pre-manufactured visual display boards through one source from a single manufacturer.

.2 Engage an experienced installer who is an authorized representative of visual display board manufacturer for both installation and maintenance of the type of products required for this Project.

1.8 SITE CONDITIONS

.1 Verify field measurements before preparation of shop drawings and before fabrication to ensure proper fitting and as follows:

.1 Coordinate fabrication schedule with construction progress to avoid delaying the Work:

.2 Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

.2 Establish dimensions and proceed with fabricating visual display surfaces without field measurements where field measurements cannot be made without delaying the work, coordinate wall construction to ensure actual dimensions correspond to established dimensions.

1.9 WARRANTY

.1 Provide manufacturers written guarantee, signed and issued in the name of Owner, to replace the following items for defective material and workmanship for the time stated from date of Substantial Performance:

.1 Framing, Panels and hardware: Failure of performance requirements specified in Contract Documents; two (2) years.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design products are named in this Section; additional manufacturers offering similar Products may be incorporated into the work provided they meet the performance requirements established by the named products provided they submit requests for substitution a minimum of ten (10) days in advance of Bid Closing.

.2 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Global School Products Inc.

.2 Architectural School Products Ltd.

.3 Claridge Products and Equipment Inc.

.4 C.P. Distributors Ltd.

.5 Crestway Systems Ltd.

.6 Egan Visual Inc.

.7 Malem Architectural Specialties Ltd.

.8 Shanahan's Ltd.

2.2 MARKER BOARDS

.1 Face Sheet: Minimum 0.62 mm enamelling grade steel specifically processed for temperatures used in coating porcelain on steel to manufacturers standard process, and as follows:

.1 Coat exposed face and edges with a 3-coat process consisting of primer, ground coat, and colour cover coat.

.2 Coat concealed face with a 2-coat process consisting of primer and ground coat.

.2 Cover Coats: Provide manufacturer's standard, light coloured, special writing surface with gloss finish intended for use with erasable dry markers.

.3 Core: Use any one of the following core materials to the manufacturer’s standard:

.1 10 mm thick, particleboard core material complying with requirements of ANSI A208.1, Grade 1 M 1.

.2 6 mm thick, tempered hardboard.

.3 13 mm gypsum board.

.4 Backing Sheet: Use any one of the following backing materials to the manufacturer’s standard:

.1 0.38 mm thick, aluminum sheet backing.

.2 0.127 mm thick, aluminum foil sheet backing.

.3 0.45 mm thick, galvanized steel sheet backing.

.5 Laminating Adhesive: Manufacturer's standard, moisture resistant, thermoplastic type adhesive.

2.3 TACKBOARDS

.1 Natural Cork Tackboards: Mildew resistant, washable vinyl fabric, weighing not less than 440 g/m2, laminated to 6 mm thick cork sheet, and as follows:

.1 Cork Thickness: 6mm (1/4”)

.2 Backing: 6mm (1/4”) thick particle board

.3 Over Thickness: 13mm (1/2”)

.4 Maximum panel size: 1220mm x 2440mm (8’ x 4’)

.2 Basis of Design Materials: Natural Cork Tackboards by Global School Products Inc, or acceptable alternate as approved by the Consultant.

.3 Trim: Extruded from aluminum alloy 6063 T5. Clear anodized finish in accordance with AA M12C22A31, full length for each installation.

.4 Chalk trays: Manufacturer's standard, plate type, extruded aluminum with clear anodized anodic oxide finish in accordance with AA M12C22A31, full length for each installation.

.5 Maprails: Extruded from aluminum alloy 6063 T5. Clear anodized anodic oxide finish in accordance with AA M12C 22A31. Cork insert. Metal map hooks. Indicate as ‘tackable strips’.

2.4 SLIDING UNITS

.1 Horizontal Sliding Display Board Panels: **Not Used**

2.5 FABRICATION

.1 Shop fabricated display boards in one piece for lengths 3600 mm or less, for longer sections colour match adjacent pieces.

.2 Laminate display board and backing sheet to the core in accordance with the display board manufacturer's recommendations.

.3 Apply pre-finished trim in continuous horizontal and vertical lengths, cut and mitred at corners, and as follows:

.1 Marker Boards:

.1 Provide continuous chalk trays below all marker boards.

.2 Provide continuous maprails above all marker boards.

.3 Use adhesive to secure centre portions of panels.

.2 Tackboards:

.1 Provide continuous maprails above all tackboards adjacent to marker boards, and elsewhere as indicated.

.2 Trim edges with J trim, join to adjacent boards or marker boards with H trim and provide map rails at the top edge.

3 EXECUTION

3.1 EXAMINATION

.1 Inspect Work and conditions affecting the Work of this Section. Proceed only after deficiencies, if any, have been corrected.

.2 Ensure that all anchors and setting or installing components provided by this Section for installation are properly located and installed.

3.2 PREPARATION

.1 Obtain all dimensions from the job site.

.2 Provide data, dimensions and components, anchors and assemblies to be installed (where required) in proper time for installation.

3.3 INSTALLATION

.1 Erect Work in strict accordance with manufacturer's written instructions.

.2 Conceal all anchors and fitments. Exposed heads of fasteners not permitted. All joints in exposed work to be flush hairline butt joints.

.3 Mount display boards as indicated on drawings.

.4 Refer to schedule and details on drawings for sizes locations, confirmed on site with Owner before installation.

.5 Mount on site maprails and tackable strips, and accesories as indicated.

3.4 CLEANING

.1 At completion and continuously as Work proceeds, remove all surplus materials, debris and scrap.

.2 At completion of Work, remove all protective surface covering film and wrappings. Clean all frames and hard surfaces using mild soap or other cleaning agent approved by manufacturer.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 RELATED WORK

.1	Rough Carpentry	– Section 06 10 00
.2	Architectural Wood Casework	– Section 06 41 00
.3	Visual Display Boards	– Section 10 11 00
.4	Gypsum Board	– Section 09 21 16
.5	Electrical	– Division 26

1.3 SUBMITTALS

.1 Submit Shop Drawings in accordance with Section 01 33 23. Indicate field dimensions on shop drawings.

.2 Shop drawings to show sizes, types, layouts, and installation details.

.3 Include copies of trade literature, outlining the care and maintenance of the installation, in Maintenance Manual.

1.4 STORAGE

.1 Deliver units fully assembled to the maximum extent practical.

.2 Store all materials within the building in clean, dry area, and in accordance with manufacturer's recommendations.

.3 Store material in manner which will not damage, mark or cause other defects detrimental to the finished appearance. Provide such protection as necessary to guard against damage and marring from this and other trades. Maintain such protection until ordered removed by the Consultant.

1.5 WARRANTY

.1 Extend the Warranty period stipulated in the General Conditions of the Contract to five (5) years.

2 PRODUCTS

2.1 MATERIALS

.1 Combination Projection Screen and Marker Board / Smart Boards:

.1 Supply and install wall mounted IDEA Screen combination projection screen and marker boards (smart boards) as manufactured by DA-LITE (1800-622-3737). Boards shall be Wide 16:1 format 1350 (H) x 2150 (W). Total eight (8) required.

.2 Surface shall consist of proprietary projection surface permanently bonded to magnetic substrate to allow use of dry erase markers, interactive stylus and touch interactivity. Projection surface to have a gain of 2.5 and viewing half angle of 25 degrees. Frame shall be 25mm thick with 9.5mm bezel in aluminum with silver finish. Bezel thickness at screen surface shall be 1.5mm. Screen shall be

equipped complete with whiteboard mount corner supports, and large top and lower mounting brackets.

.3 Provide one case (12 bottles) of whiteboard cleaner, one pack (12 cloths) of cleaning cloths and eight sets of spare markers.

3 EXECUTION

3.1 INSTALLATION

.1 Supply all labour, materials, anchors, brackets, fasteners necessary to complete the installation of smart board. All installations to be done by tradesmen experienced in this type of work.

.2 Erect all units plumb, level and accurately in locations shown on the Drawings or as directed by Consultant. Securely and permanently fix to the wall surfaces with concealed fasteners.

.3 Installation of integrated smart boards shall be coordinated with the Owner and forces installing projectors above the whiteboards. Install projection whiteboards on steel brackets and as per KPRDSB standard detail 2020.

.4 Install smart boards on steel brackets.

.5 Do not install marker tray.

.6 Co-ordinate frame support locations with gypsum board trade / carpenter.

.7 ICT to install the projector only after all construction is complete.

3.2 CLEANING

.1 Leave trim and board surfaces clean and free of stains or marks.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 Furnish all labour and materials necessary for the completion of work in this Section as shown on the Contract Drawings and specified herein.

.2 Work in this Section includes but is not limited to:

- .1 Solid Phenolic Toilet Partitions
- .2 Solid Phenolic Urinal Screens
- .3 Hardware

1.3 RELATED REQUIREMENTS

.1 Section 05 50 00: Metal Fabrications

.2 Section 09 21 16: Gypsum Board Assemblies

.3 Section 09 30 00: Tiling

.4 Section 10 28 13: Washroom Accessories

1.4 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00.

.2 Shop Drawings:

- .1 Submit shop drawings showing and describing in detail materials, finishes, dimensions, details of connections and fastenings elevations, plans, sections, thicknesses, hardware and any other pertinent information.

.3 Samples:

- .1 Submit necessary templates and instructions where supports or anchors have to be built-in by others.
- .2 Submit one sample of each of the following:
  - .1 Hinge, latch, panel fitting.
  - .2 Corner section, 305 mm x 305 mm (12" x 12") showing colour, corner, edge and core construction.

1.5 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location.

.2 Do not permit delivery of work to job site until building is sufficiently dry, wet trades are completed and the moisture readings of surfaces in proposed storage area is less than 18%.

.3 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Store materials flat on level surface. Protect materials with suitable non-staining waterproof coverings, but allow for air circulation at sides.

1.6 EQUIVALENTS

.1 Items of this Section are listed by manufacturer's name and model for the purpose of establishing the standard required. Equivalent manufacturer's models will be accepted providing they comply in all respects with the published specifications and tests of the named manufacturer and are approved for design and workmanship.

1.7 WARRANTY

.1 Warrant that the solid phenolic partitions and screens shall be free from defects in materials or workmanship in accordance with General Conditions for a period of ten (10) years and agree to promptly make good defects by replacing defective solid phenolic partitions and screens in finish to match original finish and in a manner satisfactory to Owner. Defects shall include, but not be limited to, bubbling, delamination of faces, or edges, warp, twist, bow exceeding 1/4" and telegraphing of core. "Replace" as used herein includes installing panels, pilasters, hardware, shoes including hanging and fitting doors.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design products are named in this Section; additional manufacturers offering similar solid phenolic toilet partition systems may be incorporated into the work provided they meet the performance requirements established by the named products.

.2 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 Floor Anchored Toilet Partitions:

.1 Phenolic Black Core by ASI Global Partitions

.2 Solid Phenolic DuraLine Series 1080 by Bobrick Washroom Equipment Inc.

.3 Phenolic Black Core Floor Anchored Toilet Compartments by Global Partitions.

.2 Solid Phenolic Urinal Screens:

.1 1114 mm (42") long x 610 mm (24") wide wall hung type solid phenolic urinal screens with institutional hardware.

2.2 MATERIALS

.1 Solid Phenolic, Melamine Surfaced, Panels, Pilasters and Doors:

.1 Plastic Laminate Face Sheets: High pressure, paper based, melamine surfaced, laminated plastic sheets, conforming to CAN3-A172-M, with thickness tolerances in accordance with Table 1 of CAN3-A172-M and plastic laminate grades as follows:

.1 Cores: Solid phenolic type core material.

.1 Colour: Black.

.2 Thicknesses: As specified herein.

.2 Bituminous Paint: Conforms to CAN/CGSB-1.108-M, Type 2.

.3 Butyl Tape: Extruded, High grade macro-polyisobutylene tape of width and shore hardness to suit conditions.

.4 Building Paper: Conforms to CAN/CGSB-51.32-M.

.5 Hardware and Fittings (Institutional):

.1 Hinges: 0.063" thick (16 gauge) x 2" wide continuous stainless steel piano hinge with 1/8" diameter stainless steel pin and extends full height of doors.

.2 Door Latches: 0.079" thick (14 gauge) stainless steel type slide type on nylon track. Provide "C" type pulls at compartments for handicapped.

.3 Door Keepers: 0.125" thick (11 gauge) stainless steel type.

.4 Coat Hooks: Stainless steel type with rubber bumper on end.

.5 Door Stops: 0.125" thick (11 gauge) stainless steel type designed to prevent the door from being kicked out of compartment.

.6 'U' Channels: 0.047" thick (18 gauge) continuous 'U' shaped stainless steel channel extending full height of panels and screens.

.7 Hardware Material and Finish: Stainless steel shall be AISI 18-8 type 304 alloy conforming to ASTM A167-92b.

.8 Hardware Fasteners: Vandal resistant, torks stainless steel machine screws installed from inside compartments. Door hardware shall also have factory installed threaded metal inserts in doors and pilasters.

.9 Provide reinforcement for washroom accessories as required to preserve integrity of partition panels and as required to ensure secure attachment of accessories.

.10 Top connection of pilaster for ceiling hung partitions shall consist of 3/4" diameter threaded rods complete with spacer and nuts and a 3" die-formed stainless steel pilaster shoe. Stainless steel shall be 0.024" thick, AISI type 304 stainless steel alloy conforming to ASTM A167-92b.

.11 Install matching 3/4" thick x 4" wide overhead bracing between pilasters for reinforcing. Fasten with stainless steel plates and screws on the inside of each stall.

2.3 FINISHES

.1 Melamine Surface Sheet Colours:

.1 Colours: As selected by the Consultant from the manufacturers standard product line.

.2 Stainless Steel:

.1 "No.4" brushed finish.

2.4 FABRICATION AND MANUFACTURE

.1 Shop fabricate toilet partitions. Take site measurements for areas where partitions are to be located and fabricate to suit site dimensions.

.2 Fabricate doors, panels and pilasters from solid phenolic core material with high pressure matte plastic laminate surfaces fused to core. Edges shall be "black". Stiles and doors shall have a finished thickness of 3/4" thick. Panels shall be 1/2" thick.

.3 Check sizes and locations for washroom accessories and if necessary, reinforce panels.

.4 Prepare panels to accept tissue dispensers and grab bars where indicated on drawings.

.5 Design supports to withstand, within acceptable deflection limitations, their own weight, the weight of the toilet partitions, loads imposed by the motion of partition doors and all live loads, which might be applied to the toilet partitions in the course of their normal function. Design supports as required to accommodate structural deflection. Build in reinforcing to support the grab bars and withstand a downward pull of 500lbs. at any point on the grab bar. Provide additional stainless steel brackets as required to stabilize pilasters to consultants approval.

3 EXECUTION

3.1 INSPECTION

.1 Check areas scheduled to receive partitions and urinal screens for correct dimensions, plumbness of walls and soundness of surfaces that would affect installation of holding brackets.

.2 Verify spacing of plumbing fixtures to assure compatibility with installation of partitions.

.3 Do not begin installation of partitions until conditions are satisfactory and agreement on details with the owners or contractors were well understood.

3.2 INSTALLATION

.1 Install partitions and urinal screens in strict accordance with manufacturer's installation recommendations.

.2 Install partitions and urinal screens plumb, level and securely fastened in the locations shown on the drawings.

.3 Perform drilling of steel, masonry and concrete necessary to install the work of this Section.

.4 Co-ordinate installation with the work of trades providing wall and floor finishes, washroom accessories and other adjacent partitions and constructions.

.5 Isolate contact surfaces to prevent electrolysis due to metal contact with masonry, concrete or dissimilar metal surfaces. Use bituminous paint, building paper, butyl tape or other approved means.

.6 Install hardware supplied under this Section and ensure that it is visually aligned.

.7 Securely install panels to walls and pilasters with fittings to make a strong and rigid installation.

.8 Locate wall channels so that holes for mounting occur in ceramic tile joints.

.9 Install urinal screens to locations on walls as indicated on drawings, plumb, level and rigidly secured in place.

.10 Install partitions allowing the following clearances and tolerances:

- .1 Between panel edges and wall: 1" + 1/8".
- .2 Between partition panel edge and pilaster panel: 1/2" + 1/8".
- .3 Between pilaster panel edge and door edge: 3/16" + 1/16". Ensure that partitions are visually aligned from all view points.

3.3 ADJUSTMENT

.1 Upon completion of the work or when directed, remove all traces of protective coating or paper, and polish compartments.

.2 Test hinges, locks and latches and where necessary, adjust and lubricate. Set hinges so that doors stand open 30 when compartment is not in use. Ensure that compartments are in working order.

3.4 CLEANING

.1 Clean and make good surfaces soiled or otherwise damaged in connection with the work of this Section. Replacing finishes or materials that cannot be satisfactorily cleaned.

.2 Upon completion of the work, remove all debris, equipment and excess material resulting from the work of this Section from the site.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 Furnish labour, materials and other services to complete the fabrication and installation of;

.1 Washroom accessories and framed mirrors and

.2 Attachment hardware.

.2 Include all materials and fitments required for the operation of any unit furnished, in the manner, direction and performance shown on the shop drawings and specified herein.

1.3 RELATED REQUIREMENTS

.1 Section 06 10 00: Rough Carpentry

.2 Section 09 21 16: Gypsum Board Assemblies

.3 Section 09 30 00: Tiling

.4 Section 10 21 13.19: Solid Phenolic Toilet Compartments

1.4 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware

.2 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.3 ASTM A666-10, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

.4 ASTM A1008/A1008M-12a, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

1.5 SUBMITTALS

.1 Provide submittals specified and as required to assess conformance with the Contract Documents, in accordance with Section 01 33 00 Submittals.

.2 Shop Drawings: Show and describe in detail, materials, finishes, dimensions, details of connections and fastenings, elevations, plans, sections, metal gauges, hardware and any other pertinent information.

.3 Coordinate the work of this Section with the placement of internal wall reinforcement.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location.

.2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.

.3 Store materials in original, undamaged containers or wrappings with manufacturer's seals and labels intact.

.4 Unsatisfactory materials shall be removed from the site.

.5 Adequately protect the structure and work of other Sections during delivery, storage, handling and execution of the work of the Section.

.6 Provide tools, plant and other equipment required for the proper execution of the work of this Section.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design Products: Products named in this Section were used as the basis-of-design for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products and provided they submit requests for substitution in accordance with Section 01 33 00 Submittals.

.2 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 ASI Watrous - Global Partitions

.2 Bobrick

.3 Frost

.4 Koala Kare

.5 Dyson

2.2 MATERIALS

.1 Provide one of the products indicated for each designation in the Washroom and Custodial Accessory Schedule below, subject to compliance with specified requirements.

.2 Stainless Steel: In accordance with ASTM A666, Type 304, with No. 4 finish (satin); minimum nominal thickness as established by product type.

.3 Sheet Steel: Steel: In accordance with ASTM A1008/A1008M, cold rolled, commercial quality; minimum nominal thickness as established by product type; surface preparation and metal pretreatment as required for applied finish.

.4 Galvanized Steel Sheet: In accordance with ASTM A653/A653M, minimum Z180 coating designation.

.5 Galvanized Steel Mounting Devices: In accordance with ASTM A153/A153M, hot dip galvanized after fabrication.

.6 Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

.1 Washroom and Custodial Accessories:

.1 Surface Mounted:

.1 Fabricate units with tight seams and joints, and exposed edges rolled.

.2 Hang doors and access panels with continuous stainless steel hinge.

.3 Provide concealed anchorage where possible.

.2 Recessed Mounted:

.1 Fabricate units of all welded construction, without mitred corners.

.2 Hang doors and access panels with full length, stainless steel hinge.

.3 Provide anchorage that is fully concealed when unit is closed.

.2 Workmanship shall be best grade of modern shop practice known to recognized manufacturers specializing in this work. Joints and intersecting members shall be accurately fitted, made in true planes with adequate fastening. Wherever possible fastenings shall be concealed.

.3 Isolate where necessary to prevent electrolysis between dissimilar metal to metal or metal to masonry or concrete contact.

.4 Fabricate and erect work square, plumb, straight, true and accurately fitted. Provide adequate reinforcing and anchorage.

.5 Drilling shall be reamed and exposed edges left clean and smooth.

.6 Include anchors and fastenings necessary to anchor work of this Section.

.7 Coordinate with Section 06 10 00: Rough Carpentry, for wood blocking for attachment of washroom accessories.

.8 Keys: Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six (6) keys to Owner's representative.

3 EXECUTION

3.1 EXAMINATION

.1 Inspect surfaces over which the work of this Section is dependent for any irregularities detrimental to the application and performance of the work. Notify Consultant in writing of all conditions which are at variance with those in the Contract Documents and/or detrimental to the proper and timely installation of the work of this Section. The decision regarding corrective measures shall be obtained from the Consultant prior to proceeding with the affected work.

.2 Commencement of work of this Section implies acceptance of surfaces and conditions.

3.2 INSTALLATION

.1 Make thorough examination of drawings and details, determine the intent, extent, materials, conditions of interfacing with other work and be fully cognizant of requirements.

.2 Work of this Section shall include complete installation of items specified herein. Installation shall be in strict accordance with manufacturer's printed instructions.

.3 Securely fasten accessories, level and plumb in the locations shown on the drawings and specified herein. All fastenings shall be concealed.

.4 Co-ordinate the work of this Section with the work of other Sections to provide the necessary recesses, edge conditions wood blocking for the accessories as required.

.5 Do all drilling of steel, masonry and concrete necessary for the anchorage of the work.

.6 Installed grab bars shall be capable of supporting a downward pull of 500 lbs. per lineal foot.

3.3 ADJUSTING

.1 Check mechanisms, hinges, locks and latches, adjust and lubricate to ensure that accessories are in perfect working order.

3.4 CLEANING

.1 Upon completion of the work of this Section or when directed by Consultant, remove all protective coatings, and coverings. Clean and polish exposed surfaces.

3.5 WASHROOM AND CUSTODIAL ACCESSORY SCHEDULE

No.	Description / Model
CH1	Vandal-Resistant Coat Hooks: Satin finished stainless steel, square profiled, spring loaded safety hook with vandal-resistant mounting; Colour Blue: Frost: Code 1150B (Blue) ASI Front-Mount Colapsable Clothes Hook ASI 123 Bobrick B-983
GB1	Urinal Grab Bar: Vertical 1.214mm (0.048") thickness; 305mm (12") long x 38mm (1-1/4") Ø, straight, stainless steel, slip resistant grip, concealed mounting, cap secured with vandal resistant set screws: ASI 3801-12P Bobrick B-6806.99x12
GB2	Grab Bar: Horizontal 1.214mm (0.048") thickness; 610mm (24") long x 38mm (1-1/2") Ø, straight, stainless steel, slip resistant grip, concealed mounting, cap secured with vandal resistant set screws: ASI 3801-24P Bobrick B-6806.99x24
GB3	Grab Bar: Side "L"-shape grab bar, 760mm (30") long x 760mm (30") high 38mm (1-1/2") dia., stainless steel, slip resistant grip, concealed mounting, cap secured with vandal resistant set screws: ASI Type 04
M1	Mirror (Tilt): Framed, 910mm (36") high x 460mm (18") wide, fixed tilt installation for disabled persons, mounted maximum 1000mm (40") to bottom of frame: ASI 0535-1836 Bobrick B-293x1836
M2	Mirror (Flat): Framed, 610mm (24") high x 460mm (18") wide, fixed installation, mounted 1000mm (40") to bottom of frame: ASI 0600-1824 Bobrick B-290x1824

No.	Description / Model
SND	Sanitary Napkin Disposal: Surface mounted, concealed fastening, self closing disposal opening with leak proof plastic receptacle and 10 disposable liners for initial stocking purposes for each unit: ASI 0852 Bobrick B-270 Frost 622
HD	Hand dryer “Dyson airblade V (White) low voltage: Mount the dispenser 1220mm above the floor finish (Coordinate with electrical)

3.6 WASHROOM ACCESSORY SCHEDULE – SUPPLIED BY THE SCHOOL BOARD

PTD	Paper Towel Dispenser: Supplied by school board and installed by contractor.
TPD	Toilet Tissue Dispenser: Supplied by school board and installed by contractor.
SD	Soap Dispenser: Supplied by school board and installed by Contractor.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 DELIVERY, STORAGE, AND HANDLING

.1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

1.3 SUBMITTALS

.1 Submit submittals in accordance with the General Conditions and Section 01 33 00.

.2 Shop drawings:

.1 Indicate the following: methods of anchoring, thickness and finishes of materials, relationship of work of other sections, including all required cutouts, and all other pertinent data and information.

.3 Maintenance data: Three copies of instructions covering cleaning, replacement and other relevant maintenance data.

.4 Extended Warranty: Submit a written warranty in accordance with Section 01 33 00.

.1 Warranty period of 5 years

.2 Commencement: Substantial Performance of the Work

2 PRODUCTS

2.1 MATERIALS

.1 Provide reinforcing, fastenings, and anchorage required for building in.

.2 Insulate between dissimilar metals, and metal and incompatible materials to prevent electrolysis with bituminous paint or other approved means.

.3 Do not attach manufacturer's name or trademark, plates, imprints or labels to products unless approved by Consultant.

2.2 FABRICATION

.1 Verify site dimensions prior to fabrication. Fabricate work true to dimensions and square. Finished work shall be free from distortion and defects detrimental to appearance and performance.

2.3 MISCELLANEOUS SPECIALTIES

.1 Refer to drawings and schedules for items required but not specified herein.

2.4 COAT AND HAT RACK

.1 Wall mounted coat and hat rack, adjustable height, finished with high performance electrostatically applied powder coating.

.1 Shelf: Consisting of four (4) 19 mm square tubes, closed and protected with plastic end caps.

.2 Brackets and Channel Mount: 2.3 mm steel brackets and channel mounting, designed for vertical adjustment of one full shelf height, complete with plastic end caps. Channel Spacing: Not to exceed 1016 mm.

.3 Hanger Rod: 25 mm diameter, 1.2 mm thick chrome plated steel tube with plastic end caps.

.4 Mounting Hardware: Provided by manufacturer to ensure a complete installation of coat and hat racks.

.5 Colour: Medium gray, unless otherwise indicated.

.2 Solid ABS hooks available in five (5) different colours, impact resistant, spaced at 150 mm (6") on center.

.1 Colour: As selected by the Consultant from the manufacturer's standard product line.

.3 Basis of Design Materials:

.1 Coat and Hat Racks, Model SCR1001 by Global School Products.

.2 ASP Student Line Coat Rack by Architectural School Products

3 EXECUTION

3.1 INSTALLATION

.1 Securely fasten work level and plumb in the locations shown on the drawings and as specified herein.

.2 Co-ordinate installation with the work of Sections providing adjacent construction as required.

.3 Execute electrical work by qualified electricians and in compliance with the Canadian Electrical Code and other requirements of authorities having jurisdiction.

3.2 ADJUSTMENT

.1 Upon completion of the work or when directed, remove all traces of protective coatings or paper.

.2 Test operation, adjust, lubricate and ensure that accessories are in perfect working order.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

.1 This Section includes supply and installation of manual chain operated, roller type fabric shade assembly consisting of the following:

.1 Shade housing complete with fascia

.2 Single, sunscreen fabric shade material

1.3 RELATED REQUIREMENTS

.1 Section 08 44 13: Glazed Aluminum Curtain Wall

.2 Section 08 51 13: Aluminum Windows

.3 Section 09 21 16: Gypsum Board Assemblies

.4 Section 09 51 00: Acoustic Ceilings

.5 Section 09 91 00: Painting

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Construction Conference: Arrange a site meeting attended by the Contractor, the Subcontractor, the Consultant, materials supplier(s), and other relevant personal before commencement of work for this Section; as indicated in Section 01 31 13 Project Meetings.

1.5 SUBMITTALS

.1 Submit submittals in accordance with the Contract Requirements and Section 01 33 00.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Shop Drawings: Submit shop drawings showing and describing details of opening sizes, clearances, handing of operating chains, anchorage, assembly, materials, components, finishes and assembly.

.2 Samples: Submit 305 mm x 305 mm (12" x 12") samples of the manufacturer's full range of shade fabric and colours available for later selection by the Consultant.

.3 Closeout Submittals:

.1 Operation and Maintenance Data: Submit copies of manufacturers maintenance data sheets in accordance with Section 01 33 00 Submittals: Maintenance Manual and Operating Instructions, and as follows:

.1 Provide written literature and instructions to Owner’s personnel addressing maintenance and replacement of fabric shades specified in this Section.

.2 Provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.

.3 Record Documentation: Submit as constructed information in accordance with Section 01 31 13 Project Coordination.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Consultant:

.1 Manufacturer / Supplier: Obtain materials from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties

.2 Installers: Execute Work of this Section using qualified personnel skilled in installation of work of this Section, having a minimum of five (5) years proven experience of installations similar in material, design, and extent to that indicated for this Project.

1.7 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Coordinate deliveries to comply with construction schedule and arrange for suitable storage (if required).

.2 Fabric shades shall be carefully checked, handled, unloaded and stored to prevent damage. If damaged during delivery, handling, unloading, storage or installation, fabric shades shall be returned to the fabrication shop for repairs or replacement as deemed necessary by the Consultant.

.3 Store fabric shades in fabricator's original, undamaged containers.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design products are named in this Section; form the basis-of-design materials for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products and provided they submit requests a minimum of five (5) days in advance of Bid Closing.

.2 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Mechoshade by MechoShade Systems Inc.

.2 Teleshade by Solarfective Products Limited

.3 #4110 Chain Operated Roller Shades by Silent Gliss Canada Limited

2.2 COMPONENTS

.1 Shade Roller Tubes:

.1 Minimum 2.3 mm thick x 38 mm diameter (0.09" thick x 1-1/2" diameter) extruded AA 6063-T5 aluminum alloy tube having three equally spaced internal reinforcing fins and two shade fabric mounting "keyway" type channels running full lengths of outside surface of the roller tubes. Roller tubes shall be removable, interchangeable without; removing the drive assembly, resetting the block or re-adjusting preset stops.

.2 End Brackets:

.1 Two piece, moulded ABS type end brackets with nylon drive sprocket colour matched to fascia/soffit.

.3 Mounting Brackets/Clips:

.1 Formed from minimum 1.6 mm (0.063") thick electro-galvanized, bonderized cold rolled steel with baked enamel finish.

.2 Mounting brackets/clips shall be capable of mounting inside, or outside, or to the ceiling with spring clutch drive assembly on either side for right hand or left hand operation.

.4 Drive Assemblies:

.1 Factory set, spring clutch type drive assembly to suit size and travel of fabric shades, complete with built-in shock absorber system to prevent chain breakage under normal conditions, and balancing spring or lift assist mechanism.

.2 Drive assemblies shall be capable of being field adjusted from exterior of shade without having to disassemble the shades

.5 Drive Chains:

.1 No. 10 nickel plated brass bead type chain or "bright" finished AISI Series 300 stainless steel alloy bead type chain forming continuous loops and capable of withstanding 400N pull test.

.2 Provide drive chains with upper and lower stops to prevent overwinding or underwinding.

.6 Fascias/Soffits:

.1 Minium 1.7 mm (0.067") thick extruded AA 6063-T5 aluminum alloy fascia/soffits of single lengths to suit each shade panel, designed to snap onto end brackets without any exposed fasteners and having spray painted baked enamel finish.

.7 Custom Trims:

.1 Minium 1.7 mm (0.067") thick extruded AA 6063-T5 aluminum alloy custom trims to shapes and profiles as indicated, of single lengths to suit conditions, designed to snap onto end brackets without any exposed fasteners and having spray painted baked enamel finish.

.8 Shade Mounting Splines:

.1 Continuous, single piece, extruded vinyl type shade mounting spline having asymmetrical "keyway" insertion locking channels, embossed fabric guides and having sufficient holding capacity to hold fabric shade when spline is snapped in and locked in roller tube.

.2 Shade mounting splines shall be readily removable without removing roller tubes from end brackets or removing brackets from wall/window framing.

.9 Shade Hem Bars:

.1 Provide electro-galvanized, bonderized steel flat bar, or prefinished extruded AA 6063-T5 aluminum alloy type shade hem bars, of single lengths to suit each shade panel and sufficient weight to hang shade fabric panel without buckling or distortion.

.10 Shade Fabric:

.1 Shade fabric shall be 0.45 mm (0.018") thick, solar heat control, vinyl coated, opaque polyester yarn type fabric in "basket weave" pattern design, consisting of approximately 79% vinyl and 21% denier polyester core yarn, 'Solarshield 6% Open' and 'Solarview 10% Open' by Solarfective Products Limited and distributed by Patry Products Inc., or approved equal by Phifer Wire Products Inc., and conforming to the following requirements;

.1 Flame Retardance: Certified by independent laboratory to pass Small Scale Vertical Burn Requirements of CAN/ULC-S109-M87.

.2 Openness Factor: 6% (+0%/-1%) and 10% (+0%/-1%), depending on solar intensity, solar heat gain and solar position as designated later by Consultant.

.3 Weight Per Sq. Yd.: 19 oz.

.4 Warp Ends Per Inch: 36.

.5 Fill Ends per Inch: 30.

.6 Stretch % (271 lbs. wt.);

.1 Warp: 2%.

.2 Fill: 3%.

.7 Set %;

.1 Warp: 1.5%.

.2 Fill: 1.5%.

.8 Abrasion Resistance (500 Taber Cycles):

.1 Yarn: None.

.2 Rupture: None.

.3 Wear: Trace.

.9 Ultra Violet Light Deterioration:

.1 Fade: None.

.2 Tensile Retention: 96%.

.2 Fabric shall be dimensionally stable, tensioned in the finishing range prior to heat setting to keep warp ends straight and minimize or eliminate weave distortion and keep fabric flat. Fabric shall hang flat, without buckling or distortion. Edges when trimmed, shall hang straight without ravelling. Unguided shade fabric shall roll true and straight without shifting sideways more than ± 1/8" in either direction due to warp distortion or weave design.

.3 Shade fabric shall be from same dye lot.

.4 Colour:

.1 As selected later by Consultant from the manufacturer's standard project line.

.11 Fasteners:

.1 AISI 300 Series stainless steel alloy, self-tapping type metal screws concealed in completed installation.

.12 Butyl Tape:

.1 Extruded, high grade, macro-polyisobutylene tape of size, width and shore hardness to suit conditions.

.13 Miscellaneous:

.1 Provide all non-corrosive anchors, washers, shims, butyl tape, drills tools and equipment necessary to complete the work of this Section.

2.3 FABRICATION

.1 Prior to fabrication, the actual dimensions of openings must be verified by accurate site measurements taken by the fabricator himself.

.2 Fabricate fabric shades to completely fill the openings from head to sill and from jamb to jamb, excluding fabrication and installation clearances.

.3 Install hem bars at bottoms of fabric shades, providing double thickness of shade fabric on room side and securely sew-in hem bar, with continuous hem just above hem bar and at both ends of hem bar.

.4 Securely install fabric shades in roller tubes "keyway" channels with shade mounting splines.

.5 Fabricate aluminum fascia/soffits and custom trims of single length piece to suit location of each fabric shade, free of splices or joints.

.6 For multiple window installations, fabricate fabric shades so that the ends occur only over mullions or over defined vertical separations.

.7 Fabricate fabric shades for full operation.

.8 Hand manual chain operators in suitable positions for each room, confirmed by the Consultant and Owner/Tenant.

.9 Manual Operation:

.1 Fabric shades shall be operated by chain and sprocket assembly incorporating an adjustable slip clutch to control the rate of fall, from free running to zero friction factor, to 100% friction factor.

.2 Fabric shades shall be adjustable to stop and hold at an infinite number of positions, to be adjustable at any percentage of friction and to control the fall rate of the fabric shades.

.3 When position of fabric shades are set as free fall, system shall be mechanical by use of chain retainer.

.4 Highest and lowest fabric shade position shall have automatic stops to prevent overwinding or unrolling.

2.4 FINISHES

.1 Aluminum Fascia/Soffits and Custom Trims:

.1 Ultra-violet light resistant polyester powder coating finish in colours to match adjacent aluminum framing finish colour.

.2 Protect finish with strippable protective film.

.2 Mounting brackets/clips shall have painted finish, with colour, gloss and sheen to match baked enamel finish.

.3 Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry and concrete contact. Use butyl tape or other approved divorcing material.

3 EXECUTION

3.1 EXAMINATION

.1 Prior to installation, inspect fabric shades for damage and correct sizing. Do not install damaged or incorrectly sized fabric shades. Send fabric shades back to fabricator for repairs and/or replacement.

3.2 INSTALLATION

.1 Coordinate work of this Section with work of other sections.

.2 Install fabric shades to windows as indicated on drawings using fasteners as specified herein, plumb, true, square, straight and level in proper planes, complete with all fascias/soffits, custom trims and accessories in strict accordance with the manufacturer's written instructions.

3.3 ADJUSTMENT AND CLEANING

.1 Adjust, correct and lubricate fabric shades as required, to provide smooth and efficient operation without binding.

.2 Clean fabric shade surfaces and remove all finger marks and smudges from fascias/soffits and custom trim surfaces. Remove all protective metal films. Where fabric and surfaces cannot be satisfactory cleaned, in the opinion of the Consultant/Owner/Tenant, then such fabric and surfaces shall be replaced without cost to Owner/Tenant.

.3 Leave fabric shades in raised position and in first-class condition upon completion of the work of this Section.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 WORK INCLUDED

.1 This Section covers the general requirements for the supply and installation of all electrical equipment work specified herein and as shown on the drawings; also electrical wiring and connections to electrical and instrumentation equipment specified under other Divisions and/or detailed on the contract drawings and/or supplied by the Owner.

.2 The major work included, but not limited to the following:

.3 Modifications of existing power distributions system as shown on the drawings, complete with conduits and cables.

.4 Electrical services, lighting and power systems.

.5 Lighting system complete with controls and wiring.

.6 Assist School Board and provide the information to submit an application for Save on Energy Incentives.

.7 Low voltage services and controls.

.8 Power supply to HVAC equipment.

.9 Modification in the existing Fire Alarm system for Horn/Strobe, door hold open system.

.10 Modification in the existing PA system.

.11 All required ESA inspections, permits and certificates

1.3 SCOPE OF WORK

.1 The scope of work covered by this Specification includes the purchase and installation of equipment and services on site, as follows:

.2 Provide all labour, materials, equipment, tools, tests, commissioning and services required to complete the work of Division 26 in accordance with the Specifications and the drawings.

.3 Examine the drawings, in conjunction with the specifications, to determine the scope of work. Be sure to reference Division 23 – Mechanical for work related to this Division.

.4 Installation of conduits including boring and putting sleeves as required.

.5 Installation of indoor lighting fixtures and motion controls and switches as indicated on ‘E’ drawings.

.6 All receptacles,120 V, as indicated in 'E' drawings. Note the receptacle requirements for indicated services (i.e. isolated grounds, GFI and explosion proof).

.7 All necessary wiring terminations and connections to make the project complete and functional as intended are included.

.8 At least 20% spare wires (but not less than 2) in each instrumentation and control cable/wire runs.

1.4 POWER INTERRUPTION

.1 Maintain facility into service throughout construction.

.2 Power interruptions to be kept to a minimum. Coordinate power interruptions with the Plant operation staff and all other trades. Submit requests for electrical interruptions indicating the date, time and estimated duration of the interruption at least two weeks prior to the requested shutdown date. Do not commence work until review is complete.

1.5 MATERIAL AND EQUIPMENT

.1 Use new material and equipment approved and certified by CSA / ULC. Incase of unavailability of CSA / ULC approved equipment, use equipment approved by special inspection of the ESA and the local hydro utility.

.2 Factory assembled control panels and component assemblies should be certified by CSA.

1.6 CODES, PERMITS AND INSPECTION

.1 Ensure that all materials and work meet the requirements of the Ontario Electrical Safety Code (OESC) and all local, municipal, provincial and federal by-laws and regulations.

.2 Obtain all necessary permits and pay all fees for the work of this division.

.3 On completion of the work, submit all final certificates.

.4 Submit to Inspection Authority and the Supply Authority the required quantity of drawings and specifications for examination and approval prior to commencement of work.

1.7 EXAMINATION OF SITE AND DOCUMENTS

.1 Examine the site and all drawings and specifications of other Divisions and become familiar with local conditions, building construction and finish affecting the work under this Division. Inform the Engineer of any omissions, discrepancies, defects or interferences affecting the work before the tender closes.

1.8 DRAWINGS

.1 The electrical drawings are diagrammatic and intended to convey the scope of work. The drawings indicate general arrangement of equipment, conduit runs and approximate sizes and locations of equipment. Coordinate with other divisions to ensure correct final locations as per Codes and field requirements.

.2 Follow the electrical drawings in laying out the work. The electrical drawings do not show all details which may affect the installation. Check all other division's drawings before proceeding with the electrical work.

.3 All wiring, terminations and connections shown on single line diagrams, block diagrams, riser diagrams and/or layout drawings shall be included in the contract.

1.9 SUBMITTALS

.1 Provide a copy of this relevant specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the product specifications or standards listed above, are indicated and, therefore, requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested

deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

.2 Provide the following information on all submittals:

.1 Manufacturer's and Supplier's name.

.2 Catalogue model number.

.3 Project number and name.

.4 Number identifying item on the drawings and/or in the specifications such as equipment, item number, panel identification letters, etc.

.5 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.6 Where applicable, include wiring, single line and schematic diagrams.

.7 Include wiring diagrams or diagrams showing interconnections with other Sections.

.8 In wiring diagrams, include all interconnecting Field equipment wiring along with wiring tags and terminal numbers on the field equipment.

.9 Highlight the specific make / model of the equipment being provided and cross out the details that are not related to the exact make / model being supplied.

.3 Submit samples of material and equipment where specified or as may reasonably be requested by the Engineer for their review before ordering same. The Engineer may retain the samples at their discretion until the completion of the contract.

.4 Submit shop drawings for, but not limited to, the following items:

.1 Disconnect Switches,

.2 Distribution Panelboards.

.3 Power System Studies

.5 Submit conduit, cable tray and wiring layout drawing. Show conduit and cable sizes. Drawings shall be on the same size sheets as the contract drawings.

1.10 PAINTING

.1 Touch up all prefinished electrical equipment marred during installation or shipment listing the same colour and type of finish as originally used in the factory. Thoroughly stir all paint before application.

1.11 PROTECTION

.1 Protect exposed line equipment during construction for personnel safety.

.2 Shield and mark live parts "Live 600 Volts", or with appropriate voltage.

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

1.12 TESTS

.1 Conduct and pay for tests of the following:

.1 Circuits originating from branch distribution panels.

.2 Lighting and its Control

.3 Functional tests for protection devices at switchboard.

.2 Furnish manufacturer's certificate or letter confirming that entire installation, as it pertains to each system, has been installed to manufacturer's instructions.

.3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.4 Submit test results for Engineer's review.

1.13 INSULATION RESISTANCE TESTING

.1 Megger circuits, feeders and equipment up to 350 V with 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.4 Replace cables if the resistance to ground is less than 0.5 mega-ohms for circuits or feeders up to 350 V, and if resistance to ground is less than 1.0 mega-ohms for circuits or feeders, 350-600 V.

.5 No electronic equipment will be meggered unless specifically advised by the vendor.

1.14 EQUIPMENT IDENTIFICATION

.1 Electrical nameplates to be in compliance with OESC.

.2 Provide nameplates for all electrical equipment supplied under this Division. Ensure that nameplates list equipment association and function. Include equipment Tag ID on all nameplates.

~~.3~~ Nameplates to be outdoor grade lamicoid, 50 mm square minimum or sized to suit text and location, 1.6mm thick, beveled edge, white background with 4mm high black letters.

.4 Fasten nameplates to equipment using 2 self-tapping stainless-steel screws or manufacturer supplied self-adhesive backing for clean flat surfaces. For equipment with no suitable flat surface attach the nameplate in some convenient location with black heavy-duty zip-ties.

.5 Coordinate the type and naming convention with the Engineer, prior to submitting shop drawings. Submit a nameplate list for review. List to identify equipment name, location, nameplate size, nameplate text, fastening method.

.6 Provide nameplates for all light switches and receptacles. Text to include panel and circuit numbers. Letter height to be 3mm.

.7 Provide nameplates for all cables, conduits at the source and load location and at every 10 meter (or less) regular intervals.

1.15 CARE, OPERATION AND START-UP

.1 Instruct the Engineer and Owner's operating maintenance staff in the operation, care and maintenance of all equipment and systems provided under this Division.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation and to check, adjust, balance and calibrate components.

.3 Provide these services for such period, and for as many visits as necessary to put equipment into reliable operation, and ensure that operating personnel are familiar with all aspects of its care and operation.

.4 The Owner has the privilege of the trial usage of electrical system of parts thereof for the purpose of testing and learning the operational procedures.

.5 Carry out the trial usage over a length of time as deemed reasonable by the Engineer at no extra cost.

.6 Provide supervision for these operations. Do not waive any responsibility for trial usage.

.7 Trial usage shall not be construed as acceptance by the Owner.

.8 Keep a record of dates and durations of each instruction period, together with the name(s) of the person(s) to whom the instructions were given. Forward one (1) signed copy of such record to the Engineer.

1.16 CONFLICTS

.1 If there are any conflicts between the specification and Contract Drawings, or within the specifications or Contract Drawings themselves, the more stringent requirements hold.

1.17 ABBREVIATIONS

.1 The abbreviation used in the specifications and drawings for Division 26 are as follows:

.1	ANSI	American National Standard Institute
.2	CBM	Certified Ballast Manufacturer
.3	CSA	Canadian Standard Association
.4	EEMAC	Electrical and Electronic Manufactures Association of Canada
.5	IEEE	Institute of Electrical and Electronic Engineers
.6	OESC	Ontario Electrical Safety Code
.7	OPSD	Ontario Provincial Standard Drawings
.8	OBC	Ontario Building Code

1.18 OPERATION AND MAINTENANCE DATA

.1 Submit Four (4) copies of manufacturer's maintenance instructions for each piece of apparatus, equipment, and systems to the Engineer. Include installation, operation and maintenance data and the names and addresses of spare parts suppliers and service organizations, in the instructions.

.2 General advertising literature will not be accepted. Data shall refer only to specific model and type of equipment installed.

1.19 FINAL INSPECTION

.1 Make request, in writing, to the Engineer to arrange for a final inspection of all electrical systems with timetable.

.2 Do not issue this written request until:

.1 All deficiencies noted during the job inspection have been completed.

.2 All systems have been balanced and tested and are ready for operation.

.3 Operating and maintenance instructions have been submitted and reviewed.

.4 Identification of equipment and raceways is complete.

.5 Certificates have been submitted.

.6 Spare parts and replacement parts specified have been provided and receipt of same acknowledged.

.7 Record drawings are completed and reviewed.

.8 Owner's operating personnel have been instructed.

.9 Framed Single line electrical diagrams are hung.

1.20 GUARANTEE

.1 Guarantee all equipment and material supplied and installed under this Division against any and all defects, deficiencies in equipment design, materials and workmanship which are not detected prior to formal acceptance of the system, but which may develop within one year after such acceptance. Make good any such defects and deficiencies at no additional cost to the Owner.

.2 This general guarantee shall not act as a waiver of any specified guarantee for any greater length of time.

.3 Guarantee any part of work accepted by the Owner, before completion of whole work, for one year from date of acceptance of that part of work.

.4 The guarantee period shall not be presumed to commence where any equipment is operated temporarily for the purpose of testing or checking out systems.

1.21 GROUNDING

.1 Ground electrical system and equipment to the requirements of the Electrical Safety Authority.

.2 The ground wire in multi-conductor cables shall serve as the equipment grounding conductor where used. Where flexible conduit or PVC is used, install a separate copper ground wire sized according to Table 16 of OESC.

.3 Solidly ground all equipment or as shown in the drawings.

.4 Use stranded copper with green insulation for ground conductors.

1.22 CO-ORDINATION

.1 Confer with all trades installing equipment which may affect the work of this Division, and arrange equipment in proper relation with equipment installed under other Divisions of the Contract.

.2 The Contractor will coordinate with Division 3 to provide cable penetrations and and termination to the process equipment at the right location.

.3 Relocate equipment and/or material installed, but not coordinated with the work of other Divisions as directed by the Engineer without extra cost.

.4 X-ray existing floor, walls and ceiling before cutting to avoid conflict with any existing utilities. Re-route if necessary.

1.23 CLEANING

.1 At time of final cleaning, clean lighting reflectors, lenses, and other lighting surfaces that have been exposed to construction dust and dirt.

.2 All panels to vacuumed out prior to commission.

1.24 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as over-current trips, relays and fuses are installed to correct values and settings.

Pre-Service Testing:

.1 All pre-service testing shall be coordinated by and paid for by the Contractor.

.2 Clean the inside of all switchboards, panels, bus ducts, etc., using industrial type vacuum cleaners and other appropriate equipment.

.3 The following tests shall be made, prior to putting the equipment into service, to ensure that the distribution equipment has been installed in a satisfactory manner and suitable for placing into service, without either endangering personnel or the system.

.1 Lighting/Power Panel Boards:

.1 Test and verify system circuit breaker settings and ground fault protection.

.2 Test system circuit breaker functions, i.e., trip, close, electrical operation etc.

.2 Grounding

.1 Check grounding of all devices for mechanical soundness and resistivity.

.3 Submit all test results to the Engineer.

1.25 POWER SYSTEM STUDIES

.1 Conduct Power System Studies for the entire distribution system. Obtain all necessary verified data required to run the study including field verification. Perform the following:

.1 Short Circuit Study for Line to Line, Line to Ground faults.

.2 Selective Coordination Study and device evaluation report

.3 Arc Flash Study and Hazard Analysis

.2 The study shall include High Voltage Hydro supply, 240 / 120 V system and to be submitted for approval at the same time as the Electrical Distribution Equipment and the shop drawings. It will be the contractor's responsibility to obtain and field verify the data and incorporate in the Study. The Coordination study data shall be presented in tables and on composite charts (for phase and ground) and shall include and not be limited to the following:

.1 Settings and TCC curves of the protection devices.

.2 Maximum available short circuit currents (phase and ground). Provide correspondence with Hydro as an Appendix to the report.

.3 Cable damage curves.

.4 The largest load and the largest motor, with the acceleration time, FLC, LRC and inrush currents. Include its upstream feeder damage curve.

.5 The cable damage curve for the smallest size feeder and its protection device TCC.

.3 Implement the coordination study in full and set all the protection devices as per the recommendations in the Study.

.4 Attach approval correspondence with the supply utility as an Appendix to the report.

.5 Install Arc Flash Labels on the equipment as per the recommendation of the study.

.6 Approved Vendors for the Study:

.6 Enkompass Power and Energy Corp.

.7 Eaton Canada

.8 Eastenghouse Inc., Mississauga Ontario

.9 Brosz Technical Services

.10 Schneider Canada

.7 Drawings and reports must be sealed by a Professional Engineer.

.8 Submit the study along with the main electrical distribution equipment shop drawings.

1.26 WORKMANSHIP

.1 Install equipment, cable tray, conduit and cables in a workman-like manner to present a neat appearance and to function properly to the satisfaction of the Engineer. Install runs parallel and perpendicular to building planes. Conceal conduit in chases, behind furring, or above ceiling, except in unfinished areas. Install exposed systems neatly and group to present a neat appearance.

1.27 FIREPROOFING

.1 When cables or conduits pass through floors and fire rated walls, pack space between wiring and sleeve with approved material and seal with caulking compound. Use Hilti Firestop Solution products (or approved equal) for each specific application.

1.28 WIRING AND TERMINAL BLOCK IDENTIFICATION

.1 Identify wiring with permanent, indelible, identifying markings on both ends of phase conductors of feeders, branch circuit wiring, all control wiring and instrumentation wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1:

.1 Phase A: red

.2 Phase B: black

.3 Phase C: blue

.4 Neutral: white

1.29 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination or wiring to be suitable for either copper or aluminum conductors.

1.30 MANUFACTURERS AND CSA LABELS

.1 Manufacturers' nameplates and CSA labels to be visible and legible after equipment has been installed.

1.31 WARNING SIGNS

.1 Provide warning signs, as specified or to meet requirements of Inspection Department and Engineer.

.2 Use decal signs, minimum 175 x 250 mm size.

1.32 LOCATION OF RECEPTACLES

.1 Locate receptacles as shown on the drawings.

.2 Do not install receptacles back to back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of receptacles at no extra cost or credit, providing distance does not exceed 3.0 m and information is given before installation.

.4 Locate light switches as shown on the drawings.

1.33 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centerline of equipment unless specified or indicated otherwise. Check 'E' drawings for requirements.

.2 If mounting height of equipment is not indicated verify before proceeding with installation.

.3 Install electrical equipment at the following heights (in mm) unless indicated otherwise:

- .1 Local switches: 1200
- .2 Wall receptacles:
  - .1 General: 300, otherwise 1200
  - .2 Above top counters of splash back: 175
  - .3 In mechanical rooms: 1200
  - .4 Outdoor 1200
- .3 Panelboards: max. 2000 mm at the top, or as required by Code.
- .4 Disconnects: 1400

1.34 INSERTS, SLEEVES, ESCUTCHEONS AND CURBS, EQUIPMENT SUPPORTS AND HANGERS

.1 Use only factory made threaded or toggle type inserts, as required, for support and anchors, properly sized for the load to be carried. Place inserts only in portions of the main structure and not in any finishing material.

.2 Use factory made expansion shields where inserts cannot be placed, but only where reviewed by the Engineer and for light weights.

.3 Do not use powder activated tools except with written permission of the Engineer.

.4 Supply and locate all inserts, holes, anchor bolts and sleeves in time when walls, floors and roof are erected.

.5 Bring conduits and pipes through walls and floors as required, without sleeves, unless otherwise shown. Sleeves are not required in walls and dry area floors, where conduit is installed ahead of wall construction.

.6 Provide all supports required for the erection and support of the electrical work. Construct supports of steel, masonry, or concrete as noted or required. Steel supports in contact with water or high humidity shall be galvanized after fabrication or be of galvanized members bolted together using cadmium plated bolts. Place supports in floor base prior to concrete pouring where the closest vertical structure is not suitable for supporting electrical work.

.7 Ensure that the load onto structures does not exceed the maximum loading per square foot as shown on structural drawings or as directed by the Engineer.

.8 Support all hangers directly from the structure only. Do not support from other pipes, ducts, equipment, suspended ceilings, etc., except where expressly allowed.

.9 Suspend hanger rods generally from approved inserts in concrete or by beam clamps. Welding to steel structural members shall be done only with prior approval of welding method by the Engineer.

.10 For rod hangers use round steel galvanized threaded rod supports, minimum 10 mm diameter. Use clevis type conduit attachment.

1.35 FLASHING

.1 Flash all electrical parts passing through or built into roof, an outside wall or a waterproof floor.

1.36 DELIVERY, RECEIVING AND STORAGE OF EQUIPMENT

.1 Arrange with Equipment Suppliers for delivery of all items of equipment to the site of work at the appropriate dates on the Contractor's construction schedule.

.2 Arrange for delivery of all anchor bolts, templates, embedded metal, etc., required during the concreting and other construction.

.3 Receive equipment at the site, unload it, examine it upon arrival for damage or deficiency in conjunction with the Engineer and be responsible for its safekeeping, storage and installation. Immediately notify the Engineer and the Supplier of any damages or deficiency of the equipment delivered.

.4 For the purpose of this contract, equipment storage, safekeeping and location of equipment from one area of the site to another, for whatever reason, shall be the sole responsibility of the Contractor from the time of initial off-loading at the site until the date of completion and takeover by the Owner.

1.37 WORKING DRAWINGS

.1 Within sixty (60) days of the date of execution of the Contract, submit Two (2) sets of working drawings of the electrical work to the Engineer for review. Show the general arrangement, outline dimensions and weights of each piece of apparatus in order to accurately locate same and to design such structures, foundations and external wiring or piping as may be required for installation and connection. Show all conduit and cable tray runs in proper relationship to the structure and to the equipment being supplied.

.2 Each drawing shall be clearly referenced to the project with its contract number and applicable section number.

.3 One copy of each drawing will be returned to the Contractor stamped "FOR REVIEW" or otherwise marked with the required changes. Drawings requiring changes shall be revised by the Contractor and Two (2) copies of each resubmitted to the Engineer for review.

.4 Electrical construction shall not commence until the working drawings have been reviewed by the Engineer and therefore no change shall be made in them without written permission. In the event of any such alterations or changes being authorized by the Engineer, Two (2) copies of each of the revised drawings and specifications, indicating these changes, shall be immediately furnished to him at the Contractor's expense.

.5 The Contractor shall not make any claim for changes required to the work which was undertaken prior to receipt of the Engineer's approval.

.6 Review of the Contractor's working drawings by the Engineer shall not relieve the Contractor of the responsibility for the corrections thereof, or from results arising from error or omission of details of design. Review of working drawings shall in every case be subject to final review of the equipment and materials after these have been put in commission, all guarantees have been fulfilled and the general operation of the equipment and materials has been found satisfactory to the Engineer.

.7 Four (4) additional copies of all final reviewed working drawings shall be furnished to the Engineer at the Contractor's expenses.

1.38 SINGLE LINE DIAGRAMS

.1 Provide a framed single line diagram, “arch D” size, water resistant, plaque mounted in each electrical room. The single line diagrams shall show the complete power distribution system and the local equipment.

1.39 WARRANTY AND MAINTENANCE

.1 The Warranty period commences at Substantial Performance of the entire project, unless otherwise agreed to by the Owner in writing.

.2 Unless otherwise specified, provide a one (1) year warranty for all components of the work.

.3 Provide the required guarantee/warranty certificates and/or written documentation as specified.

1.40 TESTING & COMMISSIONING FORMS

.1 Use the testing and commissioning forms appended to the relevant specification sections as minimum to record the field observation during commissioning. In addition, Contractor should also use other forms as recommended by the manufacturer or their own standard forms.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

2 PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors: with current carrying parts of coppers sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:

.1 Connector body and stud clamp for stranded copper conductors.

.2 Clamp for stranded copper conductors.

.3 Stud clamp bolts.

.4 Bolts for copper conductors.

.5 Sized for conductors as indicated.

.4 Clamps or connectors for armoured cable, flexible conduit, as required.

3 EXECUTION

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and type connectors and tighted screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness test in accordance with CSA C22.2 No. 65.

.2 Install fixture type connectors and tighten. Replace insulating cap.

.3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

.4 Install crimp type connectors with approved compression tool.

.5 Install box connectors in an approved manner.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 REQUIREMENTS

.1 The drawings are not intended to show in detail, the location and size of every wire. Ensure that each and every item of power and control equipment shown on any or all drawings is provided and interconnected by cables of the specified or approved type and size for the intended purpose, as shown by the cable schedules, schematic and distribution diagrams, manufacturer's equipment diagrams, and the Contract Documents.

.2 Identify wiring with wire markers at both ends.

.3 Wire sizes shown have been determined on the basis of ampacity, short circuit availability or voltage drop. Do not reduce wire size without approval from the Engineer.

.4 Colour code single conductors forming part of a multiple conductor cable for phase identification.

Lighting and Power

1.	Line 1	-	Red
2.	Line 2	-	Black
3.	Line 3	-	Blue
4.	Neutral	-	White
5.	Ground Wire	-	Green

.5 Phase relationships and terminal requirements:

1.	Left	-	Middle -	Right
2.	Line 1	-	Line 2 -	Line 3
3.	Red	-	Black -	Blue

1.3 QUANTITIES

.1 Refer to 'E' electrical drawings.

2 PRODUCTS

2.1 POWER AND CONTROL WIRING

.1 Conductors: sized as indicated or required, stranded copper for #12 AWG and larger. Stranded copper for motor conductors.

.2 Insulation: 600 volt RW90 insulation for conductors up to size #10 and 1000 volt RW90 insulation for conductors size #8 and larger to CSA C22.2 No. 38 -latest edition. Use RWU-90 in underground conduit and ducts and for hydro service cables.

.3 Minimum conductor size for power and lighting wiring: #12 AWG.

.4 Minimum conductor size for control wiring: #14 AWG, coloured per unit function. Provide Teck cable or corrugated aluminum sheath, PVC jacketed single or multi-conductor with approved waterproof conductors, "corflex" type.

.5 Flexible cable for pendant equipment - Type SEW 600 volt, 4 conductors.

.6 Ground wires - bare copper with green RW 90 insulation when run in duct banks, tray or conduit. Use RWU-90 in underground conduit and ducts and for hydro service cables.

.7 Provide Teck or Corflex cables for power and control for direct buried and unprotected cable trough runs.

.8 Armored VFD Cables: Provide 3/C armored cable with three symmetrical grounding wires with in the interstices of the phase conductors. Armor to also provide EMI shielding performance.

2.2 INSTRUMENTATION AND SIGNAL WIRING

.1 Analog Signal

.1 In conduit: shielded twisted pair, insulated stranded tinned copper, aluminum foil-polyester shield 100%, stranded tinned copper drain wire, PVC jacket, conductor size #16 AWG, Belden Part No. 22416 or approved equivalent.

.2 DC Power and Digital Signal

.1 In conduit: 6 conductor #14 AWG, insulated stranded copper, PVC jacket, Belden Part No. 22104 or approved equivalent.

.2 In cabletrough: 6 conductor #14 AWG copper, stranded, insulated, PVC inner jacket, PVC jacketed aluminum interlock armour, Belden Part No. 29034 or approved equivalent.

.3 Data Signals:

.1 Use Cat-6 cables for telephone, Ethernet and communication link wiring unless otherwise noted. Cables to be 24 AWG, twisted pair with flame retardant PVC for non-plenum installations and low smoke flame retardant PVC for all plenum installations. Cables to be colored gray for telephone wiring and blue for data wiring. Provide additional cable colors for other systems as required.

.4 Intercom Speaker Wiring:

.1 Provide Carol cable intercom wiring, #16AWG unless otherwise noted for wiring to audible speakers. Supply specialized cables for plenum runs.

3 EXECUTION

3.1 INSTALLATION OF POWER WIRES

.1 Install wiring as follows:

.1 In conduit system in accordance with Section 26 05 34.

.2 Do not pull spliced cables inside ducts or conduit.

.3 Do not use splice cables from supply point to load, unless otherwise indicated and approved.

.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

.2 Obtain inspection certificate of compliance covering high voltage stress coning from local Hydro and include it with maintenance manuals.

2 PRODUCTS

2.1 CONNECTORS

.1 Copper compression connectors as required, sized for conductors.

.2 Install stress cone, terminations, and splices in accordance with the manufacturer`s instructions.

.3 Bond and ground as required.

3 EXECUTION

3.1 INSTALLATION

.1 Install connectors with approved compression tool.

.2 Install stress cones, terminations and splices (where approved and required) in accordance with the manufacturer's instruction.

.3 Bond and ground as required by Code.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Install fastenings and supports as required for equipment, cables and conduits.

2 PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.7 mm thick (12 gauge), surface mounted, suspended or as required set in poured concrete walls and ceilings.

- .1 Galvanised steel channels for indoor dry areas, galvanized accessories, and plated fasteners
- .2 Aluminium channels for outdoor and indoor wet areas, stainless accessories, and stainless fasteners

3 EXECUTION

3.1 INSTALLATION

.1 Secure equipment and supports to masonry, tile and plaster surfaces with lead anchors.

.2 Secure equipment and supports to hollow masonry walls or suspended ceilings with toggle bolts.

.3 Secure equipment and supports to interior poured concrete with HILTI expandable inserts.

.4 Secure equipment and supports to exterior poured concrete with HILTI chemical adhesive and 316 stainless anchor-rod.

.5 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified.

.6 For heavy equipment or devices to be mounted in T-bar ceilings, use support chains rated for the appropriate weights, hung with support hooks mounted in ceiling slab.

.7 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps, etc., designed as accessories to the support channels. All accessories to come from support channel manufacturer.

.8 Fasten exposed surface mounted conduit and cables to building construction or support system using straps.

- .1 One-hole straps for conduits and cables 50 mm or smaller.
- .2 Two-hole straps for conduits and cables larger than 50 mm.
- .3 Beam clamps to secure conduit to exposed steel work.
- .4 Provide galvanized straps and clamps for indoor and outdoor locations, stainless fasteners, mechanical anchors.

.5 Provide hot-dip galvanized straps and clamps for hazardous, corrosive, OESC category 1, and OESC category 2 areas, PVC coated accessories, 316 stainless fasteners, stainless mechanical anchors.

.9 Suspended Support Systems.

.1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.

.3 Provide galvanized rod and clips for indoor and outdoor locations, stainless fasteners, mechanical anchors.

.4 Provide hot-dip galvanized rods and clips for hazardous, corrosive, OESC category 1, and OESC category 2 areas, PVC coated accessories, 316 stainless fasteners, stainless mechanical anchors.

.10 For surface mounting of two or more conduits use U-channels at 3 m centres spacing.

.11 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.12 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.13 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of the other trade and approval of the Engineer.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

2 PRODUCTS

2.1 JUNCTION AND PULL BOXES

.1 Size and install boxes in accordance with CSA C22.2 No. 40.

.2 Welded steel construction or rigid PVC with screw on flat covers for surface mounting.

.3 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

.4 Provide gasketed covers for wet or damp locations or outdoors, with NEMA-4X enclosure.

.5 Provide terminal blocks of suitable size for inter-connection of wires (marrette connections not allowed).

3 EXECUTION

3.1 INSTALLATION OF JUNCTION AND PULL BOXES

.1 Install junction and pull boxes in inconspicuous but accessible locations.

.2 For hazardous locations, ensure that conduit entries are threaded with at least 5 full threads engaged as per the OESC.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1, Section 12.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank coverplates for boxes without wiring devices.

.5 Combination with barriers where outlets for more than one system are grouped.

.6 Masonry electro-galvanized steel masonry single and multi-gang boxes for devices flush mounted in exposed block walls.

.7 Concrete electro-galvanized steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

.8 Telephone/Intercom fittings for underfloor distribution system (Conduflor Cat. No. 200).

.9 High tension duplex receptacle fitting for underfloor distribution system (Conduflor Cat. No. 200).

.10 Provide weatherproof fittings, boxes and covers, in below grade areas, in accordance with EEMAC 4 / NEMA 4, unless otherwise noted.

.11 Single Gang or Two Gang ECS type boxes for hazardous locations.

2.2 CONDUIT BOXES

.1 Rigid PVC FS or FD boxes with factory hubs and mounting feet for surface wiring of switches and receptacles.

2.3 FITTINGS GENERAL

.1 Ferroalloy hot-dip galvanized for rigid galvanized conduit.

.2 Rigid PVC for rigid conduit.

3 EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material.

.3 Provide correct size of openings in boxes for conduit. Reducing washers are not allowed.

.4 Provide proper seals for hazardous locations (Class 1, Division 1, Group D) meeting the requirements of the OESC.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 RELATED WORK

.1 Section 01 31 13 – Project Coordination

1.3 LOCATION OF CONDUITS

.1 Conduit locations, where shown on the drawings, are schematic only. Install actual conduit runs to suit the site conditions, except where full details are given, in such cases installation shall be as shown on the drawings. The termination of conduits, where shown, are for the general type of equipment. Ensure that they comply with the requirements and the actual equipment which is to be installed.

1.4 CODES

.1 All conduits to meet CSA Specification C22.2.

- .1 No.45, for galvanized steel; and PVC coated Rigid Steel
- .2 No.211.2, for PVC.
- .3 No. 56 for liquid tight flexible metal conduit.

2 PRODUCTS

2.1 CONDUITS

.1 Metallic Conduit:

- .1 Rigid galvanized steel
- .2 Liquid Tight flexible metal conduit

.2 PVC Coated or Epoxy coated Rigid Steel Conduit:

- .1 Acceptable manufacturer:
  - .1 Plasti-Bond REDH2OT from Crouse-Hinds / Eaton
  - .2 Ocal from Thomas&Betts
  - .3 Green-Guard from Columbex Inc.

.3 Non-Metallic Conduit:

- .1 Rigid PVC, Schedule 40, FT4 rated

2.2 APPLICATION

.1 Install conduit as following unless otherwise specified in the drawings.

- .1 Rigid PVC Schedule 40 conduits – Use at the following unclassified (non-hazardous) locations;
  - .1 Indoor, exposed installation
  - .2 Concrete encased or direct buried installations
  - .3 Chemical areas

.4 Open type conduits for TECK cable support to be Schedule 40 PVC for indoor installation.

.2 Rigid Galvanized Steel Conduits;

.1 Hazardous classified Class 1 Zone 2 areas

.2 Communication wiring

.3 VFD load side wiring (unless otherwise shown on the drawing)

.4 Mechanical Rooms

.5 Staircases and exit areas.

.3 Liquid tight Flexible conduit (one meter or less application)

.1 From junction box to the equipment

.2 From junction box to light fixtures

.4 PVC Coated or Epoxy Coated Steel conduit

.1 Hazardous classified Class 1 Zone 1 areas

.2 Category 2 areas

.3 Exposed outdoor installations.

.4 Direct buried communication wiring

.5 Minimum Size of conduits

.1 The minimum size shall be 19 mm for all type of conduits.

2.3 CONDUIT FASTENINGS

.1 For PVC Coated Rigid Steel conduits, use fastening material with similar coating.

.2 One-hole rigid PVC or malleable iron straps to secure surface conduits 50 mm and smaller. Two holes PVC or steel straps for larger conduits. Use PVC straps for rigid PVC and iron or steel straps for rigid galvanized steel.

.3 Beam clamps to be used to secure conduits to exposed steel work.

.4 Channel type supports for two or more conduits.

.5 6 mm diameter rod to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings, as required, for use with conduit specified, with coating same as conduit.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Provide expansion fittings as per manufacturer's recommendations.

.2 Expansion fittings with bonding for metallic conduits where conduit crosses a structural expansion joint - Crouse Hinds type XJ Watertight, complete with grounding strap and clamps.

.3 All conduit fittings and covers below grade shall be weatherproof and watertight to NEMA 4 unless otherwise specified or noted on the Drawings.

3 EXECUTION

3.1 INSTALLATION

.1 Conduits to be installed concealed in walls for finished areas such as offices, washrooms, control rooms, board rooms, hallways, laboratories, lunchrooms etc. Install conduit into the walls, ceilings or floors in accordance with Section 01 31 13.

.2 Provide exposed conduits in process and unfinished areas. Wherever equipment to be powered is not wall-mounted, route the conduit along the lower floor ceiling up to the equipment and then stub up to the equipment location. In case there is no lower floor, route the conduit exposed to the nearest wall and cast the conduit in the concrete floor and stub up to equipment control panel/disconnect/terminal location. Coordinate equipment stub ups with the equipment suppliers prior to installation.

.3 When installed outdoors, paint metallic rigid galvanized steel conduits with weather resistant paint. Use a compatible paint primer or two coats of paint.

.4 Paint conduits installed indoors to match the surrounding walls.

.5 Do not install conduit exposed on the exterior surface of the building. Either conceal conduits in finished areas or expose conduit on the inside of the building and stub outside to designated equipment.

.6 Wherever conduit is to be encased in concrete, ensure that joints or connections are watertight. For epoxy / PVC coated RGS, after cleaning the threads have been screwed on tightly, paint the joint with epoxy paint and allow drying before being encased. Treat outside of conduit boxes similarly after connecting the conduit and before their encasement. Before concrete is poured, pack all outlet boxes tightly with paper and have open ends of conduit capped to prevent concrete entry. Use proper solvent weld for joining rigid PRV conduit.

.7 Install expansion sleeves with bonding wherever conduits cross a structural joint.

.8 Ensure that exposed conduit runs are neat in appearance and run parallel to the structural lines of the building. Use only approved conduit fittings and covers. Fasten exposed conduit by cinch or expansion anchors only, using one-hole pipe straps or two hole straps, as specified.

.9 Make rigid galvanized steel conduit bends cold with the radius of bend not less than 9 times the conduit diameter. Ensure that no bend flattens the conduit by more than one-tenth of its diameter. Otherwise use manufactured bends.

.10 Cut threads on conduit neatly with the ends square and the inner diameter reamed smooth to remove burrs.

.11 Provide junction or pull boxes where the number of right-angle bends in one run exceeds three.

.12 Cut cover screws for conduit fittings or junction boxes, to length to avoid damage to wires.

.13 Cap open ends of conduit with proper threaded caps immediately after installation. Do not use wooden plugs.

.14 Where indicated on the Drawings, ensure conduits are sized accordingly. Do not exceed the number of wires in any conduit per the requirements of the current edition of the Canadian Electrical Code. Do not pull any group of wires sufficient to damage or distort them and use only an approved silicone base (greaseless) lubricant to facilitate pulling.

.15 Form a continuous metallic path with conduit and fittings in accordance with the latest requirements of the Canadian Electrical Code to the satisfaction of the local inspector.

.16 For conduit connections to equipment whose position is subject to adjustment or vibration, use flexible galvanized steel conduit with a PVC jacket equal to "Sealtite" for a length not exceeding 500 mm.

.17 Ensure that no conduit or pullboxes are closer than 200 mm to heating equipment.

.18 Where indicated on the Drawings or required, fasten conduit to Unistrut support channels using approved clamps.

.19 Use short lengths of liquid-tight PVC coated flexible steel conduits for connections to motors, except as otherwise indicated on the Drawings or specified.

.20 Install 4.5 kN tensile strength polypropylene or nylon fish cord in empty conduits or conduits provided for telephone and paging systems.

.21 For threaded joints in hazardous areas, ensure that at least 5 threads are fully engaged.

.22 Seal all conduits exiting the chemical area with removeable duct sealing compound.

.23 For threaded joints in chemical areas, ensure that at least 5 threads are fully engaged.

.24 Where supports are required on structural steel, weld studs to the structure but do not cut or drill beams or structural steel unless written permission from the Engineer is obtained.

.25 The conduit installations made to panelboards / control panels must maintain the panel’s appropriate EEMAC/NEMA rating.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Provide panelboards as shown on the drawings and specified herein.

1.3 RELATED WORK

.1 Molded Case Circuit Breakers - Section 26 28 16.02

1.4 SHOP DRAWINGS

.1 Drawings to include main bus voltage and ampacity, enclosure dimensions, and branch circuit breaker (type, quantity, sizes).

2 PRODUCTS

2.1 PANELBOARDS

.1 Panelboard to meet to CSA C22.2 No. 29.

.2 Manufacturer's nameplate to show fault current for panel and breakers.

.3 Voltage and phases as shown in drawing, bus and breakers rated for minimum 10KA symmetrical interrupting capacity for up to 240V and 22KA above 240V; or as indicated on the drawings.

.4 Sequence phase bussing with odd numbered breakers on the left and even numbered on the right. Permanently identify each breaker with circuit number.

.5 Panelboard door: concealed hinges and positive latching.

.6 Provide factory installed padlocking devices for each 600V breaker (for below 600V where shown on drawings)

.7 Tin plated copper bus with full size neutral.

.8 Mains suitable for bolt-on breakers. All 600V breakers (main/branch) to be bolt-on type.

.9 Surface or flush mounting or in MCC as indicated.

.10 Provide NEMA12 drip hood for indoor installation; NEMA4X for outdoor installation.

.11 Provide panelboard rated to area classification category.

2.2 BREAKERS

.1 Provide breakers per Section 26 28 16.02.

.2 Install circuit breakers in panelboards before shipment.

.3 Breakers shall have lock on devices with each panel.

2.3 IDENTIFICATION:

.1 Nameplate: provide engraved lamacoid nameplate screw fastened to door exterior, white plate with black lettering.

.2 Directory: provide a type-written complete circuit directory, protected under transparent plastic, showing location and load of each circuit. Update directories of existing panelboards.

.3 Provide lamicoid nameplate inside panelboard indicating the interrupting capacity of the system and system components at that point.

2.4 ACCEPTABLE MANUFACTURERS:

.1 First named: Schneider Electric, Eaton, Siemens, Allen Bradley, GE

3 EXECUTION

3.1 INSTALLATION:

.1 Locate panelboard as indicated and mount securely, plumb true and square, using unistrut construction or as per detail on drawing. Unistrut to be fixed in position prior to pouring cement for floor slab. Supply panelboards in MCC where shown.

.2 Mount panelboards to the heights indicated in Section 26 05 00. Where floor mounted provide a 100m high concrete maintenance pad.

.3 Assign the circuits to balance the load so that each phase is loaded equally. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within [20%] of each other.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Provide molded case circuit breakers as shown on the drawings and specified herein.

2 PRODUCTS

2.1 BREAKERS GENERAL

.1 Provide Moulded case circuit breakers certified to CSA C22.2 No. 5.

.2 Bolt-on thermal magnetic moulded case circuit breaker, quick make, quick break type, for manual operation.

.3 Common-trip breakers with single handle for multi-pole applications. No handle ties allowed.

.4 Individual moulded case circuit breakers to be in EEMAC 1A enclosures for indoor installation and NEMA-4X for outdoor installation, unless otherwise noted.

.5 Symmetrical interrupting capacity:

.1 Up to and including 250-volt: 10kA

.2 Above 250-volt and below 600-volt: 22kA.

.3 600-volt: match the Interruption capacity of the panel board / MCC in which the breaker is being installed. Breaker must be fully rated, Series rating acceptable only when specifically mentioned on drawings.

.6 Provide spare NC and NO contacts where shown.

.7 Main breakers to be 100% current rated.

.8 Breakers with adjustable ampere rating (that can be changed without removing the trip unit) are to be provided with a method of adjustment that does not require opening the panel.

.9 Breaker 1000A or above to be provided with Ground Fault Protection as per OESC rule 14-102.

.10 Breakers for utility service entrance must be CSA approved for Service Entrance application.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping under overload conditions and instantaneous magnetic tripping for short circuit protection, with interchangeable magnetic trip units.

2.3 ELECTRONIC TRIP BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of adjustable electronic tripping devices to provide inverse time current tripping under overload conditions and instantaneous tripping for short circuit protection.

.2 Breaker above 400A should be provided with adjustable electronic trip.

2.4 MAGNETIC BREAKERS

.1 Moulded case circuit breaker (motor circuit interrupter) to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for each circuit protection. Use for combination starters.

2.5 ACCEPTABLE MANUFACTURERS

.1 First named: Eaton / Cutler-Hammer, Siemens, Schneider Electric, ABB, GE

3 EXECUTION

.1 There are no instructions in this section.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

2 PRODUCTS

2.1 DISCONNECT SWITCHES

.1 Fusible or non-fusible disconnect switch as required.

.2 For 120V mechanical equipment, disconnect switch shall be a 20A toggle type switches with stainless steel cover plate unless specified otherwise.

.3 All 600V motor disconnect switches shall be “heavy duty” type rated to suit the HP rating of the motor.

.4 For 600 V rated HVAC equipment use disconnect switches approved for HVAC applications.

.5 Enclosure EEMAC/NEMA 4X for outdoor or indoor wet locations.

.6 Enclosure EEMAC/NEMA 12 for indoor dry locations.

.7 Provide option for padlocking in ON-OFF switch position.

.8 Provide mechanically interlocked door to prevent opening when handle is in ON position.

.9 Fuse holders: suitable without adapters, for type and size of fuse indicated.

.10 Switches shall have quick-make, quick-break action.

.11 Provide ON-OFF position indicator on switch enclosure cover.

.12 Auxiliary N/O and N/C contact for interlocking where shown on the control circuits.

2.2 MANUFACTURERS

.1 Acceptable manufacturers:

- .1 Eaton / Cutler Hammer
- .2 Schneider Electric
- .3 Siemens
- .4 Hubbell
- .5 Appleton
- .6 Meltric

3 EXECUTION

3.1 INSTALLATION

.1 Install seals as required by the OESC for disconnects installed in hazardous areas.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Provide contactors as shown on the drawings and specified herein.

2 PRODUCTS

2.1 CONTACTORS

.1 Contactors to match NEMA rating of panel.

.2 Provide a NEMA type 1 enclosure for indoor dry locations, unless otherwise indicated.

.3 Provide a NEMA4x enclosure for outdoor installation

.4 Electrically held, controlled by pilot devices as indicated and rated for type of load controlled.

.5 Provide 2 normally open and 2 normally closed spare auxiliary contacts.

.6 Provide surge suppressor for contactor coil.

2.2 ACCEPTABLE MANUFACTURERS

.1 First named: Danfoss, ABB, Siemens, Schneider Electric, Eaton, Allen Bradley, GE,

3 EXECUTION

3.1 GENERAL

.1 Install as per manufacturer’s recommendation.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Provide motor starters as shown on the drawings and specified herein.

1.3 RELATED WORK

.1 Contactors – Section 26 29 01

1.4 CODES AND STANDARDS:

.1 Provide starters certified to EEMAC E14-1.

.1 Half size starters not acceptable.

1.5 SUBMITTALS

.1 Provide wiring diagrams that include all interconnecting field equipment wiring along with wiring tags and terminal numbers on the field equipment.

2 PRODUCTS

2.1 COMBINATION STARTERS

.1 To be part of the MCC or in an individual enclosure as shown in drawings.

.2 Combination type starter to include motor circuit interrupter (MCI) with operating lever on outside of enclosure to control the MCI, and provision for:

.1 Locking in “OFF” position with up to 3 padlocks.

.2 Locking in “ON” position.

.3 Independent locking of enclosure door.

.3 Motor overload protective device in each phase, manually reset from outside enclosure; or automatically reset type which latching relay and reset button if shown on drawings.

.4 Power and control terminals.

.5 Wiring and schematic diagram inside starter enclosure in visible location.

.6 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.

.7 Full voltage magnetic starters of size, type, rating and enclosure type as required with components as follows:

.1 Contactor solenoid operated, rapid action type as per Section 26 29 01 – Contactors.

.8 Accessories:

.1 H-O-A Mode Selector switches (or L-O-R switches with start/stop pushbuttons, depending on application): heavy duty, oil tight, labeled to indicate function, mounted on door. Make before break contacts.

.2 Indicating lights: heavy duty oil tight type. Push to test.

.3 One (1) – N/O and one (1) N/C spare auxiliary contacts for Run/Stop state unless otherwise indicated.

.4 One (1) – N/O and one (1) N/C spare auxiliary contacts for overload trip unless otherwise noted.

.5 Control Transformer (for motor voltages greater than 120V):

.1 Single phase, dry type, control transformer with primary rated at motor voltage and 120V secondary, complete with primary and secondary fuses, installed in with starter as indicated.

.2 Size control transformer for control circuit load plus 20% spare capacity.

2.2 EQUIPMENT IDENTIFICATION

.1 Lamicoid starter designation label, black plate, white letters, engraved as indicated.

2.3 ACCEPTABLE MANUFACTURERS

.1 First named: Danfoss, Benshaw, Siemens, Allen Bradley, Eaton, Schneider.

3 EXECUTION

3.1 OPERATIONS AND MAINTENANCE TRAINING

.1 Provide the services of an experienced manufacturer service representative to instruct the Owners staff on operations and maintenance. Training sessions to consist of two person-days and two site trips. Provide an electronic copy of the training session. Training days are in addition to any other commissioning time required. Training to be complete prior to commissioning.

3.2 COMMISSIONING

.1 Provide the services of an experienced manufacturer service representative for testing, commissioning and start-up as follows:

.1 Two person-days, two trips for installation assistance and inspection.

.2 Two person-days, two trips for commissioning and completion of a certified installation report.

.2 Provide a report from the service representative certifying the following:

.1 Proper installation procedures are being followed.

.2 Completeness of installation.

.3 All switches and contactors are functioning correctly.

.4 Starting and stopping sequences for contactors and relays have been tested and are working correctly.

.5 Overload features, alarm settings and safety device settings are set correctly.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Supply, installation, testing and commissioning of AC Variable Frequency Drives.

1.3 RELATED WORK

.1	Concrete	-	Division 3
.2	Miscellaneous Metals	-	Division 5
.3	Painting	-	Division 9
.4	Mechanical	-	Division 23

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 – Submittals.

.2 Attach to the shop drawings:

- .1 Written certificates that the proposed AC Adjustable Frequency Drives will properly match and suitable for the selected motors and the standby power generator.
- .2 Provide parameter list.
- .3 Obtain and provide complete motor nameplate data.
- .4 Complete converter/inverter technical data.
- .5 Harmonic current contents for the first 12 n order harmonics, in percent, with the drive running at 100% of full load.
- .6 Line and load reactors shall be installed inside the VFD panels.
- .7 Enclosure heat rejection calculations showing that the VFD enclosure cooling system is designed such that the temperature inside the enclosure does not rise above 40°C at all operating conditions.

2 PRODUCTS

2.1 GENERAL

.1 Provide all AC Variable Frequency Drives for operation of various motors, as required in Division 11.

.2 Review the shop drawings of the pump and motor suppliers for complete co-ordination and proper acceptable matching of components.

.3 The complete assembly to be CSA / cUL approved.

.4 The complete assembly should have a short circuit current rating (SCCR) matching SCCR of the upstream Switchgear.

2.2 EQUIPMENT DESCRIPTION

.1 Voltage source type drive using a Pulse Width modulated output inverter section and shall be suitable for use with standard or high efficiency EEMAC design B, 208 V, squirrel-cage induction motor.

.2 Design drive system against:

- .1 Premature breakdown of motor insulation.
- .2 Higher than rated motor temperature rise as dictated by motor manufacturer, under intended operating speed and load range.

.3 Environmental conditions: Ambient operating temperature range 0°C to 40°C, humidity range 20% to 90% RH non-condensing, altitude 1000 m maximum above sea level.

.4 Rated and designed for continuous operation at 100% load.

.5 Robust design, incorporating Diodes, SCR's, Transistors and/or GTO's. PRV values of the input stage to be 1700 V or higher. In the inverter stage, keep maximum margins for these devices.

The current ratings of these devices allowing for full operation with adequate margins and low losses.

.6 Designed to operate the motors under supply disturbances, transient load fluctuations and various operating deviations.

.7 The invert DC filter sized to enable load transients, as well as continuous current in the input.

.8 Front access with all power components accessible without removal of any items.

.9 Designed to allow set-up and testing while the system is operating as well as without load.

.10 Fast acting input line fuses provided to protect the drive from major faults. All control circuiting shall be electrically isolated from the power circuitry.

Provide an Incoming Disconnect Switch with a door interlock mechanism and ability for padlocking.

.11 The design shall be based upon total environmental immunity, especially in the area of transients (electrical), whether the power circuit or in the logic control.

.12 The Drive shall be designed to accept the opening and closing of a Remote Motor Disconnect Switch while running, without causing damage to the drive.

.13 Provide three (3) frequencies reject points to prevent the motor from operating at a resonant speed. Both the frequency and band-width shall be adjustable.

.14 The drive shall be equipped with Line Reactor on the input and Load reactor on the output (to be supplied and installed by the VFD supplier) to reduce the output voltage change rate to no more than 100 V/microsec and the output voltage peak to no more than 1500 V. Refer to single line diagram for more details.

.15 Transient suppression of input and output (Inverter) devices of robust design.

.16 Harmonic suppression as required by Harmonic Study of the system. Vendor shall be responsible for appropriate size harmonic filters selection to limit the total harmonic distortion (voltage and current) in the acceptable limits as described in IEEE 519-2014).

.17 Provide thermostatically controlled cooling fan for the enclosure. The cooling fan to be selected such as to maintain the Ingress rating of the enclosure.

2.3 OPERATING CONDITIONS AND RATINGS:

.1 Rate the AC Variable Frequency Drives to operate reliably under the following operating conditions.

.1 Input Voltage - 208V ± 10%, 3 phase
.2 Input Frequency - 60 Hz ± 5%
.3 Ambient Temperature - 0 to 40°C
.4 Humidity - 95% non-condensing
.5 Input Power Factor - 0.95 at all loads
.6 Input Harmonics - less than 5% RMS increase in current
.7 Output Voltage - 208V pulse width modulated wave form
.8 Output Frequency - 6 to 63 Hertz
.9 Output Current - 150% FLC x 60 seconds
.10 Induced THD - max. 5% for entire system

.2 In case of power failure, the VFD should be able to automatically reset itself when the power resumes and be ready to start on receipt on start command. Provide necessary wiring to meet the above requirement.

2.4 CONTROLS AND INDICATION:

.1 The minimum controls requirement:

.1 Control Method - pulse width modulated
.2 Frequency Control Range - 20:1
.3 Adjustable Maximum Speed - 105.0% - 50.0%
.4 Adjustable Minimum Speed - 80% - 10.0%
.5 Frequency Accuracy - 0.5%
.6 Frequency Resolution - 0.01%
.7 Overload Capacity - 150% FLC for 60 seconds
.8 Frequency Setting Signal - 0 – 5 V DC or 4 – 20 mA DC
.9 Acceleration/deceleration - Adjustable 10-180 seconds each independent Decel controlled or coast-stop)
.10 Efficiency - above 96%
.11 Breaking Torque - 10% inherent
.12 Variable Frequency Patterns - (1) Constant torque
.13 (preset at factory to match - (2) Variable torque the load characteristics

.2 As a minimum, the unit shall be capable of receiving the following inputs:

.1 dry contact run/stop (maintained)
.2 dry contact start (momentary)
.3 dry contact stop (momentary)
.4 4-20 mA input signal for speed control
.5 dry contacts for two external interlocks

.3 As a minimum, provide the following output interface:

.1 dry contact control mode indication
.2 dry contact common failure alarm
.3 dry contact(s) to indicate “running” status

.4 4-20 mA output proportional to 0% - 100% motor speed

.4 As a minimum, provide the following panel controls and indication on the door panel:

.1 600 V rated disconnect switch

.2 LOCAL/OFF/REMOTE control mode switch

.3 manual speed control which controls the speed in the local mode. Adjustable range shall be 0% to 100%.

.4 running L.E.D.

.5 individual L.E.D. for each protection failure

.6 start/stop push buttons

.7 reset pushbutton

.8 Door mounted LCD display for measurement and parameterization. The display should as a minimum comprise of 2 x 40 character LCD alphanumeric to indicate values and unit of the programmed/measured parameters and should be capable to display the value and meaning of the parameters.

2.5 PROTECTION FEATURES

.1 The following protective features shall be provided:

.1 Input fuses.

.2 Input transient protection.

.3 Input phase loss.

.4 DC bus under-voltage.

.5 DC bus over-voltage.

.6 Short circuit.

.7 Commutation error.

.8 Semi-conductor over-temperature.

.9 Phase unbalance protection.

.10 Line filters.

.11 Phase to phase and phase to ground fault protection - adjustable trip level.

.12 Over-temperature protection – connected to remote motor winding sensor via permissive start and interlock circuiting.

.13 Instantaneous over-current – 125% - 150% rated current.

.14 Overload – inverse time to trip (150% trip at 60 seconds).

.15 AC Over-voltage – 1.1 x rated (fixed at factory).

.16 AC Under-voltage – 0.8 x rated (adjustable).

.17 Momentary power failure – coast to stop with automatic restart after time delay in the automatic mode – 0 to 150 seconds adjustable.

.18 Overheat (heatsink) – fault trip at 90^{o}C.

.19 Stall protection – frequency foldback @ current & O/L trip.

.20 Inrush current characteristics – less or equal to motor full load current during start-up conditions regardless of speed signal input level.

2.6 PUMP MOTOR RUN TIME METER

.1 The VFD shall contain one running time meter supplied for each pump to show the cumulative number of hours of operation.

.2 The meter shall be enclosed in a dust and moisture proof molded plastic case, suitable for flush mounting on the VFD.

.3 The meter dial shall register in hours and tenths of hours up to 99999.9 hours before repeating.

.4 The meter shall be suitable for operation from a 115V, 60 Hz supply.

2.7 CONSTRUCTION

.1 Panel mounted or as part of MCC as shown. Provide *NEMA 12* enclosures with factory finish for panel mounted unit. Provide VFD with Flange mounting kit to install the heat sink outside the third party enclosure.

.2 Coat circuit boards to prevent contamination.

.3 Mount all components securely for shipping. Provide terminal strips in the controller cabinet for the termination of all field control wiring. Identify all control wiring with wrap-around self-adhering wire number markers. Contractor to field determine cable entry – top/bottom.

.4 Provide sufficient room within the cabinet for routing all fields wiring to the terminal strip without obstruction from components or contact with the power or control devices.

2.8 SYSTEM OPERATION

.1 If the control mode selector switch is in the “Remote” position, the drive/motor is started/stopped and the speed is controlled by the next higher level of control.

.2 If the selector switch is in the “Local” position, it is controlled using the start, stop and speed controls on the panel. Provide “Bump-less” transfer.

.3 In the event of an inverter fault trip the drive shall attempt to restart automatically up to a maximum of 3 attempts. If, after 3 attempts, restart does not occur, the drive shall lock out.

.4 The lower level of control will take precedence over the higher level. Lower level means closer to the motor.

2.9 TESTS

.1 Carry out standard factory tests in accordance with these specifications and provide test schedule and procedures two (2) weeks in advance to the engineer.

.2 Test the power semi-conductors for proper electrical characteristics. All chips shall be given a 100% burn-in with applied voltage.

.3 Test and compare all printed circuit boards. Burn-in all cards for a minimum of 20 hours while undergoing heat cycling and continuous testing.

.4 Test the main frequency converter section with a worst case load for 12 hours then run a motor of nominal VFDs and cycle it automatically for an additional 6 hours.

.5 Ascertain, completion of site test if necessary, and confirm in writing, that the electrical system conforms to the requirements of the manufacturer’s equipment. All potential problems shall be submitted in writing to the Owner.

2.10 DOCUMENTATION

.1 Include, for each controller, a total documentation package that will enable complete maintenance and repair, including in the parts list types of main devices along with a

second source manufacturer capable of supplying equivalent devices. Show in the final documents the actual manufacturer's part number and second source part number.

.2 Provide a complete extensive itemized spare parts list for the drives. Include touch-up spray paint for each of the colours.

.3 In wiring diagrams, include all interconnecting Field equipment wiring along with wiring tags and terminal numbers on the field equipment.

.4 Provide the parameterization list indicating site adjusted values

2.11 APPROVED MANUFACTURERS

.1 Danfoss

.2 ABB

.3 Toshiba

.4 Eaton / Cutler Hammer

.5 Allen Bradley

.6 Siemens

.7 Benshaw

.8 Schneider

.9 Yaskawa

3 EXECUTION

3.1 INSTALLATION

.1 Install drives in accordance with the manufacturer's instruction and as shown on drawings.

.2 Provide on-site commissioning (start-up) of the adjustable frequency drives by a qualified technician.

.3 Upon completion of the installation, provide to the Owner six complete sets of service and maintenance manuals including wiring and connection diagrams.

END OF SECTION

1 GENERAL

1.1 REFERENCE

.1 Section 26 05 00 applies to and governs the work of this Section.

1.2 WORK INCLUDED

.1 Provide Lighting equipment as shown on the drawings and specified herein.

1.3 RELATED WORK

.1 Conduit, Conduit Fastenings - Section 26 05 34

1.4 CODES AND STANDARDS

.1 HID lamps to: ANSI C78-1972.

.2 Fluorescent lamps to: ANSI C78 – Fluorescent Lamps 1972.

.3 Provide equipment certified to the electrical classification of the area where the equipment is installed.

1.5 SUBMITTALS

.1 Include luminaire colour temperature.

.2 Contractor to coordinate and assist School Board and provide the information listed below at least or any information requested by the School Board to submit an application for Save on Energy Incentives.

.1 Existing Fixtures:

.1 Type

.2 Lamp wattage

.3 Lamps/fixture quantity

.2 Photos of fixture being removed:

.1 Photo of the typical room for each type of fixture.

.2 Photo of the typical fixture being removed, (for each type of fixture)

.3 Closeup photo of the nameplate showing the wattage, (either of the lamp installed or the box replacement lamps if actual lamp is not accessible).

.4 All photos must show the time stamp indicating the date it was taken.

.3 Photos of new fixtures being installed:

.1 Photo of the typical room for each type of fixture.

.2 Photo of the typical fixture being installed, (for each type of fixture)

Closeup photo of the nameplate showing the model number, wattage etc.

.3 All photos must show the time stamp indicating the date it was taken.

.4 Documentation for waste disposal:

.1 A receipt, certificate or invoice from the waste disposal company indicating the number of lamps and type of lamps disposed off.

2 PRODUCTS

2.1 LAMPS

.1 LED Lighting:

.1 CSA approved, ULC listed and labeled.

.2 Operating temperature:

.1 Luminaires in non-climate-controlled areas shall be rated for -30 C to 60 C.

.2 Luminaires in climate-controlled areas shall be rated for -20 C to 50 C.

.3 Specifications standards to comply with IES LM-79 and LM-80.

.4 Light emitting diodes (LEDs) features to include:

.1 Generally, color temperature to be in the range from 3500K-4500K, refer to schedule of Luminaires for specific requirement.

.2 Minimum CRI of 80, refer to Schedule of Luminaires for specific requirements.

.3 Rated life (based on 70% lumen depreciation level) from 50,000 to 70,000 hours.

.5 LED luminaires and LED drivers to include 5 years parts and labour warranty.

.6 Confirm exact color temperature of lamp with consultant, prior to ordering.

2.2 BALLASTS

.1 Materials:

.1 Ballasts to the following:

.1 CSA C22.2 No. 74-1969.

.2 Certified Ballast Manufacturers Association and ANSI Specifications, FCC Rules and Regulations, and the latest Electrical Testing Laboratories specifications and requirements.

.2 LED Driver (ballast):

.1 Operate from 60Hz input source of 120 VAC with sustained variation of ± 10% (voltage and frequency) with no damage to driver.

.2 Output regulated to ± 5% across load range.

.3 To operate at power factor greater than 0.9.

.4 Total harmonic distortion less than 20%.

.5 Class A sound rating.

.6 Comply with ANSI C62.41 category A for transient protection.

2.3 ACCEPTABLE MANUFACTURER

.1 First named: Lithuania / Acuity Brands, Eaton/Cooper Crouse-Hinds, Cooper lighting, Hubbell Lighting, Emergi-Lite, AimLite.

3 EXECUTION

3.1 INSTALLATION

.1 All wiring (120V and 24V) shall be installed in conduit as per Section 26 05 34.

.2 Mount all fixtures securely and accurately in line and level.

.3 Furnish fixtures with suitable plaster ring, fitter or other device to suit the area in which they are installed. Examine the room finish schedule and supply fixtures, which are suitable for the ceiling specified. Leave lighting fixtures with all glassware, lamps, etc., thoroughly cleaned and hangers and metal parts brightly polished, where applicable.

.4 Where pendant mounted fixtures are required, use rod type hangers in conjunction with ball aligners. Provide corrosion resistant hangers and fasteners.

.5 The lighting plan is a general guide for placement. Any fixture in conflict with equipment to be shifted to avoid conflict. Fixtures to be accessible for maintenance.

.6 Photo Cell Systems:

.1 Point Photo cells to north, when practical.

.2 Provide a switch to “by-pass” the photo sensor so that the lighting will remain on continuously as required for maintenance. Provide Lamacoid nameplate for each “by-pass” switch.

.7 Occupancy systems:

.1 Provide a switch to “by-pass” the occupancy/motion sensor so that the lighting will remain on continuously as required for maintenance. Provide Lamacoid nameplate for each “by-pass” switch.

.2 Provide a letter of guaranty from the manufacturer’s representative indicating the occupancy/motion system components have been installed to meet their requirements and the product is warranted for the specified time limit of five (5) years.

.8 Install the required lamps in all fixtures. Replace any burnt out lamps on the construction completion date.

END OF SECTION