

NORWOOD DISTRICT HIGH SCHOOL RENOVATIONS - PHASE 2

44 Elm St., Norwood, Ontario K0L 2V0

Tender PUR19-24-ITT



KAWARTHA PINE RIDGE DISTRICT SCHOOL BOARD

ARCHITECTURAL SPECIFICATIONS PROJECT MANUAL VOLUME 1

MOFFET & DUNCAN ARCHITECTS INC.
Prime Consultant

RAVENS ENGINEERING INC.
Structural Engineers

DEI CONSULTING ENGINEERS
Mechanical & Electrical Engineers

**NORWOOD DISTRICT HIGH SCHOOL
RENOVATIONS - PHASE 2
KAWARTHA PINE RIDGE DISTRICT SCHOOL BOARD
Tender No. PUR-19-24-ITT**

PROFESSIONAL SEALS

Architectural

Moffet & Duncan Architects Inc.



Structural

Ravens Engineering Inc.



Mechanical and Electrical

DEI & Associates Inc.



The seals above pertain to the specification sections bearing the name of the relevant consultant at the bottom of each page.

VOLUME 1 ARCHITECTURAL SPECIFICATIONS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

Section 00 20 00	Supplementary Instructions for Procurement
Section 00 73 00	Supplementary General Conditions

DIVISION 01 - GENERAL REQUIREMENTS

Section 01 10 00	General Instructions
Section 01 24 00	Valuation of Changes
Section 01 31 00	Project Management and Coordination
Section 01 32 00	Construction Progress Documentation
Section 01 33 00	Submittal Procedures
Section 01 33 23	Shop Drawings, Product Data and Samples
Section 01 35 20	Safety Requirements
Section 01 35 43	Hazardous Materials
Section 01 41 00	Regulatory Requirements
Section 01 42 13	Abbreviations and Acronyms
Section 01 43 00	Quality Assurance
Section 01 51 00	Temporary Utilities
Section 01 52 00	Construction Facilities
Section 01 56 00	Temporary Barriers and Controls
Section 01 58 00	Project Identification
Section 01 71 23	Field Engineering
Section 01 73 00	Execution
Section 01 74 00	Cleaning and Waste Management
Section 01 77 00	Closeout Procedures
Section 01 78 00	Closeout Submittals
Section 01 82 19	Fire Rating and Assemblies
Section 01 91 00	Commissioning

DIVISION 02 - EXISTING CONDITIONS

Section 02 40 00	Demolition and Alterations
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DIVISION 03 - CONCRETE

Section 03 10 00	Concrete Formwork
Section 03 20 00	Concrete and Masonry Reinforcement
Section 03 30 00	Cast-in-Place Concrete

DIVISION 04 - MASONRY

Section 04 05 13	Masonry Mortar and Grout
Section 04 05 19	Masonry Anchorage and Reinforcement
Section 04 05 23	Masonry Accessories
Section 04 21 00	Clay Unit Masonry
Section 04 22 00	Concrete Unit Masonry

DIVISION 05 - METALS

Section 05 10 00	Structural Steel
Section 05 30 00	Steel Deck
Section 05 41 00	Structural Metal Stud Framing
Section 05 52 00	Metal Fabrications

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Section 06 10 00	Rough Carpentry
Section 06 20 00	Finish Carpentry
Section 06 41 16	Architectural Casework
Section 06 41 19	Plastic Laminate Work

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 21 00	Insulation
Section 07 26 00	Vapour Barrier
Section 07 26 16	Under-Slab Vapour Barrier
Section 07 51 00	Built-Up Bituminous Roofing System
Section 07 42 13	Prefinished Architectural Panels
Section 07 62 00	Sheet Metal Flashing and Trim
Section 07 81 00	Applied Fireproofing
Section 07 84 00	Firestopping and Smoke Seal
Section 07 92 00	Joint Sealants

DIVISION 08 - OPENINGS

Section 08 11 13	Hollow Metal Doors and Frames
Section 08 14 00	Wood Doors
Section 08 51 13	Aluminum Windows and Doors
Section 08 71 00	Door Hardware
Section 08 71 05	Door Hardware List
Section 08 81 00	Glazing

DIVISION 09 - FINISHES

Section 09 01 61	Flooring Restoration
Section 09 22 16	Non-Load Bearing Metal Framing
Section 09 25 00	Acrylic Stucco Finish
Section 09 29 00	Gypsum Board
Section 09 30 00	Ceramic Tiling
Section 09 51 00	Acoustic Ceilings
Section 09 64 15	Wood Flooring Refinishing
Section 09 65 00	Resilient Flooring
Section 09 65 16	Resilient Sheet Flooring
Section 09 66 13	Terrazzo Flooring
Section 09 92 00	Painting & Repainting

DIVISION 10 - SPECIALTIES

Section 10 11 00	Visual Display Boards
Section 10 14 23	Interior Signage
Section 10 28 13	Miscellaneous Accessories
Section 10 95 00	Manufactured Specialties

DIVISION 11 - EQUIPMENT

Section 11 53 00	Laboratory Equipment
Section 11 61 33	Stage Rigging

DIVISION 12 - FURNISHINGS

Section 12 24 00	Window Shades
Section 12 36 53	Laboratory Work Surfaces

DIVISION 31 - EARTHWORK

Section 31 10 00	Site Clearing
Section 31 22 00	Grading

DIVISION 32 - EXTERIOR IMPROVEMENTS

Section 32 91 00	Topsoil
Section 32 92 23	Sodding

VOLUME 2 MECHANICAL AND ELECTRICAL SPECIFICATIONS

Division 20	Common Requirements for Mechanical
Division 22	Plumbing
Division 23	Heating, Ventilating, and Air Conditioning (HVAC)
Division 25	Integrated Automation
Division 26	Common Requirements for Electrical
Division 27	Communications
Division 28	Electronic Safety and Security

VOLUME 3 SUPPLEMENTARY INFORMATION

1. Hazardous Building Materials Assessment; report by Pinchin Ltd., File #215840.022, dated February 13, 2019.
2. Asbestos Specifications by Pinchin Ltd.
 - 02 82 00 Site Conditions and Outline of Work
 - 02 82 10 Type 1 Asbestos Abatement
 - 02 82 11 Type 2 Asbestos Abatement
 - 02 82 12 Type 3 Asbestos Abatement
 - 02 82 13 Type 2 Glove Bag Asbestos Abatement
3. Existing Drawings (separate digital file) - for reference only

1.1 SUMMARY

- .1 The purpose of this Contract is to perform interior renovations and site improvements in an existing two storey school with basement located at 44 Elm St., Norwood, Ontario K0L 2V0.
 - .1 The Contract will include, hazardous materials abatement, minor exterior work, new entrance, selective demolition and alterations, new flooring, repairs to existing terrazzo floors, new casework, hollow metal doors, frames and screens, glazed aluminum windows and doors, ceilings, painting, mechanical and electrical work, and other related work for the renovation of existing Classrooms, Science Room, Art Room and Cafeteria.
- .2 Access to selective areas of the building will be provided upon award of Contract. Refer to phasing diagram for access.
- .3 The Contract shall be subject to the requirements of the General Conditions of Stipulated Price Contract CCDC 2 - 2008 and the Supplementary General Conditions herein.

1.2 TENDERS

- .1 Refer to the Kawartha Pine Ridge District School Board's Request for Tender **PUR19-24-ITT** for bidding requirements. Bid documents will be distributed through Bids & Tenders e-bidding website.
- .2 Submit sealed, stipulated sum tenders in an 8 ½ x 11 envelope to the office of the Kawartha Pine Ridge District School Board, per the instructions included in the Board's Request for Tender documents. Tender shall be submitted on forms provided.
- .3 Tenders will be accepted only from prequalified General Contractors, including prequalified Mechanical, Electrical, and Abatement Subcontractors listed in the Board's Request for Tender document.
- .4 Tender submission must include a completed **Bid Bond** and an **Agreement to Bond**, as well as additional forms or documents as may be required by the Contract Documents and any addenda thereto.
- .5 All blanks in the form of tender and supplementary forms of tender shall be filled in or the tender may be invalidated. The Forms shall be signed by the appropriate officers of the Contractor's firm. Incorporated companies shall affix their corporate seal under the hands of their authorized officers.
- .6 These instructions for tendering must be FOLLOWED IMPLICITLY. An informal tender, not complying, may be thrown out and not considered.
- .7 Tenders shall be valid for **sixty (60) days** from the date of closing above.
- .8 Supplementary Form of Tender must note one Subcontractor only for each section of work identified. If more than one Subcontractor is listed, the Owner shall have the right to select which Subcontractor will be used, at no adjustment to the Tender Amount.
- .9 Incomplete tenders may be considered informal.

1.3 PHASING AND COMPLETION DATES

- .1 Tenders must confirm that contractor will meet critical completion dates listed in the Request for Tender documents.
- .2 Shop drawing process shall start upon receipt of "Award Letter" issued by the Owner to the Contractor. Work must continue as necessary to ensure completion by dates given in tender.
- .3 Work, including site protection, demolition, and construction, must be phased to accommodate the continuation of classes in the occupied parts of the school section.
- .4 Refer to drawings for phasing and completion dates.
- .5 Materials and equipment with long delivery times must be ordered as soon as possible on award of Contract.
- .6 All work must be ready for occupancy by Owner on **Friday, August 23, 2019**.
- .7 Classes commence on **Tuesday, September 3, 2019**. Any work within the school, and outside of hoarded areas on site, must be undertaken outside of regular school hours after that date.

1.4 SCOPE OF WORK

- .1 Each proposal shall include the complete work, as called for by drawings and the Specifications issued for the project. The Contractor must include for connection of the Owners equipment. Where furniture, fitments, or manufactured items, such as dishwashers, are noted "N.I.C." they are not included in tender but they must be set in place and connected to services after being supplied to site by the Owner's forces.
- .2 In submitting a tender, the bidder agrees to all of the requirements noted in the tender documents.

1.5 ALTERNATE PRODUCTS

- .1 Tenders shall be based on materials, construction etc. exactly as specified. No products other than those listed in the Contract Documents will be accepted without the WRITTEN approval of the Consultant.
- .2 The Contractor may list any alternates he proposes to use under "Alternate Prices" on the Supplementary Form of Tender, stating the extra or credit to base material, construction, scope of work, etc. The Contractor must be responsible for insuring that any alternative product he proposes conforms to the intention of the specification, will fit in the allotted space, meets required ratings, and will interface with other building components. Alternate Prices must include all work associated with the proposed substitution, including adjustments or changes to adjacent Work and Consultant's fees for any design changes which may be required.
- .3 Upon award of Contract, the Contractor shall submit data for the evaluation of proposed alternates, which the Owner may consider, to the Consultant for review.

1.6 TAXES AND DUTIES

- .1 Include in the tender amount all applicable provincial sales tax, excise taxes, customs duties, freight charges, monetary exchange and all other charges which are in effect or are known to be coming into effect during the course of the Work of this Contract, except for H.S.T.
- .2 The successful bidder must provide their H.S.T. registration number and this number must be indicated on each application for payment along with the amount of H.S.T. payable for the billing period.

1.7 MANDATORY PRE-BID MEETING

- .1 Before tendering, the tenderer shall examine the site, the Drawings and Project Manuals and the supplementary information provided in the Tender Documents and shall ascertain the extent and nature of the work. A mandatory pre-bid meeting for General Contractors is scheduled on **Monday, February 25, 2019 @ 3:00 p.m..** Refer to the Invitation to Tender for specific information.
- .2 Proposals shall include the cost imposed by existing conditions and limitations of site and the accepted proposal shall be held to have included such costs. NO ALLOWANCES WILL BE MADE FOR FAILURE TO EXAMINE THE EXISTING SITE. Notify the Consultant, in writing, of any conditions which are at variance with the tender documents.
- .3 The information shown on the drawings is furnished in good faith for the guidance of the Contractor, but shall in no way relieve him of the responsibility of ascertaining to his own satisfaction the nature of all conditions at the site.
- .4 Any tenderer undertaking on-site investigative work must return the site to the original condition. Tenderers are responsible for all damages caused by such investigation.
- .5 The Contractor shall not be entitled to extra payment and/or performance time for work which is required and which is reasonably inferable from the Soils Report and from site examination as being necessary.

1.8 BUILDING PERMIT

- .1 Building Permit has been applied for by the Consultant and will be paid for by the Owner. The Contractor shall expedite and pick up Building Permit at the Municipal Offices. Refer to the General Conditions of CCDC2-2008, and the Supplementary General Conditions in Section 00 73 00 of these Specifications.
- .2 The Contractor must pay all other necessary fees and charges related to Municipal, Provincial and Federal requirements including plumbing, heating, elevator permit and occupancy permit.

1.9 CONTRACT DOCUMENTS

- .1 The Contract shall be subject to the requirements of the General Conditions of Standard Construction Document CCDC 2 - 2008 and the Supplementary General Conditions herein. Successful bidder must sign Stipulated Price Contract using this document, the Project Manuals and the accompanying drawings, including any addenda issued prior to close of tender period, promptly upon notification of award.
- .2 All Contractors will be held to have examined and made themselves familiar with the various articles of these Standard Forms and the amendments contained in the Supplementary General Conditions, Section 00 73 00, and the same shall be as binding for all branches of the following specifications as though written in full therein.

1.10 ENQUIRY AND INSTRUCTION

- .1 All correspondence, enquiries, instructions, etc. in connection with the work shall be made in writing through the Bids & Tenders e-bidding site, per the instructions in the Owner's Request for Tender.
- .2 Any revisions noted during the tender period will be clarified by means of written Addenda, which will be posted and distributed through Bids & Tenders. Such Addenda shall form part of the contract.
- .3 Bidders, including Subcontractors, finding discrepancies in, or omissions from, the drawings or specifications or other contract documents, or having any doubt as to the intent or meaning of any part thereof, shall notify the Owner through Bids & Tenders. A clarification or explanation of the enquiry, if necessary, will be issued by addendum through Bids & Tenders.
- .4 No oral instructions will be valid.

1.11 REJECTION OF PROPOSALS

- .1 The Owner reserves the right to reject any or all proposals submitted, without explanations, and to waive any informalities in same. The lowest or any tender shall not necessarily be accepted.

1.12 FINAL ACCEPTANCE

- .1 It must be clearly understood that final acceptance of this contract is subject to approvals of the Owner and other bodies and these may delay final approval. There will be no adjustments in the tendered price for a period of **sixty (60) days** from receipt of tenders due to delays resulting from obtaining necessary approvals.

1.13 ERRORS IN TENDER

- .1 The Owners shall not entertain requests for gratuitous payments arising from errors alleged to have been made in a tender which the Owners have accepted.

1.14 SUBCONTRACTORS

- .1 The selection of Subcontractors shall be acceptable to the Owner and to the Consultant. If the required substitution of a Subcontractor affects the sub-tender price, an adjustment will be made to the Contract Price by the amount only of the difference in sub-tenders, without additional overhead or profit to the Contractor. THERE SHALL BE NO CHANGE IN ANY SUB-TRADES LISTED IN THE TENDER AND SUPPLEMENTARY TENDER FORMS WITHOUT THE WRITTEN CONSENT OF THE OWNER.
- .2 If the Tenderer proposes to do the Work with persons directly employed by him and not subcontract them he shall insert the words "By Own Forces" provided he can submit proof that his forces have had previous experience in this field.
- .3 Subcontractors shall be actually engaged as their own recognized business, in the line of the Work required by the specifications and shall carry out themselves the work for which they may be awarded by subcontract. They shall not be permitted to re-subcontract their work or portions thereof to other contractors. This includes shop drawings.
- .4 Only prequalified Mechanical and Electrical Subcontractors will be accepted.

1.15 FAIR WAGE AND LABOUR

- .1 Rate of wages, hours and conditions of the Work shall be in accordance with Provincial codes and as generally recognized and accepted in the locality.
- .2 Since this project will be a major construction project in the Norwood area, it is expected that Contractors and Subcontractors will make every effort to employ local labour, trades, and suppliers.
- .3 Labour forces employed on the site shall have compatible affiliation with any labour organization. Union contract itself is not a prerequisite.

1.16 UNIT PRICES

- .1 Unit rates have not been requested on the tender forms. Unit rates may be negotiated prior to the signing of the Contract if requested by the Owner.
- .2 Unit rates for extras to the Contract will not exceed those for credits to the Contract by more than 25%.
- .3 If a change involves an extra/credit of more than \$10,000.00, then the Owner and Contractor must negotiate the unit rates to reflect a fair rate considering the volume of work involved.

END OF SECTION

1.1 GENERAL

- .1 The General Conditions of the *Contract* contained in the Canadian Standard Construction Document CCDC 2, Stipulated Price Contract 2008 Edition, together with the requirements contained herein, are applicable to all persons engaged in the *Work* of this *Contract*.
- .2 The *Contractor* will be required to sign the foregoing document and to sign the *Contract* copy of *drawings* and specifications. The following conditions supplement the General Conditions of the Canadian Standard Construction Document CCDC 2 Stipulated Price Contract, 2008 Edition. Where the General Conditions of the *Contract* are not in agreement with the Supplementary Conditions, the Supplementary Conditions shall govern.
- .3 Where a General Condition or paragraph of the General Conditions of the Stipulated Price Contract is deleted by these Supplementary Conditions, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused.

1.2 ARTICLE A-3 CONTRACT DOCUMENTS

- .1 Add the following to the list of *Contract Documents* in paragraph 3.1:
 - "- Supplementary Conditions to CCDC 2 – 2008
 - Specifications as listed in Appendix E of the Invitation to Tender
 - *Drawings* as listed in Appendix F of the Invitation to Tender
 - Details included in Project Manual Volume 2
 - All Addenda issued during the tender period
 - Performance Bond
 - Labour and Material Payment Bond"

1.3 ARTICLE A-5 PAYMENT

- .1 Amend paragraph 5.1.3, in the first line, by deleting the words "...the issuance of the..." and replacing them with "...receipt of the *Consultant's*..."
- .2 Delete paragraph 5.3.1 in its entirety and replace it with the following :
 - ".1 Interest
 - .1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by arbitration or court, interest shall also become due and payable on such unpaid amounts at 0% above the prime rate. Such interest shall be compounded on a monthly basis. The prime rate shall be the rate of interest quoted by the Bank of Canada for prime business loans, as it may change from time to time."

1.4 **ARTICLE A-6 RECEIPT AND ADDRESSES FOR NOTICES IN WRITING**

- .1 Delete Article A-6.1 and substitute new article 6.1 as follows:

"6.1 *Notices in Writing* between the parties or between them and the *Consultant* shall be considered to have been received by the addressee on the date of receipt if delivered by hand or by commercial courier or if sent during normal business hours by fax and addressed as set out below. Such *Notices in Writing* will be deemed to be received by the addressee on the next business day if sent by fax after normal business hours or if sent by overnight commercial courier. Such *Notices in Writing* will be deemed to be received by the addressee on the fifth *Working Day* following the date of mailing, if sent by pre-paid registered post, when addressed as set out below. An address for a party may be changed by *Notice in Writing* to the other party setting out the new address in accordance with this Article."

1.5 **ARTICLE A-9 – CONFLICT OF INTEREST**

- .1 Add new Article A-9 – Conflict of Interest, as follows:

"9.1 The *Contractor*, all of the *Subcontractors* and *Suppliers* and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the *Owner*) with the provision of the Work pursuant to the *Contract*. The *Contractor* acknowledges and agrees that a conflict of interest, as described in this Article A-9, includes, but is not limited to, the use of *Confidential Information* where the *Owner* has not specifically authorized such use.

9.2 The *Contractor* shall disclose to the *Owner*, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any *Subcontractor* or *Supplier* that is directly or indirectly affiliated with or related to the *Contractor*.

9.3 The *Contractor* covenants and agrees that it will not hire or retain the services of any employee or previous employee of the *Owner* where to do so constitutes a breach by such employee or previous employee of the *Owner's* conflict of interest policy, as it may be amended from time to time, until after completion of the *Work* under the *Contract*.

9.4 It is of the essence of the *Contract* that the *Owner* shall not have direct or indirect liability to any *Subcontractor* or *Supplier*, and that the *Owner* relies on the maintenance of an arm's-length relationship between the *Contractor* and its *Subcontractors* and *Suppliers*. Consistent with this fundamental term of the *Contract*, the *Contractor* will not enter into any agreement or understanding with any *Subcontractor* or *Supplier*, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the *Owner*, directly or through the *Contractor*, where such claim is, in whole or in part, in respect of a disputed claim by the *Subcontractor* or *Supplier* against the *Contractor*, where the payment to the *Subcontractor* or *Supplier* by the *Contractor* is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the *Owner*, failing which the *Contractor* shall be saved harmless from all or a portion of those claims. The *Contractor* acknowledges that any such agreement would undermine the

required arm's-length relationship and constitute a conflict of interest. For greater certainty, the *Contractor* shall only be entitled to advance claims against the *Owner* for amounts pertaining to *Subcontractor* or *Supplier* claims where the *Contractor* has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the *Subcontractor* or *Supplier* and the *Contractor* has been found liable for those claims.

- 9.5 Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT, a breach of this Article by the *Contractor*, any of the *Subcontractors*, or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the *Owner* to terminate the *Contract*, in addition to any other rights and remedies that the *Owner* has in the *Contract*, in law, or in equity."

1.6 SUPPLEMENTARY DEFINITIONS

- .1 Under Definition 4, "*Consultant*" add the following:
- .1 "Wherever the word *Consultant* appears in the *Contract Documents* it shall refer to Moffet & Duncan Architects Inc."
- .2 Under Definition 21, "*Supplemental Instruction*", add the following note:
- .1 "*Supplemental Instructions* shall also be called *Jobsite Instructions* and shall be issued as such by the *Consultant*."
- .3 Add new definitions, numbers 27 to 39, as follows:
- "27. **As-Built Documents**
As-Built Documents refer to reproductions of the original *drawings* and specifications which have been marked up to accurately show all changes from the original documents."
28. **Confidential Information**
Confidential Information means all the information or material of the *Owner* that is of a proprietary or confidential nature, whether it is identified as proprietary or confidential or not, including but not limited to information and material of every kind and description (such as drawings and move-lists) which is communicated to or comes into the possession or control of the *Contractor* at any time, but *Confidential Information* shall not include information that:
- .1 is or becomes generally available to the public without fault or breach on the part of the *Contractor*, including without limitation breach of any duty of confidentiality owed by the *Contractor* to the *Owner* or to any third party, but only after that information becomes generally available to the public;
- .2 the *Contractor* can demonstrate to have been rightfully obtained by the *Contractor* from a third party who had the right to transfer or disclose it to the *Contractor* free of any obligation of confidence;
- .3 the *Contractor* can demonstrate to have been rightfully known to or in the possession of the *Contractor* at the time of disclosure, free of any obligation of confidence; or

.4 is independently developed by the *Contractor* without use of any *Confidential Information*.

29. **Construction Schedule**

Construction Schedule means the schedule for the performance of the *Work* provided by the *Contractor* pursuant to GC 3.5, including any amendments to the *Construction Schedule* made pursuant to the *Contract Documents*.

30. **Constructor**

The *Constructor* is as defined in the Occupational Health and Safety Act, R.S.O.1990 (latest amendment), referring to the person undertaking the *project* for the *Owner*, and for the purposes of this *project*, shall be the *Contractor*.

31. **Force Majeure**

Force Majeure means any cause, beyond the *Contractor's* control, other than bankruptcy or insolvency, which prevents the performance by the *Contractor* of any of its obligations under the *Contract* and the event of *Force Majeure* was not caused by the *Contractor's* default or active commission or omission and could not be avoided or mitigated by the exercise of reasonable effort or foresight by the *Contractor*. *Force Majeure* includes *Labour Disputes*, fire, unusual delay by common carriers or unavoidable casualties, civil disturbance, acts, orders, legislation, regulations or directives of any government or other public authority, acts of a public enemy, war, riot, sabotage, blockage, embargo, lightning, earthquake, or acts of God.

32. **Install**

Install means the completion of the following activities:

- .1 Remove *Product* from storage and locate for placement,
- .2 Position and adjust *Product* for final placement,
- .3 Affix and anchor *Product* in final placement, in accordance with the manufacturer's instructions.
- .4 Make all Mechanical and Electrical connections required to complete installation.

33. **Labour Dispute**

Labour Dispute means any lawful or unlawful labour problems, work stoppage, labour disruption, strike, job action, slow down, lock-outs, picketing, refusal to work or continue to work, refusal to *supply* materials, cessation or work or other labour controversy which does, or might, affect the *Work*.

34. **Overhead**

Overhead means all site and head office operations and facilities, all site and head office administration and supervision; all duties and taxes for permits and licenses required by the authorities having jurisdiction at the *Place of the Work*; all requirements of Division 1, including but not limited to *submittals*, warranty, quality control, calculations, testing and inspections; meals and accommodations; and, tools, expendables and clean-up costs.

35. **Request for Information / RFI**

Request for Information or *RFI* means written documentation sent by the *Contractor* to the *Owner* or to the *Owner's* representative or the *Consultant* requesting written clarification(s) and/or interpretation(s) of the *Drawings* and/or Specifications, *Contract* requirements and/or other pertinent information required to complete the *Work* of the *Contract* without applying for a change or changes to the *Work*.

36. **Record Documents**

Record Documents refer to a complete set of documents which have been amended to incorporate all changes to the *Work*, as marked up on the *As-built Documents*. *Record Documents* are to be submitted in an electronic format which is stored on a CD or USB flash drive.

37. **Submittals**

Submittals are documents or items required by the *Contract Documents* to be provided by the *Contractor*, such as:

- .1 *Shop Drawings*, samples, models, mock-ups to indicate details or characteristics, before the portion of the *Work* that they represent can be incorporated into the *Work*; and
- .2 *As-built Documents* and manuals to provide instructions to the operation and maintenance of the *Work*.

38. **Supply**

Supply means completion of the following activities:

- .1 Fabricate or purchase *Product*,
- .2 Deliver *Product* to the *Place of the Work*,
- .3 Unload *Product*,
- .4 Store *Product* in accordance with the manufacturer's instructions.

39. Wherever the words 'approved', 'satisfactory', 'directed', 'selected', 'permitted', 'inspected', 'instructed', 'required', 'submit', are used in *Contract Documents*, it shall be agreed that unless the context otherwise provides, the words shall mean 'approved by the *Consultant*', 'directed by the *Consultant*', 'selected by the *Consultant*', 'permitted by the *Consultant*', 'inspected by the *Consultant*', 'instructed by the *Consultant*', 'required by the *Consultant*', 'submit to the *Consultant*'."

1.7 **GENERAL**

- .1 Where a General Condition or paragraph of the General Conditions of the Stipulated Price *Contract* is deleted by these Supplementary Conditions, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused.

1.8 **GC 1.1 CONTRACT DOCUMENTS**

- .1 Add the following to the end of subparagraph 1.1.2.2:

"except where the *Consultant* shall be indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4, 9.5.3.4 and in 12.1.3."

- .2 Add the following to the end of paragraph 1.1.6:

"The Specifications are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the *Contract Documents* will be construed to place responsibility on the *Owner* or the *Consultant* to settle disputes among the *Subcontractors* and *Suppliers* with respect to such divisions. The *Drawings* are, in part, diagrammatic and are intended to convey the scope of the *Work* and indicate general and appropriate locations, arrangements and sizes of fixtures, equipment and outlets. The *Contractor*

shall obtain more accurate information about the locations, arrangements and sizes from study and coordination of the *Drawings*, including *Shop Drawings* and shall become familiar with conditions and spaces affecting those matters before proceedings with the *Work*. Where site conditions require reasonable minor changes where the change requires only the additional labour of one half hour or less, the *Contractor* shall make such changes at no additional cost to the *Owner*. Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the *Contractor* shall include such relocation in the *Work*. The *Contractor* shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are those portions of the *Contract Documents*, wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists."

- .3 Add new paragraphs 1.1.7.5, 1.1.7.6, 1.1.7.7, 1.1.7.8 and 1.1.7.9 as follows:
- " .5 noted materials and annotations on the *Drawings* shall govern over the graphic representation of the *Drawings*.
- .6 finishes in the room finish schedules shall govern over those shown on the *Drawings*.
- .7 architectural drawings shall have precedence over structural, plumbing, mechanical, electrical and landscape drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the *Consultant* or its sub-*Consultants* are to remain with each of the applicable drawing disciplines.
- .8 should non-mandatory reference standards contained in the Specifications conflict with the Specifications, the Specifications shall govern. Should mandatory reference standards and Specifications conflict with each other or if certain requirements of the Specifications conflict with other requirements of the Specifications, the more stringent requirements shall govern.
- .9 and; in general, where discrepancies occur among various parts of the *drawings* or specifications, the *Contractor* shall *Provide* the greatest amount of labour and/or materials referred to."
- .4 Delete present text of paragraph 1.1.8 and substitute the following:
- .1 "The *Consultant*, on behalf of the *Owner*, shall provide the *Contractor*, without charge, twelve (12) sets of the *drawings* and specifications upon which the *Contract* is based. Sets issued for permits and the *Contractor's Contract* signing set are not included in this amount.
- .2 The *Consultant*, on behalf of the *Owner*, shall also provide four (4) copies of any detail drawings issued subsequent to the signing of the *Contract*.
- .3 Digital copies of the *Contract Documents*, in pdf format, will be provided to the *Contractor*, who shall be responsible for the printing of any additional sets of documents required."

- .5 Add new paragraph 1.1.11, as follows:
- "1.1.11 Bylaws, codes or standards quoted shall be the latest edition, including revisions or amendments prior to date of bid submission."
- 1.9 **GC 1.3 RIGHTS AND REMEDIES**
- .1 At the beginning of paragraph 1.3.2, replace the word "No" with the words: "Except with respect to the requirements set out in paragraphs 2.2.13, 6.4.1, 6.5.4, 6.6.1 and 8.2.2, no..."
- 1.10 **GC 1.4 ASSIGNMENT**
- .1 Delete paragraph 1.4.1 in its entirety and replace with the following:
- "1.4.1 The *Contractor* shall not assign the *Contract*, or any portion thereof, without the prior written consent of the *Owner*. The *Owner* shall be entitled to assign the *Contract* to a corporation, partnership or other entity (the "Assignee"). Upon the assumption by the Assignee of the *Owner's* obligations under the *Contract*, the *Owner* shall be released from its obligations under the *Contract*."
- 1.11 **GC 1.5 EXAMINATION OF DOCUMENTS AND SITE**
- .1 Add new GC 1.5 – EXAMINATION OF DOCUMENTS AND SITE as follows:
- "1.5.1 The *Contractor* declares and represents that in tendering for the *Work*, and in entering into a *Contract* with the *Owner* for the performance of the *Work*, it has reviewed all information provided and has investigated for itself the character of the *Work* to be done, based on information generally available from examination of the site. The *Contractor* has assumed and does hereby assume all risk of conditions now existing or arising in the course of the *Work* which might or could make the *Work*, or any items thereof more expensive in character, or more onerous to fulfil, which could reasonably been contemplated or known when the tender was made or the *Contract* signed.
- 1.5.2 The *Contractor* also declares that in tendering for the *Work* and in entering into this *Contract*, the *Contractor* did not and does not rely upon information, other than that provided by the *Owner* during the tender period, furnished by the *Owner* or any of its agents or servants respecting the nature or confirmation of the ground at the site of the *Work*, or the location, character, quality or quantity of the materials to be removed or to be employed in the construction of *Work*, or the character of the construction machinery and equipment or facilities needed to perform the *Work*, or the general and local performance of the *Work* under the *Contract* and expressly waives and releases the *Owner* from all claims with respect to the said information with respect to the *Work*."
- 1.12 **GC 1.6 TIME IS OF THE ESSENCE OF THE CONTRACT**
- .1 Add new GC 1.6 - TIME IS OF THE ESSENCE OF THE CONTRACT as follows:
- "1.6.1 All time limits stated in the *Contract Documents* are of the essence of the *Contract*."

1.13 GC 2.2 ROLE OF THE CONSULTANT

- .1 Under 2.2.3, add to the end of the last sentence:

"...and to the *Owner*."

- .2 Under 2.2.7, delete the words "Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER".

- .3 Add at the end of paragraph 2.2.9:

"The *Owner* and the *Contractor* shall waive any claims against the *Consultant* arising out of the making of such interpretations and findings made in accordance with paragraphs 2.2.7., 2.2.8. and 2.2.9".

- .4 Amend paragraph 2.2.13 by the addition of the following to the end of that paragraph:

"If, in the opinion of the *Contractor*, the *Supplemental Instruction* involves an adjustment in the *Contract Price* or in the *Contract Time*, it shall, within ten (10) *Working Days* of receipt of a *Supplemental Instruction*, provide the *Consultant* with a *notice in writing* to that effect. Failure to provide written notification within the time stipulated in this paragraph 2.2.13 shall be deemed an acceptance of the *Supplemental Instruction* by the *Contractor*, without any adjustment in the *Contract Price* or *Contract Time*."

- .5 In paragraph 2.2.14, delete the comma after the word "*submittals*" and add the words "which are provided" before the words "in accordance".

- .6 Add new paragraph 2.2.19 as follows:

"The *Consultant* or the *Owner*, acting reasonably, may from time to time require the *Contractor* to remove from the *Project* any personnel of the *Contractor*, including project managers, superintendents or *Subcontractors*. Such persons shall be replaced by the *Contractor* in a timely fashion to the satisfaction of the *Consultant* or the *Owner*, as the case may be, at no cost to the *Owner*."

1.14 GC 2.3 REVIEW AND INSPECTION OF THE WORK

- .1 Amend paragraph 2.3.2 by adding the words "and *Owner*" after the words "*Consultant*" in the second and third lines.

- .2 Delete paragraph 2.3.3 in its entirety and replace it with the following:

"The *Contractor* shall furnish promptly two copies to the *Consultant* and one copy to the *Owner* of all certificates and inspection reports relating to the *Work*."

- .3 Insert the word "review" after the word "inspections" in the first line of paragraph 2.3.4.

- .4 Under 2.3.5, in the first line after "*Consultant*", add "or the *Owner*".

- .5 Add a new paragraph 2.3.8 as follows:

"2.3.8 The *Consultant* will conduct periodic reviews of the *Work* in progress, to determine general conformance with the requirements of the *Contract Documents*. Such reviews, or lack thereof, shall not give rise to any claims by the *Contractor* in connection with construction means, methods, techniques, sequences and procedures, nor in connection with construction safety at the *Place of Work*, responsibility for which belongs exclusively to the *Contractor*."

1.15 **GC 2.4 DEFECTIVE WORK**

- .1 Amend GC 2.4.1 by inserting ", the *Owner* and/or its agent" in the first sentence following "rejected by the *Consultant*".

- .2 Add new subparagraphs 2.4.1.1 and 2.4.1.2:

"2.4.1.1 The *Contractor* shall rectify, in a manner acceptable to the *Owner* and the *Consultant*, all defective work and deficiencies throughout the *Work*, whether or not they are specifically identified by the *Consultant*."

"2.4.1.2 The *Contractor* shall prioritize the correction of any defective work, which, in the sole discretion of the *Owner* through the *Consultant*, adversely affects the day to day operations of the *Owner* or which, in the sole discretion of the *Consultant*, adversely affects the progress of the *Work*."

- .3 Delete the content of paragraph 2.4.2 in its entirety and replace it with the following:

"The *Contractor* shall promptly pay the *Owner* for costs incurred by the *Owner*, the *Owner's* own forces or the *Owner's* other contractors, for work destroyed or damaged or any alterations necessitated by the *Contractor's* removal, replacement or re-execution of defective work."

- .4 Add new paragraphs 2.4.4, 2.4.5 and 2.4.6 as follows:

"2.4.4 Neither acceptance of the *Work* by the *Consultant* or the *Owner*, nor any failure by the *Consultant* or the *Owner* to identify, observe or warn of defective work or any deficiency in the *Work* shall relieve the *Contractor* from the sole responsibility for rectifying such defect or deficiency at the *Contractor's* sole cost, even where such failure to identify, observe or warn is negligent.

2.4.5 Where work has been identified as defective by the *Owner* or *Consultant*, and the *Contractor* fails to make corrections to the *Work*, the cost of correcting the *Work* shall be determined by the *Consultant* and the amount may be deducted from the Progress Payment.

2.4.6 The *Contractor* shall prepare a monthly status report on the deficiency corrections identified by the *Consultant*. Where deficiencies remain on the status report for a period of more than two (2) progress payment applications then, without prejudice to the *Owner's* right and remedy under paragraph 2.4.4, the *Owner* may withhold an amount equal to the value of said deficiency (as determined by the *Consultant*) from the *Contractor*, until such deficiencies are corrected to the satisfaction of the *Owner* and *Consultant*."

1.16 **GC 3.1 CONTROL OF THE WORK**

- .1 Add new paragraph 3.1.3 as follows:

"3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the *Contractor* shall verify, at the *Place of the Work*, all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the *Work* and shall further carefully compare such field measurements and conditions with the requirements of the *Contract Documents*. Where dimensions are not included or contradictions exist, or exact locations are not apparent, the *Contractor* shall immediately notify the *Consultant* in writing and obtain written instructions from the *Consultant* before proceeding with any part of the affected work."

- .2 Add new paragraph 3.1.4 as follows:

"3.1.4 Notwithstanding the provisions of paragraphs 3.1.1 and 3.1.2, the *Owner* shall have access to the site at all times to monitor all aspects of construction. Such access shall in no circumstances affect the obligations of the *Contractor* to fulfill its contractual obligations."

1.17 **GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS**

- .1 Delete paragraph 3.2.2.1 in its entirety.

- .2 Delete paragraph 3.2.2.2 in its entirety.

- .3 Delete paragraph 3.2.2.3 in its entirety.

- .4 Delete paragraph 3.2.2.4 in its entirety.

- .5 Delete the content of paragraph 3.2.3.2 and replace it with the following:

"Co-ordinate and schedule the activities and work of other contractors and *Owner's* own forces with the *Work* of the *Contractor* and connect as specified or shown in the *Contract Documents*."

- .6 Add new paragraph 3.2.3.4 as follows:

"3.2.3.4 Subject to GC 9.4 CONSTRUCTION SAFETY, for the *Owner's* own forces and for other contractors, assume overall responsibility for compliance with all aspects of the applicable health and safety legislation in force at the *Place of the Work*, including all of the responsibilities of the "*constructor*", pursuant to the Occupational Health and Safety Act (Ontario)."

1.18 **GC 3.3 TEMPORARY WORK**

- .1 In paragraph 3.3.2, in the second line after the words "where required by law", insert "or the *Consultant*".

1.19 GC 3.4 DOCUMENT REVIEW

- .1 Delete paragraph 3.4.1 in its entirety and substitute new paragraph 3.4.1:

"3.4.1 The *Contractor* shall review the *Contract Documents* and shall report promptly to the *Consultant* any error, inconsistency or omission the *Contractor* may discover. Such review by the *Contractor* shall comply with the standard of care described in paragraph 3.14.1 of the *Contract*. Except for its obligation to make such review and report the result, the *Contractor* does not assume any responsibility to the *Owner* or to the *Consultant* for the accuracy of the *Contract Documents*. Provided it has exercised the degree of care and skill described in this paragraph 3.4.1, the *Contractor* shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the *Contract Documents*, which the *Contractor* could not reasonably have discovered through the exercise of the required standard of care."

- .2 Add new paragraph 3.4.2. as follows:

"3.4.2 If, at any time, the *Contractor* finds errors, inconsistencies, or omissions in the *Contract Documents* or has any doubt as to the meaning or intent of any part thereof, including laying out of the *Work*, the *Contractor* shall immediately notify the *Consultant*, and request instructions, a *Supplemental Instruction*, *Change Order*, or *Change Directive*, as the case may require, and the *Contractor* shall not proceed with the *work* affected until the *Contractor* has received such instructions, a *Supplemental Instruction*, *Change Order* or *Change Directive*. Neither the *Owner* nor the *Consultant* will be responsible for the consequences of any action of the *Contractor* based on oral instructions."

- .3 Add new paragraph 3.4.3 as follows:

"3.4.2 Errors, inconsistencies and/or omissions in the *Drawings* and/or *Specifications* which do not allow completion of the *Work* of the *Contract* shall be brought to the *Consultant's* attention prior to the execution of the *Contract* by means of an *RFI*."

1.20 GC 3.5 CONSTRUCTION SCHEDULE

- .1 Delete the content of paragraph 3.5.1 in its entirety and replace with the following:

"3.5.1 The *Contractor* shall:

- .1 within five (5) calendar days of receiving written confirmation of the award of the *Contract*, prepare and submit to the *Owner* and the *Consultant* for their review and acceptance, a *construction schedule* in the format indicated below that indicates the timing of the activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate the *Work* will be performed in conformity with the *Contract Time* and in accordance with the *Contract Documents*. Such schedule is to include a delivery schedule for *Products* whose delivery is critical to the schedule for the *Work* or are required by the *Contract* to be included in a *Products* delivery schedule. The *Contractor* shall employ construction scheduling software, being the latest version of "Microsoft Project", that permits the progress of the *Work* to be monitored in relation to the critical path

established in the schedule. The *Contractor* shall provide the schedule and any successor or revised schedules in both electronic format and hard copy. Once accepted by the *Owner* and the *Consultant*, the *construction schedule* submitted by the *Contractor* shall become the baseline *construction schedule*; and,

- .2 provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the accepted baseline *construction schedule* or revised schedule accepted by the *Owner* pursuant to GC 3.5 CONSTRUCTION SCHEDULE; and,
- .3 monitor the progress of the *Work* on a weekly basis relative to the baseline *construction schedule*, or any revised schedule accepted by the *Owner* pursuant to GC 3.5 CONSTRUCTION SCHEDULE, update and submit to the *Consultant* and *Owner* the electronic and hard copy schedule on a monthly basis, at a minimum, or as required by the *Consultant* and advise the *Consultant* and the *Owner* weekly in writing of any variation from the baseline or slippage in the schedule; and,
- .4 provide overtime work without change to the *Contract Price* if such work is deemed necessary to meet the schedule; and,
- .5 ensure that the *Contract Price* shall include all costs required to phase or stage the *Work*."

- .2 Add new paragraphs 3.5.2 and 3.5.3 as follows:

"3.5.2 If, at any time, it should appear to the *Owner* or the *Consultant* that the actual progress of the *Work* is behind schedule or is likely to become behind schedule, or if the *Contractor* has given notice of such to the *Owner* or the *Consultant* pursuant to subparagraph 3.5.1.3, the *Contractor* shall, either at the request of the *Owner* or the *Consultant*, or following giving notice pursuant to subparagraph 3.5.1.3, take appropriate steps to cause the actual progress of the *Work* to conform to the schedule or minimize the resulting delay. Within five (5) calendar days of the request by the *Owner* or the *Consultant* or the notice being given pursuant to subparagraph 3.5.1.3, the *Contractor* shall produce and present to the *Owner* and the *Consultant* a plan demonstrating how the *Contractor* will achieve the recovery of the last accepted schedule.

3.5.3 The *Contractor* is responsible for performing the *Work* within the *Contract Time*. Any schedule submissions revised from the accepted baseline *construction schedule* or revised schedule accepted by the *Owner* pursuant to GC 3.5 CONSTRUCTION SCHEDULE, during construction are not deemed to be approved extensions to the *Contract Time*. All extensions to the *Contract Time* must be made in accordance with the *Contract Documents*."

1.21 GC 3.6 SUPERVISION

- .1 Delete the content of paragraph 3.6.1 in its entirety and replace with the following:

"The *Contractor* shall employ a competent full-time superintendent, acceptable to the *Owner* and *Consultant*, who shall be in full time attendance at the *Place of Work* while the *Work* is being performed. The superintendent shall not be changed by the *Contractor* without valid

reason which shall be provided in writing and shall not be changed without prior consultation with and agreement by the *Owner* and the *Consultant*. The *Contractor* shall replace the superintendent within 7 *Working Days* of the *Owner's* written notification, if the superintendent's performance is not acceptable to the *Owner*. The *Contractor* shall provide the *Owner* and the *Consultant* with the names, addresses and telephone numbers of the superintendent referred to in this paragraph 3.6.1 and other responsible persons who may be contacted for emergency and other reasons during non-working hours."

- .2 Delete the content of paragraph 3.6.2 in its entirety and replace with the following:

"The superintendent, and any project manager appointed by the *Contractor*, shall represent the *Contractor* at the *Place of Work* and shall have full authority to act on written instructions given by the *Consultant* and/or the *Owner*. Instructions given to the superintendent or the project manager shall be deemed to have been given to the *Contractor* and both the superintendent and any project manager shall have full authority to act on behalf of the *Contractor* and bind the *Contractor* in matters related to the *Contract*."

- .3 Add new paragraph 3.6.3 , 3.6.4, 3.6.5 and 3.6.6 as follows:

"3.6.3 The *Owner* may, at any time during the course of the *Work*, request the replacement of the appointed representative(s). Immediately upon receipt of the request, the *Contractor* shall make arrangements to appoint an acceptable replacement, which is approved by the *Owner*.

3.6.4 The supervisory staff assigned to the *Project* shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and *submittals* defined in the Specifications, and have minimum 5 years documented "Superintendent/Project Management" experience.

3.6.5 The *Consultant* and *Owner* shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the *Project* prior to commencement of the *Work*.

3.6.6 A superintendent assigned to the *Work* shall be "Gold Seal Certified" as per the Canadian Construction Association; or a superintendent that can demonstrate the requisite experience and success related to the *Project* to the sole satisfaction of the *Owner*."

1.22 **GC 3.7 SUBCONTRACTORS AND SUPPLIERS**

- .1 In paragraph 3.7.1.1 add to the end of the second line "including any warranties and service agreements which extend beyond the term of the *Contract*."
- .2 In subparagraph 3.7.1.2 after the words "the *Contract Documents*" insert the words "including any required surety bonding".

- .3 Delete the content of paragraph 3.7.2. in its entirety and replace with the following:

"Substitution of any *Subcontractor* and/or *Suppliers* after submission of the *Contractor's* bid will not be accepted unless a valid reason is given in writing to and approved by the *Owner*, whose approval may be arbitrarily withheld. The reason for substitution must be provided to the *Owner* and to the original *Subcontractor* and/or *Supplier* and the *Subcontractor* and/or *Supplier* shall be given the opportunity to reply to the *Contractor* and *Owner*. The *Contractor* shall be fully aware of the capability of each *Subcontractor* and/or *Supplier* included in its bid, including but not limited to technical ability, financial stability and ability to maintain the proposed *construction schedule*."

- .4 Add new paragraphs 3.7.7 and 3.7.8 as follows:

"3.7.7 Where provided in the *Contract*, the *Owner* may assign to the *Contractor*, and the *Contractor* agrees to accept, any contract procured by the *Owner* for work or services required on the *Project* that has been pre-tendered or pre-negotiated by the *Owner*, and upon such assignment, the *Owner* shall have no further liability to any party for such contract.

3.7.8 The *Contractor* covenants that each subcontract or supply contract which the *Contractor* enters into for the purpose of performing the *Work* shall expressly provide for the assignment thereof to the *Owner* (at the option of the *Owner*) and the assumption by the *Owner* of the obligations of the *Contractor* thereunder, upon the termination of the *Contract* and upon written notice by the *Owner* to the other parties to such subcontracts or supply contracts, without the imposition of further terms or conditions; provided, however, that until the *Owner* has given such notice, nothing herein contained shall be deemed to create any contractual or other liability upon the *Owner* for the performance of obligations under such subcontracts or supply contracts and the *Contractor* shall be fully responsible for all of its obligations and liabilities (if any) under such subcontracts and supply contracts."

1.23 **GC 3.8 LABOUR AND PRODUCTS**

- .1 Delete the content of paragraph 3.8.2 and substitute with the following:

"*Products* provided shall be new and shall conform to all current applicable specifications of the Canadian Standards Association, Canadian Standards Board or General Standards Board, ASTM, National Building Code, provincial and municipal building codes, fire safety standards, and all governmental authorities and regulatory agencies having jurisdiction at the *Place of the Work*, unless otherwise specified. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*. *Products* brought on to the *Place of the Work* by the *Contractor* shall be deemed to be the property of the *Owner*, but the *Owner* shall be under no liability for loss thereof or damage thereto arising from any cause whatsoever. The said *Products* shall be at the sole risk of the *Contractor*. Workmanship shall be, in every respect, first class and the *Work* shall be performed in accordance with the best modern industry practice."

- .2 Amend paragraph 3.8.3 by adding the words, "... , agents, *Subcontractors* and *Suppliers*..." after the word "employees" in the first line.

.3 Add new paragraphs 3.8.4, 3.8.5, 3.8.6, 3.8.7, 3.8.8, 3.8.9, and 3.8.10 as follows:

- "3.8.4 Upon receipt of a written notice from the *Owner*, the *Contractor* shall immediately remove from the *Place of the Work*, tradesmen and labourers whose conduct jeopardizes the safety of the *Owner's* operations. Immediately upon receipt of the request, the *Contractor* shall make arrangements to appoint an acceptable replacement.
- 3.8.5 Upon receipt of written notice from the *Consultant*, the *Contractor* shall remove from the *Place of Work*, tradesmen and labourers whose work is unsatisfactory to the *Consultant* or who are considered by the *Consultant* to be unskilled or otherwise objectionable.
- 3.8.6 The *Contractor* shall cooperate with the *Owner* and its representatives and shall take all reasonable and necessary actions to maintain stable and harmonious labour relations with respect to the *Work* at the *Place of the Work*, including cooperation to attempt to avoid work stoppages, trade union jurisdictional disputes and other *Labour Disputes*. Any costs arising from *labour disputes* shall be at the sole expense of the *Contractor*.
- 3.8.7 The cost for overtime required beyond the normal *Working Day* to complete individual construction operations of a continuous nature, such as pouring or finishing of concrete or similar work, or work that the *Contractor* elects to perform at overtime rates without the *Owner* requesting it, shall not be chargeable to the *Owner*.
- 3.8.8 All manufactured *Products* which are identified by their proprietary names or by part or catalogue number in the Specifications shall be used by the *Contractor*. No substitutes for such specified *Products* shall be used without the written approval of the *Owner* and the *Consultant*. Substitutes will only be considered by the *Consultant* when submitted in sufficient time to permit proper review and investigation. When requesting approval for the use of substitutes, the *Contractor* shall include in its submission any proposed change in the *Contract Price*. The *Contractor* shall use all proprietary *Products* in strict accordance with the manufacturer's directions. Where there is a choice of proprietary *Products* specified for one use, the *Contractor* may select any one of the *Products* so specified for this use.
- 3.8.9 Materials, appliances, equipment and other *Products* are sometimes specified by reference to brand names, proprietary names, trademarks or symbols. In such cases, the name of a manufacturer, distributor, *Supplier* or dealer is sometimes given to assist the *Contractor* to find a source *Supplier*. This shall not relieve the *Contractor* from its responsibility from finding its own source of supply even if the source names no longer supplies the *Product* specified. If the *Contractor* is unable to obtain the specified *Product*, the *Contractor* shall supply a substitute *product* equal to or better than the specified *Product*, as approved by the *Consultant* with no extra compensation. Should the *Contractor* be unable to obtain a substitute *Product* equal to or superior to the specified *Product* and the *Owner* accepts a different *Product*, the *Contract Price* shall be adjusted accordingly, as approved by the *Consultant*.

3.8.10 The *Contractor* is responsible for the safe on-site storage of *Products* and their protection (including *Products* supplied by the *Owner* and other contractors to be installed under the *Contract*) in such ways as to avoid dangerous conditions or contamination to the *Products* or other persons or property and in locations at the *Place of the Work* to the satisfaction of the *Owner* and the *Consultant*. The *Owner* shall provide all relevant information on the *Products* to be supplied by the *Owner*."

1.24 **GC 3.9 DOCUMENTS AT THE SITE**

- .1 Delete paragraph 3.9.1 in its entirety and substitute the following:

"The *Contractor* shall keep one copy of the current *Contract Documents*, *Supplemental Instructions*, contemplated change orders, *Change Orders*, *Change Directives*, cash allowance disbursement authorizations, reviewed *Shop Drawings*, *submittals*, reports and records of meeting at the *Place of the Work*, in good order and available to the *Owner* and *Consultant*."

1.25 **GC 3.10 SHOP DRAWINGS AND OTHER SUBMITTALS**

- .1 Revise the title of GC 3.10 to read "**SHOP DRAWINGS AND OTHER SUBMITTALS**".

- .2 Delete the content of paragraph 3.10.1 in its entirety and replace with the following:

.1 "The *Contractor* shall provide *shop drawings* and *submittals* as described in the *Contract Documents* and as the *Consultant* may reasonably request."

- .3 Add "and *Submittals*" after the words "*Shop Drawings*" in paragraphs 3.10.2, 3.10.4, 3.10.7, 3.10.8, 3.10.8.2, 3.10.10, and 3.10.11.

- .4 Add the following sentence to paragraph 3.10.2:

"Where verified and determined dimensions from the *Place of the Work* are required in the preparation of *Shop Drawings*, the *Contractor* shall determine the exactness of the dimensions prior to the preparation of these drawings."

- .5 Delete the content of paragraph 3.10.3 in its entirety and replace with the following:

"The *Contractor* shall prepare a schedule for *Shop Drawings* and *Submittals* acceptable to the *Owner* and the *Consultant* prior to the first application for payment. A draft of the proposed *Shop Drawings* and *Submittals* schedule shall be submitted by the *Contractor* to the *Consultant* and the *Owner* for approval. The draft *Shop Drawings* schedule shall clearly indicate the phasing of *Shop Drawings* submissions. The *Contractor* shall periodically re-submit the *Shop Drawings* and *Submittals* schedule to correspond to changes in the *construction schedule*."

- .6 Delete the content of paragraph 3.10.9 in its entirety and substitute the following:

"At the time of providing *Shop Drawings* and *Submittals*, the *Contractor* shall advise the *Consultant* in writing of any deviations in *Shop Drawings* and *Submittals* from the requirements of the *Contract Documents*. The *Consultant* shall indicate the acceptance of such deviation expressly in writing. Where manufacturers' literature is submitted in lieu of scaled drawings, it shall be clearly marked in ink, to indicate the specific items for which review is requested."

.7 Add new paragraphs 3.10.13 through 3.10.21 as follows:

- "3.10.13 Reviewed *Shop Drawings* and *Submittals* shall not authorize a change in the *Contract Price* and/or the *Contract Time*.
- 3.10.14 Except where the parties have agreed to a different *Shop Drawings* and *Submittals* schedule pursuant to paragraph 3.10.3, the *Contractor* shall comply with the requirements for submissions of *Shop Drawings* and *Submittals* as stated in the Specifications.
- 3.10.15 The *Contractor* shall not use the term "by others" on *Shop Drawings* or other *submittals*. The related trade, *Subcontractor* or *Supplier* shall be stated.
- 3.10.16 Certain Specifications sections require the *Shop Drawings* and *Submittals* to bear the seal and signature of a professional engineer. Such professional engineer must be registered in the jurisdiction of the *Place of the Work* and shall have expertise in the area of practice reflected in the *Shop Drawings*.
- 3.10.17 The *Consultant* will review and return *Shop Drawings* and *Submittals* in accordance with the schedule agreed upon in paragraph 3.10.3, The *Contractor* shall allow the *Consultant* a minimum of 10 *Working Days* to review *Shop Drawings* from the date of receipt. If resubmission of *Shop Drawings* is required, a further 10 *Working Day* period is required for the *Consultant's* review.
- 3.10.18 The *Consultant's* review of *Shop Drawings* and *Submittals* does not relieve the *Contractor* of the responsibility to review all information pertaining to:
- .1 detail design
 - .2 dimensions
 - .3 fabrication processes
 - .4 techniques of construction and installation
 - .5 coordination of the *Work* of *Subcontractor*
- 3.10.19 Only *Shop Drawings* indicated as 'Reviewed' or 'Reviewed as noted' and bearing the *Consultant's* review date and initials, shall be used at the *Place of the Work*.
- 3.10.20 Any fabrication work done before receiving final reviewed *Shop Drawings* shall be at the *Contractor's* and his *Subcontractor's* and/or *Supplier's* risk.
- 3.10.21 The *Contractor* shall submit *shop drawings* in accordance with the shop drawing procedures specified in Section 01 33 23."

1.26 **GC 3.11 USE OF THE WORK**

- .1 Under 3.11.1, in the second line between the words "permits," and "or" insert "by direction of the *Owner* or *Consultant*,".

- .2 Add new paragraph 3.11.3 as follows:

"3.11.3 The *Owner* shall have the right to enter or occupy the *Work* in whole or in part for the purpose of placing fittings and equipment, or for other use before *Substantial Performance of the Work*, if, in the opinion of the *Consultant*, such entry and occupation does not prevent or substantially interfere with the *Contractor* in the performance of the *Contract* within the *Contract Time*. Such entry or occupation shall neither be considered as acceptance of the *Work*, nor in any way relieve the *Contractor* from its responsibility to complete the *Contract*."

1.27 **GC 3.12 CUTTING AND REMEDIAL WORK**

- .1 Add new paragraphs 3.12.5 and 3.12.6 as follows:

"3.12.5 Unless specifically stated otherwise in the Specifications, the *Contractor* shall do all cutting and making good necessary for the proper installation and performance of the *Work*.

3.12.6 To avoid unnecessary cutting, the *Contractor* shall lay out its work and advise the *Subcontractors*, when necessary, where to leave holes for installation of pipes and other work."

1.28 **GC 3.13 CLEANUP**

- .1 Revise paragraph 3.13.1 as follows:

- .1 Insert the words "snow and ice and" after the words "accumulation of" to read:

"... free from the accumulation of snow and ice and waste products and ..."

- .2 At the end of the paragraph 3.13.1, add the following:

"Remove accumulated waste and debris at least once a week as a minimum or as required by the nature of the *Work*."

- .2 In paragraph 3.13.2, in the fourth line add the word "materials" between the word "tools" and the words "*Construction Equipment*".

- .3 In paragraph 3.13.3, in the first and second lines add the word "materials" between the word "tools" and the words "*Construction Equipment*".

- .4 Add new paragraphs 3.13.4, 3.13.5 and 3.13.6 as follows:

"3.13.4 The *Contractor* shall clean up garbage during and after construction, and maintain the site in a neat and orderly condition on a daily basis. Prior to leaving the site at the end of construction, the *Contractor* shall make good all damage to the building and its components caused by the performance of the *Work* or by any *Subcontractor* or *Supplier*. The *Contractor* shall leave the site in a clean and finished state; remove all equipment and materials; remove all paint, stains, labels, dirt, etc. from the *Work*; and touch up all damaged painted areas.

3.13.5 Without limitation to or waiver of the *Owner's* other rights and remedies, the *Owner* shall have the right to back charge to the *Contractor* the cost of damage to the site caused by transportation in and out of the site by the *Contractor*, *Subcontractors* or *Suppliers*, if not repaired before final payment.

3.13.6 The *Contractor* shall dispose of debris at location and in a manner acceptable to the *Owner*, and authorities having jurisdiction in the area of the *Work* and the disposal area, and cover containers with tarpaulins tied in place to prevent scattering of debris on site and during transport."

1.29 **GC 3.14 CONTRACTOR STANDARD OF CARE**

.1 Add new General Condition 3.14 - CONTRACTOR STANDARD OF CARE as follows:

"3.14.1 In performing its services and obligations under the *Contract*, the *Contractor* shall exercise a standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The *Contractor* acknowledges and agrees that throughout the *Contract*, the *Contractor's* obligations, duties and responsibilities shall be interpreted in accordance with this standard. The *Contractor* shall exercise the same standard of due care and diligence in respect of any *Products*, personnel, or procedures which it may recommend to the *Owner*.

3.14.2 The *Contractor* further represents, covenants and warrants to the *Owner* that:

- .1 The personnel it assigns to the *Project* are appropriately experienced;
- .2 It has a sufficient staff of qualified and competent personnel to replace any of its appointed representatives, subject to the *Owner's* approval, in the event of death, incapacity, removal or resignation; and
- .3 there are no pending, threatened or anticipated claims, liabilities or contingent liabilities that would have a material effect on the financial ability of the *Contractor* to perform its *Work* under the *Contract*."

1.30 **GC 3.15 OCCUPANCY OF THE WORK**

.1 Add new General Condition 3.15 - OCCUPANCY OF THE WORK as follows:

"3.15.1 The *Owner* reserves the right to take possession of and use for any intended purpose any portion or all of the undelivered portion of the *Project* even though the *Work* may not be substantially performed, provided that such taking possession and use will not interfere, in any material way, with the progress of the *Work*. The taking of possession or use of any such portion of the *Project* shall not be deemed to be the *Owner's* acknowledgement or acceptance of the *Work* or the *Project*, nor shall it relieve the *Contractor* of any of its obligations under the *Contract*.

- 3.15.2 Whether the *Project* contemplates work by way of renovations in buildings which will be in use or be occupied during the course of the *Work* or where the *Project* involves work that is adjacent to a structure which is in use or is occupied, the *Contractor*, without in any way limiting its responsibilities under the *Contract*, shall take all reasonable steps to avoid interference with fire exits, building access and egress, continuity of electric power and all other utilities, to suppress dust and noise and to avoid conditions likely to propagate mould or fungus of any kind and all other steps reasonably necessary to promote and maintain the safety and comfort of the users and occupants of such structures or adjacent structures."

1.31 **GC 4.1 CASH ALLOWANCES**

- .1 Delete the second sentence in paragraph 4.1.1

- .2 Delete paragraph 4.1.4 in its entirety and substitute the following:

"Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the *Consultant's* direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for *overhead* and profit. Only where the actual cost of the *Work* under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for *overhead* and profit on the excess only, as set out in the *Contract Documents*."

- .3 Delete paragraph 4.1.5 in its entirety and substitute the following:

"The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor's overhead* and profit on such amount."

- .4 Add new paragraphs 4.1.8 and 4.1.9 as follows:

"4.1.8 The *Owner* reserves the right to call, or to have the *Contractor* call, for competitive bids for portions of the *Work*, to be paid for from cash allowances."

4.1.9 Cash allowances cover the net cost to the *Contractor* of services, *Products*, *Construction Equipment*, freight, unloading, handling, storage, installation, provincial sales tax, and other authorized expenses incurred in performing any *Work* stipulated under the cash allowances but does not include any *Value Added Taxes* payable by the *Owner* and the *Contractor*."

1.32 **GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER**

- .1 Delete paragraph 5.1.1 in its entirety.

- .2 Delete paragraph 5.1.2 in its entirety.

1.33 GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Delete paragraph 5.2.2 in its entirety and substitute the following:

"Applications for payment shall be dated the last day of each payment period, which is the last day of the month or an alternative day of the month agreed in writing by the parties. The amount claimed shall be for the value, proportionate to the amount of the *Contract*, or *work* performed and *Products* delivered and incorporated into the *Work* at that date. No amount claimed shall include *products* delivered and incorporated into the *work*, unless the *products* are free and clear of all security interests, liens and other claims of third parties.

Each application for payment, except the first, shall include a statutory declaration, in the current CCDC 9A form, up to the date of the application for payment. Each application for payment (including the first the holdback upon *Substantial Performance*, and final payments), shall also include:

- .1 A certificate, issued by an agency or firm providing workers' compensation insurance to the *Contractor*, verifying that coverage is in force at the time of making the application for payment, and that coverage will remain in force for at least sixty (60) days thereafter.
 - .2 A declaration by the *Contractor* verifying that the performance of the *Work* is in compliance with all applicable regulatory requirements respecting environmental protection, first safety, public safety and occupational health and safety.
 - .3 A pre-approved schedule of values, supplied by the *Contractor*, for Divisions 01 through 14 and 31 through 33 of the *Work*, aggregating the total amount of the *Contract Price*.
 - .4 A separate pre-approved schedule of values, supplied by each *Subcontractor*, for each of Divisions 20 through 28 of the *Work*, aggregating the total amount of the *Contract Price*.
 - .5 Invoices to support all claims against the cash allowance.
 - .6 An acceptable *construction schedule* pursuant to GC 3.5."
- .2 Amend paragraph 5.2.3 by adding the following to the end of that paragraph:
- "No amount claimed shall include *Products* delivered to the *Place of the Work* unless the *Products* are free and clear of all security interests, liens, and other claims of third parties."
- .3 Delete existing paragraph 5.2.7 and add new paragraphs 5.2.7, and 5.2.8 as follows:
- "5.2.7 The *Contractor* shall prepare and maintain current as-built drawings which shall consist of the *Drawings* and Specifications revised by the *Contractor* during the *Work*, showing changes to the *Drawings* and Specifications, which current as-built drawings shall be maintained by the *Contractor* and made available to the *Consultant* for review with each application for progress payment. The *Consultant* shall retain a reasonable amount for the value of the as-built drawings not presented for review.
 - 5.2.8 Prior to each application for payment, the *Contractor* and the *Consultant* shall jointly review the progress of the *Work*."

- .4 Add new paragraph 5.2.9 as follows:

"5.2.9 Applications for monthly payments shall be reviewed in rough draft form and approved by the *Owner*, *Consultant* and *Contractor*. Drafts are to be in triplicate with one (1) copy each retained by the *Owner* and *Consultant*. This is to be done prior to the *Contractor* issuing his formal application."

1.34 **GC 5.3 PROGRESS PAYMENT**

- .1 In paragraph 5.3.1.2, amend the first sentence as follows: After the words "issue to the *Owner*" delete "and copy to the *Contractor*". After the words "after the receipt of the" add "complete".

- .2 Delete subparagraph 5.3.1.3 in its entirety and substitute as follows:

"the *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement – PAYMENT no later than 20 calendar days after the date of a complete certificate of payment is issued by the *Consultant*"

- .3 Add new paragraphs 5.3.2 and 5.3.3 as follows:

"5.3.2 If the *Contractor* fails to provide all documentation as required by GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT, the *Contractor* or *Owner* shall be entitled to return the application for progress payment to the *Contractor* for completion. The 10 day review period by the *Consultant* and 20 day payment period by the *Owner* will commence upon receipt of a complete application for progress payment.

5.3.3 Payment will be mailed to the *Contractor*. The payment date shall be the date the cheque is mailed. Delay resulting from mail shall not be used in calculating payment date."

- .4 Add new paragraph 5.3.4 as follows:

"5.3.4 All progress payments are not conclusive as to the value or quality of services provided and are subject to further evaluation and readjustment on future and final progress payments. The submission of monthly draw amounts by the *Contractor* and *Subcontractors* must reflect accurate valuations for work completed and installed. The *Contractor* shall review and evaluate all *Subcontractors* work and be responsible for verifying the monthly draw amounts claimed."

- .5 Add new paragraph 5.3.5 as follows:

"5.3.5 Once *Substantial Performance of the Work* has been achieved, no further applications for payment will be considered until the application for final payment. Final payment will be authorized when all *Work* is 100% complete and all deficiencies are corrected."

1.35 GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Delete paragraph 5.4.2 in its entirety and substitute the following:

"The *Consultant* will review the *Work* to verify the validity of the application and shall promptly, and in any event, no later than 30 calendar days after receipt of the *Contractor's* complete deficiency list and application, the *Consultant* shall:

- .1 prepare a final deficiency list incorporating all items to be completed or corrected. Each item is to have an indicated value for correction or completion. Determination of the value is defined in GC 5.10 – DEFICIENCY HOLDBACK. The final deficiency list complete with values is to be included with the *Consultant's* draft verification and shall be reviewed with the *Owner* prior to 5.4.2.2.

- .2 having completed 5.4.2.1, the *Consultant* shall:

- .1 advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or
.2 state the date of *Substantial Performance of the Work* in a certificate and issue a copy of that certificate to each the *Owner* and the *Contractor*."

- .2 Delete paragraph 5.4.3 in its entirety and substitute the following:

"Following the issuance of the certificate of *Substantial Performance of the Work*, the following shall apply to completing the *Work*:

- .1 *Contractor* is to complete the *Work* within sixty (60) calendar days.
.2 No payments will be processed between *Substantial Performance of the Work* and the completion of the *Work*.
.3 The *Owner* reserves the right to contract out any or all unfinished *Work* if it has not been completed within sixty (60) days of *Substantial Performance of the Work* without prejudice to any other right or remedy and without affecting the warranty period. The cost of completing the *Work* shall be deducted from the *Contract Price*."

- .3 Add new paragraphs 5.4.4, 5.4.5, 5.4.6 and 5.4.7:

"5.4.4 Within the time prescribed by the construction/builder's lien legislation in force at the *Place of the Work*, or where there is no legislation or no time prescribed, within a reasonable time of receiving a copy of the certificate of *Substantial Performance of the Work* signed by the *Consultant*, the *Contractor* shall take whatever steps are required to publish or post a signed copy of the certificate, as is required by such legislation. If the *Contractor* fails to comply with this provision, the *Owner* may take the required steps pursuant to the legislation and charge the *Contractor* for any costs so incurred.

5.4.5 Prior to submitting its written application for *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* all:

- .1 guarantees;
.2 warranties;
.3 certificates;
.4 final testing and balancing reports;

- .5 distribution system diagrams;
- .6 spare parts;
- .7 maintenance manuals;
- .8 samples;
- .9 reports and correspondence from authorities having jurisdiction in the *Place of the Work*;
- .10 *shop drawings*;
- .11 inspection certificates;
- .12 red-lined record drawings from the construction trailer in two copies.

and other materials or documentation required to be submitted under the *Contract*, together with written proof acceptable to the *Owner* and the *Consultant* that the *Work* has been substantially performed in conformance with the requirements of municipal, governmental, and utility authorities having jurisdiction in the *Place of the Work*. The *Consultant* shall refuse to certify *Substantial Performance of the Work* if the *submittals* referred to in this paragraph 5.4.5 are not provided by the *Contractor*."

5.4.6 The *Owner* shall withhold, from amounts otherwise payable to the *Contractor*, an amount not to exceed one (1) percent of the *Contract Price* as security for the obligation of the *Contractor* to deliver two copies of the red-lined as-built drawings.

5.4.7 Promptly upon receiving the certificate of *Substantial Performance of the Work*, the *Contractor* shall see to the publication of the certificate in a trade publication ."

1.36 **GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK**

- .1 Add new subparagraph 5.5.1.3 as follows:

".3 submit a statement that no written notices of liens have been received by it."

- .2 Amend paragraph 5.5.2 by adding the following sentence to the end of that paragraph:

"A reserve fund may be retained by the *Owner* to secure the correction of deficiencies and/or warranty claims. Included in the reserve fund would be all *Consultant* and *Owner* costs related to the correction of deficiencies and/or warranty claims."

- .3 Delete paragraph 5.5.3 in its entirety.

- .4 Delete paragraph 5.5.5 in its entirety and replace with the following:

"The *Contractor* must provide certification of publication of the Certificate of *Substantial Performance of the Work* with the release of holdback application."

- .5 Add new paragraph 5.5.6 as follows:

"5.5.6 Failure by the *Contractor* to publish the *Substantial Performance* Certificate places no onus on the *Consultant* or *Owner* to do so. If that Certificate is not published, the *Owner* shall release the holdback to the *Contractor* 45 days after the *Contract* is deemed complete, again having satisfied himself as above."

1.37 **GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK**

- .1 Delete GC 5.6 in its entirety.

1.38 **GC 5.7 FINAL PAYMENT**

- .1 Delete paragraph 5.7.1 in its entirety and substitute as follows:

"When the *Contractor* considers that the *Work* is completed, as defined in the lien legislation applicable to the *Place of the Work* or if such definition does not exist, in accordance with other applicable legislation, industry practice or provisions which may be agreed to between the parties, the *Contractor* shall submit an application for final payment. The *Contractor's* application for final payment shall be accompanied by any documents or materials not yet delivered pursuant to paragraph 5.4.5, together with complete and final as-built drawings and:

- .1 the *Contractor's* written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;
- .2 a Statutory Declaration CCDC 9A-2001.

The *Work* shall be deemed not to be completed until all of the aforementioned documents have been delivered, and the *Owner* may withhold payment in respect of the delivery of any documents in an amount determined by the *Consultant* in accordance with the provisions of GC 5.8 - WITHHOLDING OF PAYMENT."

- .2 Delete from the first line of paragraph 5.7.2 the words, "calendar days" and substitute the words "*Working Days*".
- .3 Delete from the second line of paragraph 5.7.4 the words, " 5 calendar days after the issuance" and substitute the words "30 calendar days after receipt of".

1.39 **GC 5.8 WITHHOLDING OF PAYMENT**

- .1 Delete paragraph 5.8.1 and replace with the following:

"If because of conditions reasonably beyond the control of the *Contractor*, there are items of work that cannot be performed, payment in full for that portion of the *Work* which has been performed as certified by the *Consultant* shall not be withheld or delayed by the *Owner* on account thereof, but the *Owner* may withhold, until the remaining portion of the *Work* is finished, only such an amount that the *Consultant* determines is sufficient and reasonable to cover the cost of performing such remaining *work*."

1.40 **GC 5.10 DEFICIENCY HOLDBACK**

- .1 Add a new General Condition 5.10 as follows:

"5.10.1 Notwithstanding any provisions contained in the *Contract Documents* concerning certification and release of monies to the *Contractor*, the *Owner* reserves the right to establish a deficiency holdback, at the time of the review for *Substantial Performance*, based on a 200% dollar value of the deficiencies listed by the *Consultant*. The value of *work* outstanding for the calculation of *Substantial*

Performance of the Work under the Construction Act (Ontario) shall utilize the 100% dollar value. No individual deficiency will be valued at less than two hundred dollars (\$200.00). The *Owner* shall retain the entire deficiency holdback amount until completion of all of the deficiencies listed by the *Consultant* to the satisfaction of the *Consultant*.

1.41 **GC 6.1 OWNER'S RIGHT TO MAKE CHANGES**

- .1 Add new paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7 and 6.1.8 as follows:

- "6.1.3 The *Contractor* agrees that changes resulting from construction coordination, including but not limited to, site surface conditions, site coordination, and Subcontractor and *Supplier* coordination are included in the *Contract Price* and the *Contractor* shall be precluded from making any claim for a change in the *Contract Price* as a result of such changes.
- 6.1.4 Labour costs shall be actual, prevailing rates at the *Place of the Work* paid to workers, plus statutory charges on labour including WSIB, unemployment insurance, Canada pension, vacation pay, hospitalization and medical insurance. The *Contractor* shall provide these rates, when requested by the *Consultant*, for review and/or agreement.
- 6.1.5 Quotations for changes to the *Work* shall be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from *Subcontractors* and *Suppliers*, submitted in a format acceptable to the *Consultant* and including any costs associated with extensions in *Contract Time*.
- 6.1.6 When both additions and deletions covering related *Work* or substitutions are involved in a change to the *Work*, payment, including *Overhead* and profit, shall be calculated on the basis of the net difference, if any, with respect to that change in the *Work*.
- 6.1.7 No extension to the *Contract Time* shall be granted for changes in the *Work* unless the *Contractor* can clearly demonstrate that such changes significantly alter the overall *construction schedule* submitted at the commencement of the *Work*. Extensions of *Contract Time* and all associated costs, if approved pursuant to GC 3.4.2, are to be included in the relevant *Change Order*.
- 6.1.8 When a change in the *Work* is proposed or required, the *Contractor* shall within 10 calendar days submit to the *Consultant* for review a claim for a change in *Contract Price* and/or *Contract Time*. Should 10 calendar days be insufficient to prepare the submission, the *Contractor* shall within 5 calendar days, advise the *Consultant* in writing of the proposed date of submission of the claim. Claims submitted after the dates prescribed herein will not be considered."

1.4.2 GC 6.2 CHANGE ORDER

- .1 In 6.2.1, add after the last sentence in the paragraph:

"The adjustment in the *Contract Time* and the *Contract Price* shall include an adjustment, if any, for delay or for the impact that the change in the *Work* has on the *Work* of the *Contractor*, and once such adjustment is made, the *Contractor* shall be precluded from making any further claims for delay or impact with respect to the change in the *Work*."

- .2 Add new paragraph 6.2.3 as follows:

"6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the *Consultant*.

- .1 by estimate and acceptance of a lump sum;
- .2 by negotiated unit prices which include the *Contractor's Overhead* and profit, or;
- .3 by the actual cost to the *Owner*, such costs to be the actual cost after all credits included in the change have been deducted, plus the following ranges of mark-up on such costs:
 - .1 for *Change Orders* with a value of \$0 to \$15,000 the total *Subcontractor/Supplier* mark-up including *Overhead* and profit shall be 10% and the total *Contractor* mark-up including *overhead* and profit shall be 5%.
 - .2 For *Change Orders* in excess of \$15,000, the total *Subcontractor/Supplier* mark-up including *Overhead* and profit shall be 5% and the total *Contractor* mark-up including *Overhead* and profit shall be 3%.

- .3 Add new paragraph 6.2.4 as follows:

"6.2.4 All quotations will be submitted in a complete manner listing:

- .1 quantity of each material,
- .2 unit cost of each material,
- .3 man hours involved,
- .4 cost per hour,
- .5 *Subcontractor* quotations submitted listing items 1 to 4 above and item 6 below.
- .6 mark-up"

- .4 Add new paragraph 6.2.5 as follows:

"6.2.5 The *Owner* and the *Consultant* will not be responsible for delays to the *Work* resulting from late, incomplete or inadequately broken down valuations submitted by the *Contractor*."

1.43 GC 6.3 CHANGE DIRECTIVE

- .1 Amend paragraph 6.3.6.1 by deleting the final period and adding, "as follows:

- .1 Ten percent (10%) for profit plus five percent (5%) for *overhead* on *work* by the *Contractor's* own forces up to the value of \$15,000 and five percent (5%) for profit plus three percent (3%) for *Overhead* on *work* by the *Contractor's* own forces in excess of \$15,000 and,
- .2 Ten percent (10%) fee on amounts paid to *Subcontractors* or *Suppliers* under subparagraph 6.3.7.9 for changes up to the value of \$15,000 and five percent (5%) on changes over \$15,000.

Unless a *Subcontractor's* or *Supplier's* price has been approved by the *Owner*, the *Subcontractor* or *Supplier* shall be entitled to its actual net cost as determined in accordance with paragraph 6.3.7, plus ten percent (10%) for profit and five percent (5%) for *Overhead* on such actual net cost for changes in the *Work*, up to the value of \$15,000 and five percent (5%) for profit and three percent (3%) for *overhead* on such actual net cost changes in the *Work* in excess of \$15,000."

- .2 Delete paragraph 6.3.6.2 and replace it with the following:

"If a change in the *Work* results in a net decrease in the *Contract Price* in excess of \$15,000 the amount of the credit shall be the net cost, with deduction for *Overhead* and profit. If a change in the *Work* results in a net decrease in the *Contract Price* of \$15,000 or less, the amount of the credit shall be the net cost, without deduction for *Overhead* or profit."

- .3 In subparagraph 6.3.7.1 insert "while directly engaged in the *work* attributable to the change" after the words "in the direct employ of the *Contractor*".

- .4 At the end of paragraph 6.3.7 add the following:

"All other costs attributable to the change in the *Work* including the costs of all administrative or supervisory personnel are included in *Overhead* and profit calculated in accordance with the provisions of paragraph 6.1.5 of GC6.1 – OWNER'S RIGHT TO MAKE CHANGES."

1.44 GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- .1 Delete paragraph 6.4.1 and replace with the following:

"6.4.1.1 Prior to the submission of the bid on which the *Contract* was awarded, the *Contractor* confirms that it carefully investigated the *Place of the Work* and carried out such tests as it deemed appropriate and, in doing so, applied to that investigation the degree of care and skill required by paragraph 3.14.1.

6.4.1.2 No claim by the *Contractor* will be considered by the *Owner* or the *Consultant* in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the *Contract*."

- .2 Amend paragraph 6.4.2 by adding a new first sentence as follows:

"Having regard to paragraph 6.4.1, if the *Contractor* believes that the conditions of the *Place of the Work* differ materially from those reasonably anticipated, differ materially from those indicated in the *Contract Documents* or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1, it shall provide the *Owner* and the *Consultant* with *Notice in Writing* no later than five (5) *Working Days* after the first observation of such conditions."

- .3 Amend the existing second sentence of paragraph 6.4.2 in the second line, following the word "materially" by adding the words "or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1,"

- .4 Delete paragraph 6.4.3 in its entirety and substitute the following:

"If the *Consultant* makes a finding pursuant to paragraph 6.4.2 that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* shall report in writing the reasons for this finding to the *Owner* and the *Contractor*."

- .5 Add new paragraph 6.4.5 as follows:

"6.4.5 No claims for additional compensation or for an extension of *Contract Time* shall be allowed if the *Contractor* fails to give *Notice in Writing* to the *Owner* or *Consultant*, as required by paragraph 6.4.2."

1.45 **GC 6.5 DELAYS**

- .1 Delete the words after the word "for" in the fourth line of paragraph 6.5.1, and add the words "...reasonable direct costs directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity)."

- .2 Delete the words after the word "for" in the fourth line of paragraph 6.5.2, and add the words "...reasonable direct costs directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity)."

- .3 Delete paragraph 6.5.3 in its entirety and replace with the following:

"If the *Contractor* is delayed in the performance of the *Work* by *Force Majeure*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The extension of time shall not be less than the time lost as a result of the event causing the delay, unless the *Contractor* agrees to a shorter extension. The *Contractor* shall not be entitled to payment for costs incurred by such delays unless such delays result from the actions of the *Owner*."

- .4 Delete paragraph 6.5.4 in its entirety and replace with the following:

"No extension or compensation shall be made for delay or impact on the *Work* unless *notice in writing* of a claim is given to the *Consultant* not later than ten (10) *Working Days* after the commencement of the delays or impact on the *Work*, provided however, that, in the case of a continuing cause of delay or impact on the *Work*, only one notice of claim shall be necessary."

- .5 Add new paragraphs 6.5.6, 6.5.7 and 6.5.8 as follows:

"6.5.6 If the *Contractor* is delayed in the performance of the *Work* by an act or omission of the *Contractor* or anyone directly or indirectly employed or engaged by the *Contractor*, or by any cause within the *Contractor's* control, then the *Contract Time* may be extended for such reasonable time as the *Owner* may decide in consultation with the *Consultant* and the *Contractor*. The *Owner* shall be reimbursed by the *Contractor* for all reasonable costs incurred by the *Owner* as the result of such delay, including, but not limited to, the cost of all additional services required by the *Owner* from the *Consultant* or any sub-consultants, project managers, or others employed or engaged by the *Owner*, and in particular, the costs of the *Consultant's* services during the period between the date of *Substantial Performance of the Work* stated in Article A-1 herein, as the same may be extended through the provision of these General Conditions, and any later or actual date of *Substantial Performance of the Work* achieved by the *Contractor*.

6.5.7 Without limiting the obligations of the *Contractor* described in GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS or GC 9.4 – CONSTRUCTION SAFETY, the *Owner* or *Consultant* may, by *notice in writing*, direct the *Contractor* to stop the *Work* where the *Owner* or *Consultant* determines that there is an imminent risk to the safety of persons or property at the *Place of the Work*. In the event that the *Contractor* receives such notice, it shall immediately stop the *Work* and secure the site. The *Contractor* shall not be entitled to an extension of the *Contract Time* or to an increase in the *Contract Price* unless the resulting delay, if any, would entitle the *Contractor* to an extension of the *Contract Time* or the reimbursement of the *Contractor's* costs as provided in paragraphs 6.5.1, 6.5.2 or 6.5.3.

6.5.8 No claim for delay shall be made and the *Contract Time* shall not be extended due to climatic conditions or arising from the *Contractor's* efforts to maintain the *Contract schedule*."

1.46 **GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE**

- .1 Delete GC 6.6 in its entirety.

1.47 **GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT**

- .1 Revise the heading to read "OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT"

- .2 Add a new subparagraph 7.1.3.4 as follows:

"7.1.3.4 An 'acceptable schedule' as referred to in subparagraph 7.1.3.2. means a schedule approved by the *Consultant* and the *Owner* wherein the default can be corrected within the balance of the *Contract Time* and shall not cause delay to any other aspect of the *Work* or the work of other contractors, and in no event shall it be deemed to give a right to extend the *Contract Time*."

- .3 In 7.1.4.1, delete sentence and replace with the following:

"Correct such default and deduct the cost, including *Owner's* expenses, thereof from any payment then or thereafter due the *Contractor*."

- .4 In subparagraph 7.1.5.3 delete the words: "however, if such cost of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference;"

- .5 Delete paragraph 7.1.6 in its entirety and add new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9 and 7.1.10 as follows:

"7.1.6 In addition to its right to terminate the *Contract* set out herein, the *Owner* may terminate this *Contract* at any time for any other reason and without cause upon giving the *Contractor* fifteen (15) *Working Days Notice in Writing* to that effect. In such event, the *Contractor* shall be entitled to be paid for all *Work* performed including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the termination of the *Contract*, but in no event shall the *Contractor* be entitled to be compensated for any loss of profit on unperformed portions of the *Work*, or indirect, special, or consequential damages incurred.

7.1.7 The *Owner* may suspend *Work* under this *Contract* at any time for any reason and without cause upon giving the *Contractor Notice in Writing* to that effect. In such event, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of suspension and be compensated for all actual costs incurred arising from the suspension, including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the suspension of the *Work*, but in no event shall the *Contractor* be entitled to be compensated for any indirect, special, or consequential damages incurred. In the event that the suspension continues for more than thirty (30) calendar days, the *Contract* shall be deemed to be terminated and the provisions of paragraph 7.1.6 shall apply.

7.1.8 In the case of either a termination of the *Contract* or a suspension of the *Work* under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall use its best commercial efforts to mitigate the financial consequences to the *Owner* arising out of the termination or suspension, as the case may be.

7.1.9 Upon the resumption of the *Work* following a suspension under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* will endeavour to minimize the delay and financial consequences arising out of the suspension.

7.1.10 The *Contractor's* obligations under the *Contract* as to quality, correction, and warranty of the *Work* performed by the *Contractor* up to the time of termination or suspension shall continue after such termination of the *Contract* or suspension of the *Work*."

1.48 **GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT**

.1 Add the following to paragraph 7.2.1:

"A duplicate of this notice shall be sent simultaneously to the *Consultant*."

.2 Delete subparagraph 7.2.3.1 in its entirety.

.3 In subparagraph 7.2.3.4, delete the words "except for GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER".

.4 Renumber paragraph 7.2.5 as paragraph 7.2.6. Add a new paragraph 7.2.5 as follows:

"7.2.5 If the default cannot be corrected within the 5 *Working Days* specified in paragraph 7.2.4, the *Owner* shall be deemed to have cured the default if it:

.1 commences correction of the default within the specified time;

.2 provides the *Contractor* with an acceptable schedule for such correction; and,

.3 completes the correction in accordance with such schedule.

.5 Delete the text of paragraph 7.2.6 entirely and replace with the following:

"7.2.6 If the *Contractor* terminates the *Contract* under the conditions described in GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of termination, as determined by the *Consultant*. The *Contractor* shall also be entitled to recover the direct costs associated with termination, including the costs of demobilization and losses sustained on *Products* and *Construction Equipment*. The *Contractor* shall not be entitled to any recovery for any special, indirect or consequential losses, including loss of profit."

- .6 Add new paragraphs 7.2.7, 7.2.8 and 7.2.9 as follows

"7.2.7 The *Contractor* shall not be entitled to give notice of the *Owner's* default or terminate the *Contract* in the event the *Owner* withholds certificates or payment or both in accordance with the *Contract* because of:

- .1 the *Contractor's* failure to pay all legitimate claims promptly, or
- .2 the failure of the *Contractor* to discharge construction liens which are registered against the title to the *Place of the Work*.

7.2.8 The *Contractor's* obligations under the *Contract* as to quality, correction and warranty of the *Work* performed by the *Contractor* up to the effective date of termination shall continue in force and shall survive termination by the *Contractor* in accordance with paragraph 7.2.4.

7.2.9 If the *Contractor* suspends the *Work* or terminates the *Contract* as provided for in GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall ensure the site and the *Work* are left in a safe, secure condition as required by authorities having jurisdiction at the *Place of the Work* and the *Contract Documents*."

1.49 **GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION**

- .1 Amend paragraph 8.2.1 by changing part of the second line from "shall appoint a Project Mediator" to "may appoint a Project Mediator, except that such an appointment shall only be made if both the *Owner* and the *Contractor* agree."

- .2 Amend paragraph 8.2.4 by changing part of the second line from "the parties shall request the Project Mediator" to "and subject to paragraph 8.2.1 the parties may request the Project Mediator".

- .3 Delete paragraphs 8.2.6, 8.2.7 and 8.2.8 in their entirety.

- .4 Add new paragraph 8.2.6 as follows:

"8.2.6 The dispute may be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, provided that both the *Contractor* and the *Owner* agree. If the *Contractor* and the *Owner* agree to resolve the dispute by arbitration, the arbitration shall be conducted in the jurisdiction of the *Place of the Work*."

- .5 Add new paragraph 8.2.7, 8.2.8, 8.2.9, 8.2.10, 8.2.11, and 8.2.12, as follows:

"8.2.7 Within five days of receipt of the notice of arbitration by the responding party under paragraph 8.2.6, the *Owner* and the *Contractor* shall give the *Consultant* a written notice containing:

- .1 a copy of the notice of arbitration;
- .2 a copy of supplementary conditions 8.2.7 to 8.2.12 of this *Contract*, and;

- .3 any claims or issues which the *Contractor* or the *Owner*, as the case may be, wishes to raise in relation to the *Consultant* arising out of the issues in dispute in the arbitration.

8.2.8 The *Owner* and the *Contractor* agree that the *Consultant* may elect, within ten (10) days of receipt of the notice under paragraph 8.2.7, to become a full party to the arbitration under paragraph 8.2.6 if the *Consultant*:

- .1 has a vested or contingent financial interest in the outcome of the arbitration;
- .2 gives the notice of election to the *Owner* and the *Contractor* before the arbitrator is appointed;
- .3 agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.2.6, and;
- .4 agrees to be bound by the arbitral award made in the arbitration.

8.2.9 If an election is made under paragraph 8.2.8, the *Consultant* may participate in the appointment of the arbitrator and, notwithstanding the rules referred to in paragraph 8.2.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the *Owner* receives a copy of the notice of arbitration.

8.2.10 The arbitrator in the arbitration in which the *Consultant* has elected under paragraph 8.2.8 to become a full party may:

- .1 on application of the *Owner* or the *Contractor*, determine whether the *Consultant* has satisfied the requirements of paragraph 8.2.8, and;
- .2 make any procedural order considered necessary to facilitate the addition of the *Consultant* as a party to the arbitration.

8.2.11 The provisions of paragraph 8.2.7 shall apply mutatis mutandis to written notice to be given by the *Consultant* to any subconsultant.

8.2.12 In the event of notice of arbitration given by the *Consultant* to a subconsultant, the subconsultant is not entitled to any election with respect to the proceeding as outlined in 8.2.8, and is deemed to be bound by the arbitration proceeding."

1.50 **GC 9.1 PROTECTION OF WORK AND PROPERTY**

- .1 Delete subparagraph 9.1.1.1 in its entirety and substitute new subparagraph 9.1.1.1:

"1 Errors in the *Contract Documents* which the *Contractor* could not have discovered applying the standard of care described in paragraph 3.14.1;"

- .2 Delete paragraph 9.1.2 in its entirety and substitute the following new paragraph 9.1.2:

"Before commencing any Work, the *Contractor* shall determine the locations of all underground utilities and structures indicated in the *Contract Documents*, or that are discoverable by applying to an inspection of the *Place of the Work* the degree of care and skill described in paragraph 3.14.1."

- .3 Add new paragraph 9.1.5 as follows:

"9.1.5 With respect to any damage to which paragraphs 9.1.3 or 9.1.4 apply, the *Contractor* shall neither undertake to repair or replace any damage whatsoever to the work of other contractors, or to adjoining property, nor acknowledge that the same was caused or occasioned by the *Contractor*, without first consulting the *Owner* and receiving written instructions as to the course of action to be followed from either the *Owner* or the *Consultant*. Where, however, there is danger to life, the environment, or public safety, the *Contractor* shall take such emergency action as it deems necessary to remove the danger."

1.51 **GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES**

- .1 Add a new subparagraph 9.2.5.5 as follows:

"9.2.5.5 in addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials."

- .2 Add to paragraph 9.2.6, in the second line after the word "responsible", the following new words:

"...or whether any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the *Owner* or others,..."

- .3 Add "and the *Consultant*" after the word "*Contractor*" in subparagraph 9.2.7.4.

- .4 Add to paragraph 9.2.8 after the word "responsible", the following new words:

"...or that any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the *Owner* or others,..."

- .5 Add new paragraph 9.2.10 as follows:

"9.2.10 The *Contractor*, *Subcontractors* and *Suppliers* shall not bring on to the *Place of the Work* any toxic or hazardous substances and materials except as required in order to perform the *Work*. If such toxic or hazardous substances or materials are required, storage in quantities sufficient to allow work to proceed to the end of any current work week only shall be permitted. All such toxic and hazardous materials and substances shall be handled and disposed of only in accordance with all laws and regulations that are applicable at the *Place of the Work*."

1.52 GC9.4 CONSTRUCTION SAFETY

- .1 Delete paragraph 9.4.1 in its entirety and substitute as follows:

"9.4.1 The *Contractor* shall be solely responsible for construction safety at the *Place of the Work* and for compliance with the rules, regulations, and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the *Work*."

- .2 Add new paragraphs 9.4.2 to 9.4.10 as follows:

"9.4.2 Prior to the commencement of the *Work*, the *Contractor* shall submit to the *Owner*:

- .1 the evidence of workers' compensation compliance required by GC 10.4.1;
- .2 copies of the *Contractor's* insurance policies having application to the *Project* or certificates of insurance, at the option of the *Owner*;
- .3 documentation setting out the *Contractor's* in-house safety programs;
- .4 copies of any documentation or notices to be filed or delivered to the authorities having jurisdiction for the regulation of occupational health and safety at the *Place of the Work*.

9.4.3 The *Contractor* shall indemnify and save harmless the *Owner*, its agents, trustees, officers, directors, employees, consultants, successors, appointees, and assigns from and against the consequences of any and all safety infractions committed by the *Contractor* under the occupational health and safety legislation in force at the *Place of the Work* including the payment of legal fees and disbursements on a substantial indemnity basis.

9.4.4 The *Owner* undertakes to include in its contracts with other contractors and in its instructions to its own forces the requirement that the other contractor or its own forces, as the case may be, comply with the policies and procedures of and the directions and instructions from the *Contractor* with respect to occupational health and safety and related matters.

9.4.5 If the *Owner* is of the reasonable opinion that the *Contractor* has not taken such precautions as are necessary to ensure compliance with the requirements of paragraph 9.4.1, the *Owner* may take any remedial measures which it deems necessary, including stopping the performance of all or any portion of the *Work*, and the *Owner* may use its employees, the *Contractor*, any *Subcontractor* or any other contractors to perform such remedial measures.

9.4.6 The *Contractor* shall file any notices or any similar document required pursuant to the Contract or the safety regulations in force at the *Place of the Work*. This duty of the *Contractor* will be considered to be included in the *Work* and no separate payment therefore will be made to the *Contractor*.

- 9.4.7 Unless otherwise provided in the *Contract Documents*, the *Contractor* shall develop, maintain and supervise for the duration of the *Work* a comprehensive safety program that will effectively incorporate and implement all required safety precautions. The program shall, at a minimum, respond fully to the applicable safety regulations and general construction practices for the safety of persons or property, including, without limitation, any general safety rules and regulations of the *Owner* and any workers' compensation or occupational health and safety statutes or regulations in force at the *Place of the Work*.
- 9.4.8 The *Contractor* shall provide a copy of the safety program described in paragraph 9.4.7 hereof to the *Consultant* for delivery to the *Owner* prior to the commencement of the *Work*, and shall, ensure, as far as it is reasonably practical to do so, that every employer and worker performing *work* in respect of the *Project* complies with such program.
- 9.4.9 The *Contractor* shall arrange regular safety meetings, and shall *supply* and maintain, at its own expense, at its office or other well-known place at the job site, safety equipment necessary to protect the workers and general public against accident or injury as prescribed by the authorities having jurisdiction at the *Place of the Work*, including, without limitation, articles necessary for administering first-aid to any person and an emergency procedure for the immediate removal of any injured person to a hospital or a doctor's care.
- 9.4.10 The *Contractor* shall promptly report in writing to the *Owner* and the *Consultant* all accidents of any sort arising out of or in connection with the performance of the *Work*, whether on or adjacent to the job site, giving full details and statement of witnesses. If death or serious injuries or damages are caused, the accident shall be promptly reported by the *Contractor* to the *Owner* and the *Consultant* by telephone or messenger in addition to any reporting required under the applicable safety regulations."

1.53 **GC 9.5 MOULD**

- .1 Add "and the *Consultant*" after "*Contractor*" in subparagraph 9.5.3.4.

1.54 **GC 10.1 TAXES AND DUTIES**

- .1 Amend paragraph 10.1.2 by adding the following sentence to the end of the paragraph:

"For greater certainty, the *Contractor* shall not be entitled to any mark-up for *overhead* or profit on any increase in such taxes and duties and the *Owner* shall not be entitled to any credit relating to mark-up for *overhead* or profit on any decrease in such taxes. The *Contractor* shall provide a detailed breakdown of additional taxes if requested by the *Owner* in a form satisfactory to the *Owner*."

- .2 Add new paragraph 10.1.3 as follows:

"10.1.3 Where the *Owner* is entitled to an exemption or a recovery of sales taxes, customs duties, excise taxes or *Value Added Taxes* applicable to the *Contract*, the *Contractor* shall, at the request of the *Owner*, assist with the application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the *Owner*. The *Contractor* agrees to endorse over to the *Owner* any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph. "

1.55 **GC 10.2 LAWS, NOTICE, PERMITS AND FEES**

- .1 Amend paragraph 10.2.5 by addition the words "Subject to GC 3.4 and GC 3.14," at the beginning of the paragraph. Add the following to the end of the second sentence:

"...and no further *Work* on the affected components of the *Contract* shall proceed until these directives have been obtained by the *Contractor* from the *Consultant*."

- .2 Amend paragraph 10.2.6 by adding the following sentence to the end of the paragraph:

"In the event the *Owner* suffers loss or damage as a result of the *Contractor's* failure to comply with paragraph 10.2.5 and notwithstanding any limitations described in paragraph 12.1.1, the *Contractor* agrees to indemnify and to hold harmless the *Owner* and the *Consultant* from and against any claims, demands, losses, costs, damages, actions suits or proceedings resulting from such failure by the *Contractor*."

- .3 Add new paragraph 10.2.8:

"10.2.8 The *Contractor* shall furnish all certificates that are required or given by the appropriate governmental authorities as evidence that the *Work* as installed conforms with the laws and regulations of authorities having jurisdiction, including certificates of compliance for the *Owner's* occupancy or partial occupancy. The certificates are to be final certificates giving complete clearance of the *Work*, in the event that such governmental authorities furnish such certificates."

1.56 **GC 10.4 WORKERS' COMPENSATION**

- .1 Delete paragraph 10.4.1 and replace with the following:

"Prior to commencing the *Work*, and with each and every application for payment thereafter, including the *Contractor's* application for payment of the holdback amount following *Substantial Performance of the Work* and again with the *Contractor's* application for final payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation in force at the *Place of the Work*, including payments due thereunder."

1.57 GC 11.1 INSURANCE

- .1 Delete entirety of general condition and CCDC 41 and replace with the following:

"11.1.1 Without restricting the generality of GC 12 – INDEMNIFICATION, the *Contractor* shall provide, maintain, and pay for the insurance coverages specified in GC 11.1 – INSURANCE. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the *Work* until the expiration of the warranty periods set out in the *Contract Documents*. Prior to commencement of the *Work* and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements.

.1 General Liability Insurance

General liability insurance shall be in the name of the *Contractor*, with the *Owner* and the *Consultant* named as additional insureds, with limits of not less than \$5,000,000.00 inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, *Subcontractors* and/or agents. The insurance coverage shall not be less than the insurance required by IBC Form 2100, or its equivalent replacement, provided that IBC Form 2100 shall contain the latest edition of the relevant CCDC endorsement form. To achieve the desired limit, umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of *Substantial Performance of the Work*, as set out in the certificate of *Substantial Performance of the Work*, on an ongoing basis for a period of 6 years following *Substantial Performance of the Work*. Where the *Contractor* maintains a single, blanket policy, the addition of the *Owner* and the *Consultant* is limited to liability arising out of the *Project* and all operations necessary or incidental thereto. The policy shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of any cancellation and of change or amendment restricting coverage.

.2 Automobile Liability Insurance

Automobile liability insurance in respect of licensed vehicles shall limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, covering all licensed vehicles owned or leased by the *Contractor*, and endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of any cancellation, change or amendment restricting coverage. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor*.

.3 Aircraft and Watercraft Liability Insurance

Where determined necessary by the *Contractor*, acting reasonably, aircraft and watercraft liability insurance will be obtained in accordance with the provisions of paragraph 11.1.3. Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft if used directly or indirectly in the performance of the *Work*, including use of additional premises, shall be subject to limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, including loss of use thereof and limits of not less than \$2,000,000.00 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the *Owner*. The policies shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of cancellation, change or amendment restricting coverage.

.4 Property and Boiler and Machinery Insurance

- .1 Builder's Risk property insurance shall be in the name of the *Contractor* with the *Owner* and the *Consultant* named as additional insureds. The policy shall insure against all risks of direct physical loss or damage to the property insured which shall include all property included in the *Work*, whether owned by the *Contractor* or the *Owner* or owned by others, so long as the property forms part of the *Work*. The property insured also includes all materials and supplies necessary to complete the *Work*, whether installed in the *Work* temporarily or permanently, in storage on the project site, or in transit to the project site, as well as temporary buildings, scaffolding, falsework forms, hoardings, excavation, site preparation and similar work. The insurance shall be for not less than the sum of the amount of the *contract price* and the full value of *products* that are specified to be provided by the *Owner* for incorporation into the *Work*, if applicable, with the deductible of \$10,000.00 payable by the *Contractor*. The insurance shall include the foregoing and, otherwise, shall not be less than the insurance required by IBC Form 4042 or its equivalent replacement provided that the IBC Form 4042 shall include the latest addition of the relevant CCDC endorsement form. The coverage shall be based on a completed value form and shall be maintained continuously until ten (10) days after the date of the final certificate of payment.
- .2 Boiler and machinery insurance shall be in the name of the *Contractor*, with the *Owner* and the *Consultant* named as additional insureds, for not less than the replacement value of the boilers, pressure vessels and other insurable objects forming part of the *Work*. The insurance provided shall not be less than the insurance provided by the "Comprehensive Boiler and Machinery Form" and shall be maintained continuously from commencement of use or operation of the property insured and until 10 days after the date of the final certificate for payment.
- .3 The policies shall allow for partial or total use or occupancy of the *Work*.

- .4 The policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. The *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except that the *Contractor* shall be entitled to such reasonable extension of the *Contract Time*, relative to the extent of the loss or damage, as determined by the *Owner*, in its sole discretion.
- .5 The *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount at which the *Owner's* interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT. In addition, the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor's* interest in the restoration of the *Work*.
- .6 In the case of loss or damage to the *Work* arising from the work of other contractors, or the *Owner's* own forces, the *Owner*, in accordance with the *Owner's* obligations under paragraph 3.2.2.4 of GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, shall pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT.
- .5 Contractors' Equipment Insurance
- 'All risks' contractors' equipment insurance covering construction machinery and equipment used by the *Contractor* for the performance of the *Work*, excluding boiler insurance, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner*. The policies shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of cancellation, change or amendment restricting coverage. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance of his equipment, the *Owner* agrees to waive the equipment insurance requirement.
- 11.1.2 The *Contractor* shall be responsible for deductible amounts under the policies except where such amounts may be excluded from the *Contractor's* responsibility by the terms of GC 9.1 - PROTECTION OF WORK AND PROPERTY and GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.
- 11.1.3 Where the full insurable value of the *Work* is substantially less than the *Contract Price*, the *Owner* may reduce the amount of insurance required to waive the course of construction insurance requirement.

- 11.1.4 If the *Contractor* fails to provide or maintain insurance as required by the *Contract Documents*, then the *Owner* shall have the right to provide and maintain such insurance and provide evidence of same to the *Contractor*. The *Contractor* shall pay the costs thereof to the *Owner* on demand, or the *Owner* may deduct the amount that is due or may become due to the *Contractor*.
- 11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*."

1.58 **GC 11.2 CONTRACT SECURITY**

- .1 In 11.2.2, delete paragraph after the word "provided" and replace with the following:

"Such bonds shall be issued by a duly licensed surety company, which has been approved by the *Owner*, authorized to transact a business of suretyship in the province or territory of the *Place of the Work* and shall be maintained in good standing until the fulfillment of the *Contract*, including all warranty and maintenance periods set out in the *Contract Documents*."

- .2 Add new paragraph 11.2.3 as follows:

"11.2.3 It is the intention of the parties that the performance bond shall be applicable to all of the *Contractor's* obligations in the *Contract Documents* and, wherever a performance bond is provided with language which conflicts with this intention, it shall be deemed to be amended to comply. The *Contractor* represents and warrants to the *Owner* that it has provided its surety with a copy of the *Contract Documents* prior to the issuance of such bonds."

1.59 **GC 12.1 INDEMNIFICATION**

- .1 Delete General Condition 12.1 – INDEMNIFICATION in its entirety and substitute as follows:

"12.1.1 The *Contractor* shall indemnify and hold harmless the *Owner*, its parent, subsidiaries and affiliates, their respective partners, trustees, officers, directors, agents and employees and the *Consultant* from and against any and all claims, liabilities, expenses, demands, losses, damages, actions, costs, suits, or proceedings (hereinafter called "claims"), whether in respect of claims suffered by the *Owner* or in respect of claims by third parties, that directly or indirectly arise out of, or are attributable to, the acts or omissions of the *Contractor*, its employees, agents, *Subcontractors*, *Suppliers* or any other persons for whom it is in law responsible (including, without limitation, claims that directly or indirectly arise out of, or are attributable to, loss of use or damage to the *Work*, the *Owner's* property or equipment, the *Contractor's* property or equipment or equipment or property adjacent to the *Place of the Work* or death or injury to the *Contractor's* personnel).

12.1.2 The provisions of GC 12.1 - INDEMNIFICATION shall survive the termination of the *Contract*, howsoever caused and no payment or partial payment, no issuance of a final certificate of payment and no occupancy in whole or in part of the *Work* shall constitute a waiver or release of any of the provisions of GC 12.1."

1.60 **GC 12.2 WAIVER OF CLAIMS**

- .1 In 12.2.1, in the fourth line, add the words "claims for delay pursuant to GC 6.5 DELAYS" after the word "limitation". Add the words "(collectively "Claims")" after "*Substantial Performance of the Work*" in the sixth line.
- .2 In 12.2.1.1, change the word "claims" to "Claims" and change the word "claim" to "Claim".
- .3 In 12.2.1.2, change the word "claims" to "Claims".
- .4 In 12.2.1.3, delete paragraph in its entirety.
- .5 In 12.2.1.4, change the word "claims" to "Claims".
- .6 In 12.2.2, change the words "in paragraphs 12.2.1.2 and 12.2.1.3" to "in paragraph 12.2.1.2". Change the word "claims" to "Claims" in both instances and change the word "claim" to "Claim".
- .7 Delete paragraph 12.2.3 in its entirety.
- .8 Delete paragraph 12.2.4 in its entirety.
- .9 Delete paragraph 12.2.5 in its entirety.
- .10 In 12.2.6, change the word "claim" to "Claim" in all instances in the paragraph.
- .11 In 12.2.7, change "The party" to "The *Contractor*". Change the word "claim" to "Claim" in all instances in the paragraph.
- .12 In 12.2.8, change "under paragraphs 12.2.1 or 12.2.3" to "under paragraph 12.2.1". Change both instances of the words "the party" to "the *Contractor*". Change the word "claim" to "Claim" in all instances in the paragraph.
- .13 Delete paragraph 12.2.9 in its entirety.
- .14 Delete paragraph 12.2.10 in its entirety.

1.61 **GC 12.3 WARRANTY**

- .1 Delete from the first line of paragraph 12.3.2 the word, "The" and substitute the words:
"Subject to GC 3.14, paragraph 3.14.1, the..."
- .2 Add new paragraphs 12.3.7 to 12.3.12 as follows:

"12.3.7 Where required by the *Contract Documents*, the *Contractor* shall provide a maintenance bond as security for the performance of the *Contractor's* obligations as set out in GC 12.3 WARRANTY.

12.3.8 The *Contractor* shall provide fully and properly completed and signed copies of all warranties and guarantees required by the *Contract Documents*, containing:

- .1 the proper name of the *Owner*;
- .2 the proper name and address of the *Project*;
- .3 the date the warranty commences, which shall be at the "date of *Substantial Performance of the Work*" unless otherwise agreed upon by the *Consultant* in writing.
- .4 a clear definition of what is being warranted and/or guaranteed as required by the *Contract Documents*; and
- .5 the signature and seal (if required by the governing law of the Contract) of the company issuing the warranty, countersigned by the *Contractor*.

12.3.9 Should any *Work* be repaired or replaced during the time period for which it is covered by the specified warranty, a new warranty shall be provided under the same conditions and for the same period as specified herein before. The new warranty shall commence at the completion of the repair or replacement.

12.3.10 The *Contractor* shall ensure that its *Subcontractors* are bound to the requirements of GC 12.3 – WARRANTY for the *Subcontractor's* portion of the *Work*.

12.3.11 The *Contractor* shall ensure that all warranties, guarantees or other obligations for *Work*, services or *Products* performed or supplied by any *Subcontractor*, *Supplier* or other person in connection with the *Work* are obtained and available for the direct benefit of the *Owner*. In the alternative, the *Contractor* shall assign to the *Owner* all warranties, guarantees or other obligations for *Work*, services or *Products* performed or supplied by any *Subcontractor*, *Supplier* or other person in connection with the *Work* and such assignment shall be with the consent of the assigning party, where required by law, or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the *Owner* under the *Contract Documents*.

12.3.12 The *Contractor* shall commence or correct any deficiency within 2 *Working Days* after receiving a notice from the *Owner* or the *Consultant*, and shall complete the *Work* as expeditiously as possible, except in the case where the deficiency prevents maintaining security or where basic systems essential to the ongoing business of the *Owner* and/or its tenants cannot be maintained operational as designed. In those circumstances all necessary corrections and/or installations of temporary replacements shall be carried out immediately as an emergency service. Should the *Contractor* fail to provide this emergency service within 8 hours of a request being made during the normal business hours of the *Contractor*, the *Owner* is authorized, notwithstanding GC 3.1, to carry out all necessary repairs or replacements at the *Contractor's* expense."

1.62 **PART 13 OTHER PROVISIONS**

- .1 Add new Part 13 - OTHER PROVISIONS

1.63 **GC13.1 OWNERSHIP OF MATERIALS**

- .1 Add new GC13.1 - OWNERSHIP OF MATERIALS, as follows:

"13.1.1 Unless otherwise specified, all materials existing at the *Place of the Work* at the time of execution of the *Contract* shall remain the property of the *Owner*. All *Work* and *Products* delivered to the *Place of the Work* by the *Contractor* shall be the property of the *Owner*. The *Contractor* shall remove all surplus or rejected materials as its property when notified in writing to do so by the *Consultant*."

1.64 **GC 13.2 CONSTRUCTION LIENS**

- .1 Add new GC 13.2 - CONSTRUCTION LIENS, as follows:

"13.2.1 In the event that a claim for lien is registered against the *Project* by a *Subcontractor*, Sub-subcontractor or *Supplier*, and provided the *Owner* has paid all amounts properly owing under the *Contract*, the *Contractor* shall, at its own expense:

- .1 within 10 calendar days, ensure that any and all claims for lien and certificates of action are discharged, released, or vacated by the posting of security or otherwise; and
- .2 in the case of written notices of lien, ensure that such notices are withdrawn, in writing.

13.2.2 In the event that the *Contractor* fails to conform with the requirements of paragraph 13.2.1, the *Owner* may fulfil those requirements without *Notice in Writing* to the *Contractor* and set off and deduct from any amount owing to the *Contractor*, all costs and associated expenses, including the costs of posting security and all legal fees and disbursements associated with discharging or vacating the claim for lien or certificate of action and defending the action. If there is no amount owing by the *Owner* to the *Contractor*, then the *Contractor* shall reimburse the *Owner* for all of the said costs and associated expenses.

13.2.3 Notwithstanding any other provision in the *Contract*, the *Consultant* shall not be obligated to issue a certificate and the *Owner* shall not be obligated to make payment to the *Contractor* if, at the time such certificate or payment was otherwise due:

- .1 a claim for lien has been registered against the Project lands, or
- .2 if the Owner or mortgagee of the Project lands has received written notice of a lien, or
- .3 the *Owner* or *Consultant* reasonably believe that any party has purported to retain title to *Products* or materials in respect of which an application for payment has been made.

- 13.2.4 Without limiting the foregoing, the *Contractor* shall, if requested by the *Owner*, defend, indemnify and save the *Owner* harmless from the amount of all such claims and the costs of defending any and all actions commenced against the *Owner* pursuant to the construction/builder's lien legislation in force at the *Place of the Work*, including the legal costs of the *Owner*, unless the lien was a direct result of a breach of the *Contract* by the *Owner* or the non-payment by the *Owner* of a valid charge or claim under the *Contract*.
- 13.2.5 GC 13.2 – CONSTRUCTION LIENS does not apply to construction/builder's liens claimed by the *Contractor*."

END OF SECTION

1.1 CONTRACT DOCUMENTS

- .1 Contract documents for work under this contract consists of the following:
 - .1 Invitation to Tender Documents
 - .2 Standard Construction Document CCDC 2, 2008
 - .3 Supplementary Conditions, in Section 00 73 00
 - .4 Specifications as listed in Index to Specifications
 - .5 Drawings as listed in List of Drawings
 - .6 All Detail Drawings and Schedules as bound in Project Manual
 - .7 All Addenda issued prior to closing of the tender
 - .8 Amendments incorporated prior to the signing of the Contract, as agreed to between the signing parties.

1.2 PRODUCTS SUPPLIED BY OWNER

- .1 Products, including appliances, indicated on the drawings as "N.I.C.", or so noted in specifications, are not included in the Contract but will be supplied by the Owner. These are to be put in place and connected to services by the Contractor.
- .2 The Owner will provide manufacturer's installation instructions for each such product, when available.
- .3 The Contractor's duties with respect to products supplied by the Owner include:
 - .1 Unload and handle at site.
 - .2 Remove and dispose of packaging. Inspect delivered products notify Owner and Consultant of any damage or missing components.
 - .3 Temporarily store products in secure and suitable storage, if they are not to be installed immediately.
 - .4 Install and connect to services as applicable.
 - .5 Coordinate with millwork subcontractor to provide trim at items installed in cabinetry.
- .4 Where any item is fully specified, it is to be provided, regardless of any note on any drawings which may indicate it is supplied by others (or N.I.C.).

1.3 RELATION OF TRADES

- .1 These specifications have been divided generally into sections conforming to Construction Specifications Canada Master Format 2004 for the purpose of ready reference. They must be read as a whole. The responsibility for apportioning the work or of settling disputes related to same shall rest entirely with the Contractor.
- .2 The Contractor is responsible for co-ordinating all trades. He is solely responsible for determining the lines of demarcation between Contractor and/or trades. Neither the Consultant nor the Owner assume any responsibility for any such determination or for any dispute arising concerning it. No extras will be considered due to any such dispute concerning either labour or materials.

SECTION 01 10 00 - GENERAL INSTRUCTIONS

- .3 Specifications & drawings form an integral part of the Contract Documents. Any subject or item omitted from one but which is mentioned or reasonably implied in the other, shall be considered properly and sufficiently specified and will be part to the work.

1.4 EXAMINATION OF SITE

- .1 Examine existing building and site immediately prior to commencing Work to confirm that building and site as received by the Contractor, including adjoining Municipal lands, conform to information on tender documents.
- .2 Notify Consultant immediately if site conditions are not acceptable. Commencement of the Work of this Contract will be taken as acceptance of site conditions. No extras will be considered unless accepted in advance of performance of the work, in writing, by Owner and Consultant.
- .3 Contractor must make himself familiar with conditions on the roadway which may affect construction ie location of services, road widening, site access, etc.

1.5 ACCEPTANCE OF WORK IN PLACE

- .1 Before starting his work and from time to time as the work progresses, each subcontractor shall examine the work and materials installed by the other subcontractors insofar as it affects his own work, and shall promptly notify the Consultant IN WRITING, if any condition exists that will prevent him from giving a satisfactory result in his own work.
- .2 Should the subcontractor start his own work without such notification, it shall be construed as an acceptance by him of all preceding work and as a waiver of all claims or questions as to its suitability for receiving his work.
- .3 All Subcontractors installing building finishes and site work shall submit written confirmation of acceptance of existing conditions, to the Consultant, prior to commencing their work. Finishing work and landscaping work may not commence without submission of this confirmation. Receipt of this confirmation will be considered a prerequisite for certification of payment to the relevant Subcontractors.

1.6 MATERIALS AND WORKMANSHIP

- .1 All materials shall be new and the best of their respective kinds. Where a specific grade or brand is not indicated preference shall be given to materials of Canadian manufacture. Pre-packaged materials shall be delivered and stored in unopened containers.
- .2 All work performed under this Contract shall be done by mechanics skilled in their respective trades. They shall make use of such templates, jigs or special tools as may be required for the operation involved.
- .3 The Contractor is responsible for maintaining quality of workmanship. He shall report to the Consultant whenever the Work or material of any trade does not meet the required standard.
- .4 The acceptance of any materials or workmanship shall not be a bar to their subsequent rejection, if found defective.

- .5 Rejected materials and workmanship, and any work which is found defective, shall be removed and replaced or made good by the Contractor without cost to the Owner and to the satisfaction of the Consultant.
- .6 Adequate, dry storage facilities shall be provided and all stored materials shall be protected from damage and theft.
- .7 Perform Work in accordance with the best industry practice of the type of work specified, unless the Contract Documents stipulate more precise requirements, in which case, the more precise requirements shall govern.
- .8 Do Work in a neat, plumb & square manner. Ensure that various work components are properly installed, forming tight joints and appropriately aligned junctions, edges and surfaces, free of warps, twists, waves, or other such irregularities.
- .9 Wherever indicated on the drawings or specifications, or in the manufacturers'/suppliers' written instructions, arrange to have manufacturers'/installer's representatives inspect the Work which incorporates their materials, products or items.
- .10 Do not permit materials to come in contact with other materials such conditions may result in corrosion, staining, discolouration or deterioration of the completed Work. Provide compatible, durable separators where such contact is unavoidable
- .11 Where equipment is supported by the walls or structure, shop drawings must be stamped by an Ontario Registered Professional Engineer confirming that the wall/structure is capable of supporting the equipment/element and that the anchorage provided is adequate to support the equipment/element together with any potential load or stress.
- .12 The design of the Work is based on the full interaction of its component parts. No provisions have been made for conditions occurring during construction. Ensure that no part of the Work is subjected to a load which will endanger its safety or which might cause permanent deformation.
- .13 Conceal pipes, ducts, conduit, wiring and other such items requiring concealment preferably in, wall or ceiling construction of all finished areas. If in doubt as to method of concealment, or intent of the Contract Documents in this regard, request clarification from the Consultant before proceeding with the Work.
- .14 Lay out mechanical and electrical work well in advance of concrete placement and furring installation to allow for proper concealment. Test and inspect Work before applying pipe covering and before it is concealed.
- .15 Provide and maintain control lines and levels required for the Work. Lay out the Work in accordance with these lines and levels and dimensions indicated on the drawings.
- .16 Verify lines, levels and dimensions and report any errors or inconsistencies on the drawings to the Consultants.
- .17 Final responsibility of satisfactory completion of all the Work, however, lies with the Contractor.

SECTION 01 10 00 - GENERAL INSTRUCTIONS**1.7 SECURITY**

- .1 The Contractor shall be responsible for security of all areas affected by the Work of this Contract until taken over by the Owner. Steps shall be taken to prevent entry to the Work by unauthorized persons and to guard against theft, fire and damage by any cause.
- .2 A regular full-time watchman will be required on from Substantial Performance of the Work until Occupancy by the Owner. During this time the Contractor must have a watchman on site whenever construction personnel are not on site, ie nights, weekends, holidays, stoppages, etc.
- .3 If, in the opinion of the Consultant, the Work is not adequately protected by the Contractor at any time prior to this, the Owner may demand that a watchman be employed by the Contractor at no extra cost to the Contract. The cost of site security at any time during the contract shall be fully borne by the Contractor.

1.8 SCAFFOLDING

- .1 All necessary scaffolding shall be provided and constructed according to by-law and safety regulations.
- .2 Construct and maintain scaffolding in rigid, secure and safe manner.
- .3 Erect scaffolding independent of building walls.
- .4 Avoid interference with other trades.
- .5 Move when not in use to permit installation of other work and promptly remove when no longer required.
- .6 The provision of scaffolding shall be a matter of agreement between the Contractor and Subcontractors.
- .7 Build temporary stairs with handrail for access to upper floors until permanent stairs are in place.

1.9 PROTECTION OF OTHER WORK

- .1 Each trade shall avoid damage to other trades and shall take all measures necessary and provide all masking and materials necessary to provide adequate protection.
- .2 Each Contractor and Subcontractor shall be held responsible for all damage to work installed by others that is caused by this work or by anyone employed by him.
- .3 Patching and repairing of damaged work shall be done by the contractor who installed the work, as directed by the Consultant, but the cost of same shall be paid for by the contractor who is responsible for the damage.

1.10 FASTENINGS

- .1 All fastenings must be permanent, of same metal or compatible with any metals with which they are in contact, of adequate size and spacing to ensure permanent anchorage against load or shear.
- .2 Exposed fastenings must be evenly spaced, neatly laid out and must not mar surfaces of prefinished materials.
- .3 No ram setting or similar techniques will be permitted without prior written approval of the Consultant.
- .4 No wood plugs and no anchorages which cause spalling or cracking will be accepted.
- .5 Generally use plain washers. Where vibration may occur, use lock type washers and where fasteners are stainless steel use resilient washers.
- .6 All fasteners exposed on the exterior must be stainless steel.

1.11 SUPPLY AND INSTALL

- .1 Unless specifically noted "supply only", any reference to supply intends the supply and installation of material or item so noted.

1.12 OCCUPATION BEFORE COMPLETION

- .1 If the Contractor, for any reason, does not have the job completed by the completion date and the Owner, of necessity, is forced to occupy any part of the building before the whole of the work is completed, the Contractor will not be entitled to any indemnity for interference with his operation.

1.13 GENERAL REQUIREMENTS

- .1 All Subcontractors shall examine carefully all drawings and specifications to inform themselves fully of all conditions and limitations pertaining to the work of the contract.
- .2 All Subcontractors shall co-operate and co-ordinate their work for the proper completion of the work, including co-ordination of delivery dates and commencement of sub-trades work.
- .3 The responsibility for all work, including temporary structures, shoring and erection shall at all times rest with the Contractor and his Subcontractors. The Consultant will review construction methods and shop drawings for general arrangements only. The method of obtaining the results contemplated by the Contract Documents shall be determined by the Contractor.
- .4 The undertaking of periodic site review by the Consultant or Owner's representative shall not be construed as supervision of actual construction, nor make him responsible for providing a safe place for work, visit, use, access, travel, or occupancy of their employees or agents.

SECTION 01 10 00 - GENERAL INSTRUCTIONS

- .5 The Contractor shall be fully responsible for co-ordinating and expediting the work of all Subcontractors and shall employ the necessary and qualified personnel to provide the required quality of labour and materials and to prevent delays in the progress of the project. Each trade shall be afforded all reasonable opportunities for the installation of its work and for the storage and handling of its materials.

1.14 COORDINATION

- .1 Coordinate all work and preparation on which subsequent work depends to facilitate mutual progress, and to prevent any conflict.
- .2 Review all drawings to identify interference issues prior to commencing construction. Request and review interference drawings from all mechanical and electrical trades. Review all shop drawings, samples, product data, mock-ups, and other required submittals for potential interference issues and co-ordinate with the trades to avoid these conflicts.
- .3 Where interference issues arise during construction, correct work at no expense to the Owner where the interference could have reasonably been foreseen.
- .4 Ensure that each trade makes known, for the information of the Contractor and other trades, the environmental and surface conditions required for the execution of its work; and that each trade makes known the sequence of others' work required for installation of its work.
- .5 Ensure that each trade, before commencing work, knows requirements for subsequent work and that each trade is assisted in the execution of its preparatory work by trades whose work depends upon it.
- .6 Mechanical and electrical trades in particular, shall ensure that items, such as electrical panels, outlets, diffusers, switches, etc., are located where they will not interfere with the installation or operation of other items.
 - .1 Check all drawings for the location of items to be installed later, such as millwork, visual display boards, and other wall or ceiling mounted items.
 - .2 Ensure items installed do not interfere with the operation of equipment or fittings, such as the swinging of doors, opening of operable partitions or curtains, raising of basketball backstops, etc.
- .7 Review all shop and layout drawings, templates, and other required submittals for coordination purposes.
 - .1 Ensure that all information necessary for the location and installation of materials, openings, inserts, anchors, accessories, fastenings, connections and access panels are provided by each trade whose work requires co-operative location and installation by other trades and that such information is communicated to the applicable installer.
 - .2 Ensure that shop drawings for aluminum and hollow metal work are coordinated with the openings for doors, frames and windows; site measurements must be indicated on the drawings.
 - .3 Review millwork shop drawings to ensure adequate clearance from walls, doors, windows, writing boards, mechanical and electrical equipment, etc.
- .8 Deliver materials supplied by one trade to be installed by another well before the installation begins.

- .9 Trades giving installation information in error, or too late to incorporate in the work, shall be responsible for any extra work caused thereby.
- .10 Immediately remove any work which is unsatisfactory for subsequent work, as directed by the Consultant or by the appointed inspection firms.
- .11 Inform Commissioning Agent and / or Owner's representative of all equipment installations and start ups.

1.15 ACCESS TO THE PROJECT

- .1 The Contractor for this work shall at all times allow the Owner or any other contractor or their employees in the building or around the premises, undisturbed, whether union or non-union, as may be required in the execution of other portions of the building work and installation of equipment, etc.
- .2 Cooperate fully with forces carrying out any work on behalf of the Owner.
- .3 Note that the intermediate school will be occupied when the Work of this Contract commences. The Contractor will not have access to occupied areas of the building during the school academic year. Refer to phasing notes on the drawings.

1.16 SUB-TRADE AWARDS

- .1 The Contractor shall, on notice of award of the contract, obtain the Consultant's approval of a complete list of all persons or firms to which he proposes to sublet any part of the work, the trades or divisions of work which are to be sublet to each, and the amount of each trade. He shall provide to the Consultant a financial breakdown showing all divisions of the work amounting to the full sum of the contract. Mechanical and Electrical trades shall be further broken down as required by the mechanical and electrical consultants.

1.17 SAFETY DATA SHEETS

- .1 The Contractor shall submit material and safety data sheets prior to commencing installation and application of at least the following:
 - .1 lead-free solder
 - .2 sealants and caulking
 - .3 resilient flooring
 - .4 painting and finishing
 - .5 fertilizers
 - .6 pesticides
 - .7 herbicides
 - .8 all adhesives
 - .9 any other product which may give off air borne particles after installation
- .2 The Contractor and all of his Subcontractors must note that specifically, Asbestos and Asbestos containing materials, solder for piping containing lead, and Painting & Coatings containing lead and/or mercury must be excluded from any part of the Work.

SECTION 01 10 00 - GENERAL INSTRUCTIONS

- .3 The Contractor must submit Certificates of Compliance, prior to the application for Substantial performance, for each of the following items:
 - .1 An affidavit relative to the use of Lead-free solder for all domestic water lines, regardless of location.
 - .2 Products for which Material Safety Data Sheets have been submitted and accepted.
 - .3 Other Work/Products identified in the Contract Documents as requiring a Certificate of Compliance.
- .4 Each Certificate of Compliance must indicate names and addresses of the project, the Owner, the date of Issue, produce description including name, number, manufacturer, with a statement verifying that the Work/Product installed meets specified requirements and, if applicable, complies with the submitted and accepted Material Safety Data Sheets.
- .5 Each Certificate of Compliance must be issued on the trade's letterhead, properly executed, under whose work the respective Work/Product has been provided.
- .6 Each Certificate of Compliance must be endorsed by the Contractor with his authorized stamp/signature.
- .7 The Contractor must ensure that submissions are made to allow sufficient time for review without delaying progress of scheduled completion.
- .8 WHMIS Material Safety Data Sheets (MSDS) are required to be provided before or with the first delivery of every controlled product.
- .9 Ensure that worksite copies of MSDS's are available to workers wishing to consult them and to the health and safety representative and/or joint health and safety committee.
- .10 Ensure that workers are instructed in the purpose and content of MSDS.
- .11 Provide prescribed information on any workplace controlled product, including confidential business information, to a doctor or nurse who needs it for diagnosis or emergency medical treatment.
- .12 WHMIS MSDS sheets to be kept on site at all times.

1.18 REGULATING DOCUMENTS

- .1 Refer to Section 01 41 00, Regulatory Requirements. Conform to applicable Codes and Building By-Laws. Conform to the requirements of the authorities having jurisdiction, such as public utilities. Where required under The Occupational Health and Safety Act, engage a Professional Engineer to design formwork and falsework for concrete.
- .2 Provide copies of documents referred to in the Specification for joint use of Contractor and Consultant, on site.

1.19 CONTRACTOR'S RESPONSIBILITY

- .1 The Contractor will be responsible to take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract. The list of Contractor's responsibilities identified below is by no means comprehensive, nor is it in any priority or critical order. It is here, merely to identify the most often forgotten or ignored responsibilities of the Contractor and is reproduced only as a reminder. The Consultants and the Owner advise the Contractor that it is he who is responsible for all aspects and facets of the Project, from start to completion, from compliance with Occupational Health and Safety regulations to compliance with all codes and statutes.
- .2 The Owner may perform periodic monitoring to ensure that safety requirements are met, and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the Contract to be cancelled and the Contractor removed from the site.
- .3 All work procedures and equipment shall be in accordance with Owner and Legislation standards.
- .4 All equipment shall be in safe operating condition and appropriate to the task.
- .5 Only competent personnel will be permitted on site. During the site introduction, the Owner will determine who is competent. The Contractor will cause to remove from the site any persons not observing or complying with safety requirements.
- .6 The Contractor shall comply with all Federal, Provincial and Municipal Safety Codes and Regulations and the Occupational Health and Safety Act. He shall insure that all of his Subcontractors, suppliers, installers, etc. comply with all applicable codes, regulations, and acts.
- .7 The Contractor shall supply competent personnel to implement his safety program and ensure that the Owner's standards, and those of the Occupational Health and Safety Act, are being complied with.
- .8 The Contractor shall report to the Owner and jurisdictional authorities any accident or incident involving personnel and/or property of the Contractor, Owner, or Public, arising from the Contractor's or any of his Subcontractors, execution of the work.
- .9 Provide the Owner with a copy of each site visit report by the Ministry of Labour, as soon as the report is issued.
- .10 The Contractor shall include all provisions of this contract in any agreement with Subcontractors, and hold all subcontractors equally responsible for safe work performance.
- .11 If the Contractor is responsible for a delay in the progress of the work due to an infraction of legislation or Owner Health and Safety requirements, the Contractor will, without additional cost to the Owner, work such overtime, and acquire and use for the execution of the work such additional labour and equipment as to be necessary, in the opinion of the Owner's Representative, to avoid delay in the final completion of the work or any operations thereof.

SECTION 01 10 00 - GENERAL INSTRUCTIONS**1.20 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 Notify Consultant in writing of any conflict between these specifications and manufacturer's instructions. Consultant will clarify any such conflict when requested.

1.21 AIR, VAPOUR, AND THERMAL SEAL

- .1 Ensure that exterior walls, windows, floor and roof surfaces provide an air-tight and vapour-tight membrane to prevent problems due to building vapour migration.
- .2 In general, the air/vapour barrier must be achieved on the interior side of the thermal insulation.
- .3 The air barrier/vapour retarder membrane, together with flashings and caulking shall provide a complete and continuous air barrier/vapour retardant envelope. All trades must co-ordinate their work with the work of other trades to ensure that the continuity and integrity of the envelope is maintained.

1.22 SAFETY REQUIREMENTS

- .1 Comply with safety requirements outlined in Section 01 35 20.

1.23 TRUCKING COSTS

- .1 The Contractor is responsible for all costs related to trucking required for the Contract. No extra costs will be considered for weight load or limits due to seasonal conditions or restrictions on load capacities imposed by any authorities or any similar limitations or factors.

1.24 CONTINGENCY ALLOWANCE

- .1 Include in the Contract Price a Contingency Allowance in the amount of **\$50,000.00**
- .2 Expend Contingency Allowance as directed by Consultant, in writing, in accordance with the General Conditions and Supplementary Conditions of the Contract.
- .3 Contractor's charges for expenses and profit on Contingency Allowance expenditure shall not be included in Contract Price. Such charges shall be added to the net trade cost of each expenditure from the Contingency Allowance at the percentage rates noted Section 10 24 00, Valuation of Changes.
- .4 Credit the contract with any unused portion of the Contingency Allowance in the final payment statement.

1.25 **INDEPENDENT TESTS AND INSPECTIONS**

- .1 The Contractor shall appoint inspection firms as directed by Consultant and make payments from the cash allowances specified in Division noted, except for the following, which shall be included in the contract.
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Re-testing as described under the Quality Control subsection, below
- .2 The Consultant will authorize payment of inspection services from specified cash allowances.
- .3 Where tests or inspections reveal work not in accordance with Contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work. In the case of soil compactions, the first retest only will be considered as part of inspection allowance.
- .4 The Contractor shall furnish labour and facilities to:
 - .1 Provide access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good work disturbed by inspection and test.
 - .4 Pour concrete test cylinders and store as directed by Inspection Firm.
- .5 Notify Inspection Firms sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .6 Where materials are specified to be tested, delivery representative samples in required quantity to testing laboratory.
- .7 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Consultant.

1.26 **CASH ALLOWANCES**

- .1 Include in the Contract Price, a stipulated sum Cash Allowance in the amount of **\$65,000.00**, to be expended as outlined below, which shall apply to the following aspects of the Work:

Interior Sign Allowance - supply and installation
Rekeying Locksets (entire School)

SECTION 01 10 00 - GENERAL INSTRUCTIONS

- .2 Additional cash allowances, to be carried by mechanical and electrical Subcontractors, are included in mechanical and electrical specifications.
- .3 Cash Allowances, unless otherwise specified, cover the net cost to the Contractor of services, products, construction, machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing the Work.
- .4 The Contract Price, and not the Cash Allowance, includes the Contractor's profit in connection with such cash allowance.
- .5 The listing of a cash allowance in this section shall not be construed to imply the deletion from the base contract of any work which may be specified elsewhere. Where the expenditure of a cash allowance is not specifically outlined in the specifications, it shall be expended as per instructions and specifications to be provided by the Consultant at a later date.
- .6 The Contract Price will be adjusted by written order by the Consultant to provide for an excess or deficit to the Cash Allowance. Any unused portion of the allowance shall be returned to the Owner at the conclusion of the Contract.
- .7 A schedule shall be prepared by the Contractor to show when items called for under Cash Allowances are required, so that the progress of the Work is not delayed.
- .8 Expend cash allowances as directed by Consultant in writing. Allowances will be adjusted to actual cost with no adjustment to Contractor's charges. Cash expenditure must identify the H.S.T. separately.
- .9 Material Allowances
 - .1 Material allowances shall include the following:
 - .1 Net cost of material
 - .2 Applicable taxes and duties, excluding H.S.T.
 - .3 Delivery to site
 - .2 For Material Allowance, the contract shall include:
 - .1 Handling at site, including unloading, uncrating, storage and hoisting.
 - .2 Protection from elements, from damage.
 - .3 Labour, installation, and finishing.
 - .4 Other expenses required to do cash allowance work (ie contract co-ordination).
 - .5 Overhead and profit.
- .10 Material and Installation Allowances:
 - .1 Material and Installation Allowances shall include the following:
 - .1 Net cost of material
 - .2 Applicable taxes and duties, excluding H.S.T.
 - .3 Deliver to site
 - .4 Handling at site, including unloading, uncrating, storage and hoisting
 - .5 Labour, installation and finishing

- .2 For Material and Installation Allowances, the contract shall include:
 - .1 Protection from elements, from damage
 - .2 Overhead and profit
 - .3 Other expenses required to do cash allowance work (ie contract co-ordination)
- .11 Testing and Inspection Allowances:
 - .1 Testing and Inspection Allowances shall include the following:
 - .1 Net cost of testing and inspection firm, and laboratory services, designated and authorized by Consultant.
 - .2 Applicable Taxes, excluding H.S.T.
 - .2 For Testing and Inspection Allowances, the contract shall include:
 - .1 Overhead and profit
 - .2 Supply of material tested
 - .3 Other testing and re-testing work specified
 - .4 Other expenses required to do cash allowance work (ie contract co-ordination)

1.27 **WARRANTIES**

- .1 The following is a summary of the warranties required by the contract:

	# Years
Entire Building, General Contract	1
Concrete Floors, Concrete Slabs-on-grade	3
Cavity Wall Insulation / AV Barrier	2
Finish Carpentry	2
Architectural Casework	2
Countertops	2
Stack Jack Flashing	20
Roofing and Sheet Metal	10
Applied Fireproofing	3
Caulking and Sealants	2
Hollow Metal Doors, Frames and Screens	3
Wood Doors	3
Finish Hardware	3
Panic Devices and Door Closers	5
Aluminum Windows and Doors	3
Sealed Window Units	10
Glass and Glazing	10
Fire Rated Glass	5
Acoustic Ceilings	2
Carpet Tile	10
Resilient Sheet Flooring	5
Painting	2
Marker Boards	5
Marker Board Projection Screen	5
Tackboards	2
Interior Signage	2
Window Shades	3

SECTION 01 10 00 - GENERAL INSTRUCTIONS

Drapery & Tracks	5
Sodding	2

- .2 Additional warranties may be noted within the specification sections.

1.28 **ADDITIONAL DRAWINGS**

- .1 Consultant may furnish additional drawings to assist proper execution of the Work. These drawings will be issued for clarification only. Such drawings, however, shall have the same meaning and intent as if they were included with plans referred to in the Contract Documents.

1.29 **QUALITY CONTROL**

- .1 The Consultants and authorized Owner staff shall have access to all areas of the Work, including any off site construction facilities.
- .2 The Contractor shall give timely notice requesting inspection if Work is designated for special tests, inspections, or approvals by the Consultants, or any other authorized Owner staff, or testing and inspection company.
- .3 If the Contractor covers, or permits to be covered Work that has been designated as outlined above, he shall uncover such work, have the inspections and tests satisfactorily completed and make good such work at no additional cost to the Owner.
- .4 The Consultants or the authorized Owner Staff may order any part of the Work to be examined, if such Work is suspected not to be according to the Contract Documents. If, upon examination, such work is found not to be in accordance with the Contract Documents, then the Contractor shall correct such Work and pay for cost of examinations and correction. If such Work is found to be in full accordance with the Contract Documents, the Owner shall pay for the cost of examination and making good.
- .5 If defects are revealed during inspection and/or testing, the appointed agency may request additional inspection and/or testing to ascertain the full degree of defects. The Contractor shall correct the defects and irregularities as reported by the inspection and/or testing agency, at no additional cost to the Owner and the Contractor shall pay all associated costs for retesting and reinspection.
- .6 The Contractor shall provide any tools, materials or equipment that may be required by the inspection and/or testing agencies in retesting the Work. (E.g. Video camera rental to reinspect incorrectly installed sewer lines.)
- .7 The employment of inspection and/or testing agencies does not, in any way, affect the Contractor's responsibility to perform the Work in strict accordance with the Contract Documents.

- .8 The Contractor shall remove all defective work, whether the result of poor workmanship by him or his subtrades, use of defective or damaged products, whether or not incorporated into the Work and any Work that has been rejected by the Consultants or authorized Owner Staff as failing to conform to the Contract Documents. Replacement and execution of the affected Work shall be done in full accordance with the Contract Documents, making good other trades' work damaged by such removals or replacements at no additional charge to the Owner.
- .9 If, in the opinion of the Consultant and/or the authorized Owner Staff, it is not expeditious to correct the defective Work, or Work not performed in accordance with the Contract Documents, the Owner, may, at its sole discretion, deduct from the Contract Price, the difference in value between the work performed and that required by the Contract Documents, the amounts of which shall be determined by the Owner.
- .10 The notable exception to the above item is a faulty installation of base and asphalt paving. If, the inspection agency, after performing random test holes to determine compaction and thickness of sub base, base and asphalt, determines that either one or both, are not according to what was specified in the Contract Documents, the Owner will not accept credits for such inconsistencies but rather, demand that any such installation be removed and redone in its entirety, at the convenience of the Owner, but within the first year of the warranty period.

1.30 ENVIRONMENTAL DESIGN REQUIREMENTS

- .1 Indoor air quality is of major importance in the building. It is the intention of this Contract that the materials and products used be as low as possible in emissions of volatile organic compounds (VOCs). Low or no VOC products shall be used where these are available and suitable for the application. This is particularly of concern with regard to paints and other finishes, adhesives, sealants, and products manufactured using these materials.
- .2 Any cleaners, solvents, fuels, aerosol sprays and other chemical products used during construction should also be low VOC emitting where possible. Provide good ventilation when using any products that may emit VOCs.

1.31 START-UP

- .1 Work inside the vacant parts of school may start immediately upon receipt of Letter of Intent from Owner, and Contractors submission of start-up documents and insurance.
- .2 Some work, including selective interior demolition and alterations, surface preparation, window replacement, and roofing work may begin without a permit.
- .3 New work cannot commence without a building permit.
- .4 Refer also to phasing notes on drawings.

1.32 PAYMENT PROCEDURES

- .1 Refer to CCDC2 2008, Stipulated Price Contract, Part 5, Payment, and amendments included in Section 00 73 00, Supplementary Conditions.

SECTION 01 10 00 - GENERAL INSTRUCTIONS

- .2 Before submitting first request for payment, submit a Schedule of Values, which shall be a detailed breakdown of the Contract price, as directed by the Consultant and as per the Owner's format. Breakdown must equal Contract price. After approval by Consultant, cost breakdown will be used as basis for progress payments.
- .3 Notwithstanding the amounts indicated on the Schedule of Values for the various aspects of the Work, the Owner reserves the right to retain additional funds for some items, where listed in the specifications. This includes amounts to be retained for maintenance manuals and for commissioning, as outlined in the applicable specification sections.
- .4 Applications for payment shall list HST separately.

1.33 REQUESTS FOR SUBSTITUTIONS

- .1 Products, materials, equipment, and methods of construction included in the Contract Documents are to be used in the execution of the Work of this Contract unless otherwise accepted by the Consultant in writing. Substitute products and materials may not be ordered or installed without written acceptance from the Consultant.
- .2 Changes proposed by the Contractor are considered requests for "Substitutions". Requests for Substitutions are to be submitted only by the Contractor.
- .3 Submit a complete package, including information and documentation outlined below, for evaluation by the Consultant.
- .4 A Request for Substitution must include the following information:
 - .1 Data sheets for both the specified item and the proposed substitution, enabling side by side comparisons.
 - .2 Complete description of the proposed alternative product or material, including:
 - .1 Laboratory tests results
 - .2 dimensions, gauges, weights, etc.
 - .3 An explanation of how the proposed substitute differs from the specified product
 - .1 in physical properties
 - .2 in quality and performance
 - .4 A list of any effects the proposed substitution would have
 - .1 on service connections (wiring, piping, ductwork, etc.)
 - .2 on the work of other trades
 - .3 on construction Schedules
 - .5 Evidence that manufacturers warranties and guarantees for the proposed substitutes are the same, or exceed those required under the Contract.
 - .6 Information on the availability of maintenance services and replacement materials for proposed substitute.
 - .7 Names, addresses, and phone numbers of fabricators and suppliers for proposed substitute(s).
 - .8 Confirmation that the proposed substitution, if accepted, would have no cost impact, or indication of a credit (or extra cost) associated with the substitution.

- .5 Submissions of Requests for Substitution must be received by the Consultant well prior to any shop drawing submissions. The Shop Drawing process is not an acceptable means of requesting a substitution, and submission of drawings for products that have not been accepted will result in the automatic rejection of the Shop Drawing submission.
- .6 The burden of proof of the merit of the proposed substitution lies with the Contractor.
- .7 Substitution requests deemed incomplete or incorrect by the Consultant will be rejected.
- .8 The Consultant may require the submission of further information in order to make an informed determination on the suitability of the proposed substitution. Allow a minimum of 10 working days, upon receipt of all required information, for the Consultant's decision. Substitutions requested too late, not allowing sufficient time for thorough review by the Consultant, will be rejected.
- .9 The Owner's decision, based upon recommendations of the Consultant, of acceptance or rejection, of a proposed substitution shall be final.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROCEDURES

- .1 Changes in the Work ordered by the Consultant in accordance with the General Conditions of the Stipulated Price Contract shall be valued in accordance with the General and Supplementary Conditions of the Stipulated Price Contract and as more fully specified herein.
- .2 The standard documentation for effecting changes in the Work shall be as follows:
 - .1 Consultant's Notice of Contemplated Change issued to the Contractor on standard form and accompanied by necessary Drawings, Schedule, Details and Specifications.
 - .2 Contractor's Quotation submitted to the Consultant showing amount by which the Contract Sum shall be adjusted by way of increase or decrease if the change is ordered.
 - .3 Consultant's formal Change Order issued to the Contractor on Standard Form after Owner's approval. Formal Change Order becomes valid when signed by Consultant, Contractor, and Owner.
- .3 Where a change is not expected to result in an increase or decrease to the scope or cost of work, the Consultant may issue such change as a Jobsite Instruction. Should the Contractor determine that any part of a Jobsite Instruction will result in extra costs, or credits, they shall notify the Consultant, and request the issuance of a Notice of Contemplated Change for the relevant portion of the work. A Jobsite Instruction does not authorize work which will result in a change in the Contract Price.
- .4 Standard form of Jobsite Instruction, Notice of Contemplated Change and Change Order may be viewed at the Consultant's office during normal working hours.

1.2 VALUATION OF CHANGES

- .1 Quotations submitted by the Contractor in response to Consultant's Notice of Change shall be fully detailed and itemized to facilitate checking and processing by the Consultant. Quotations shall be submitted in triplicate and shall:
 - .1 List Work proposed to be carried out by Contractor's Own Forces showing labour, material, and equipment charges together with quantities and costs (unit rates if applicable) in the assessment of such charges.
 - .2 List Work proposed to be carried out by Subcontractors showing the amount quoted by each Subcontractor as verified by the Subcontractor's quotation which shall show labour, material, plant and equipment charges together with quantities and costs (unit rates if applicable) upon which the quotation is based.
 - .3 In evaluating a change, the net cost shall be the net difference in quantity between the original and revised Work. For example: If the change affects the omission of 3m³ and the addition of 4m³ of an item, the value of the change will be assessed by applying the net difference of 1m³ (extra) and applying the appropriate mark-up specified herein.

- .2 Unit rates are only applicable if they have been accepted by the Owner in advance and included in the Contract.
- .3 Where unit rates are not established in the Contract, quote costs as follows:
 - .1 material prices shall be the net price paid by the Contractor (or Subcontractor) after deduction of all trade discounts and the like other than reasonable discount for prompt payment.
 - .2 plant and equipment costs shall not be more than rates quoted in the latest edition of "Rental Rates on Contractor's Equipment" published by the Canadian Construction Association.
 - .3 labour costs shall be the actual rate paid to the workers in accordance with the fair wage provision of the Contract plus a "fair wage burden" mark-up of thirty-eight percent to cover Welfare contribution, Pension contribution, Vacation Pay, Trade Improvement Fund, Promotional Fund, Training Fund, Supplementary Unemployment Benefits, Check Off, Apprenticeship, Trust Fund and similar labour contract payments; Worker's Compensation Insurance, Canada Pension Scheme and other statutory charges on labour..
- .4 Unless otherwise specified in the Form of Tender, unit rates quoted in Tender and incorporated in the Contract shall include the "fair wage burden" for labour as specified in paragraph 1.2.3.3 hereof, but shall be exclusive of mark-up for overhead and profit.
- .5 Where Contract unit rates (if applicable) are to be modified:
 - .1 Where a change involves an extra/credit of more than \$10,000.00 (using Contract unit rates), a new unit rate must be negotiated to reflect a fair rate considering the volume of work involved.
- .6 "Overhead", means all expenses to carry on work, except items included in the cost as defined above, and shall include but shall not be limited to: use of Plant, tools; administrative and supervisory staff; personal vehicles, travel; bonds, insurance; health and safety protocols ; and closeout submissions.
- .7 Refer to Section 00 73 00, Supplementary Conditions, as revised and reissued by Addendum, GC 6.2 and GC 6.3, for maximum mark-ups for overhead and profit.
- .8 When work deleted from the Contract is later added back into the Contract, additional overhead and profit will not apply to the reinstated work. Overhead and profit amounts are not included in credits and so remain included in the Contract amount.
- .9 Where overhead and profit mark-ups are to be modified:
 - .1 Where a change involves an extra/credit of more than \$10,000.00, smaller mark-up percentages must be negotiated to reflect a fair mark-up considering the volume of work involved.

- .10 It shall be understood and agreed that the mark-ups specified above shall be deemed to provide for payment in full for all items that in the custom of the Construction Industry in Ontario are considered to be site or head office overhead, profit, supervision, administration and labour costs.
- .11 Claims for extras will not be considered unless they can be verified by the Consultant. Site work, excavation, backfill, footings and all below grade work must be visually inspected by the Consultant and documented by an independent third party (ie Surveyor) BEFORE the work is hidden.
- .12 The signing of a Change Order by all parties shall be deemed to be formal acceptance by the Owner of the Contractor's quotation. Following the issue of a Change Order the Owner will not entertain claims for extra payments due to errors alleged to have been made in the Contractor's Quotation.
- .13 Under no circumstances will a claim for extra be considered if it is for work recommended by the Inspection Company unless the Consultant has been advised and his approval obtained PRIOR TO THE EXECUTION OF THE WORK.

END OF SECTION

PART 1 - GENERAL

1.1 SITE SUPERVISOR

- .1 The Contractor shall be fully responsible for co-ordinating and expediting the work of all Subcontractors and shall employ a qualified Site Supervisor who shall be in full time attendance on this project.
- .2 Prior to the Preconstruction Meeting, the Contractor shall inform the Consultant of their choice for Site Supervisors and shall provide resumes outlining qualifications and related work experiences.
- .3 Site Supervisor shall have as a minimum:
 - .1 Recent, previous experience with renovation or addition projects involving occupied buildings including (but not limited to) school construction, sites with students, tenants, employees, pedestrian and vehicular traffic.
 - .2 Successful completion of a multi-session Supervisor's training course conducted by a recognised Construction Association in Ontario.
- .4 The Supervisors must be assigned to projects for the duration of the construction period, until the buildings are fully occupied by the Owner.
- .5 The Owner and the Consultant reserve the right to reject the proposed Supervisors should they feel that they are not fully qualified to assume the responsibilities of the positions.
- .6 There shall be a minimum of one full time Site Supervisor dedicated to the site.
- .7 Site Supervisor must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded during all non-work hours including weekends and holidays.
- .8 Once the Supervisors are confirmed, there will be no change permitted without the written consent of the Consultant.

1.2 CONSULTANT/CONTRACTOR MEETING

- .1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding regular "site meetings" on same day (to be determined) of every second week.

1.3 PRE-CONSTRUCTION MEETING

- .1 Immediately prior to construction, upon notification, attend at location of Owner's choice, pre-construction meeting, along with authoritative representatives of certain key Subcontractors as specifically requested by the Consultant.
- .2 Purpose of meeting is as follows:
 - .1 Review project communications procedures.

01 31 00 - PROJECT MANAGEMENT AND COORDINATION

- .2 Review contract administration requirements including submittals, payment and change order procedures.
- .3 Identify all critical points on Construction Schedule for positive action.
- .4 Identify any product availability problems and substitution requests.
- .5 Establish site arrangements and temporary facilities.
- .6 Review any items which, in the Board's, Consultant's and Contractor's opinion, require clarification.
- .7 Exchange names & addresses of all key personnel representing Owner, Consultant, Contractor and Subcontractors.
- .8 Identify Consultant's inspection requirements.

1.4 PROJECT MEETINGS

- .1 Consultant shall Chair project meetings on Site, on a regular basis and will issue minutes to Owner's Representative, Consultants, and Contractor.
- .2 Consultant shall take minutes of meeting showing:
 - .1 List of persons attending.
 - .2 Decisions taken.
 - .3 Instructions required or issued - Allocating responsibilities to action items.
 - .4 All matters discussed.
 - .5 Schedule Update - Progress, Delays.
- .3 Contractor shall provide suitable on site accommodation for meeting, attend all meetings, arrange for attendance of all necessary Subcontractors, and distribute minutes of previous meeting to Subcontractors and Suppliers as appropriate.
- .4 The Contractor's representatives at site meetings must include the project co-ordinator as well as site Supervisor.
- .5 Contractor shall hold regular co-ordination meeting with Subcontractors and shall chair and minute each meeting. Copies of minutes shall be distributed to relevant Trades and Consultants and Owner.
- .6 In addition to jobsite meetings, Contractor shall arrange for, chair, and record safety meetings and regular meetings with his Subcontractors and suppliers. He shall distribute copies of the minutes of these meetings to all Subcontractors, Owner and Consultant.

1.5 ON SITE DOCUMENTS

- .1 The Contractor shall maintain the following documents, up to date, in the site office:
 - .1 Contract Documents
 - .2 Reviewed Shop Drawings - Printed in full colour or redline
 - .3 All instructions and changes, i.e. Work Authorization, Jobsite Instructions, Notices of Contemplated Change, Change Orders, etc.
 - .4 All inspection and test reports
 - .5 Permit drawings and specifications
 - .6 Authorizations, approval documents, permits, special rulings, etc., issued for the project by Authorities Having Jurisdiction.

- .7 Details of tested assemblies being used on the project; ULC, cUL, etc.
- .8 As-Built drawings.

- .2 Confirm with building inspector, at the commencement of construction, what documents are required for submission both during construction and for occupancy. Keep copies of such documents on site. Refer also to Section 01 41 00, Regulatory Requirements.
- .3 Documents listed above shall be printed, full size documents, not only digit format.
- .4 Maintain copies of Regulating Documents referred to in the specifications, up to date, in the site office.
- .5 Maintain a file of Material Safety Data Sheets (MSDS) for all materials being used on site and make available to all concerned, in the site office.
- .6 Maintain a hard copy of available existing construction documents in the site office.

END OF SECTION

PART 1 - GENERAL

1.1 SCHEDULE

- .1 Within fifteen (15) days of contract award, submit a detailed construction schedule. Base the submission on the commencement of completion dates of the Contract and indicate specified restraints and milestones, activities and durations for shop drawing submission and approval, testing, fabrication and delivery, construction sequence and timing, interdependencies and constraints. Include the procurement activities for major structural elements, cladding, windows, and mechanical and electrical equipment. Ensure the participation of all major Subcontractors and Suppliers. Schedule must include reasonably detailed breakdown of mechanical, and electrical work.
- .2 Schedule shall show:
 - .1 Commencement and completion dates of Contract.
 - .2 Commencement and completion dates of stipulated stages.
 - .3 Commencement and completion dates of Trades.
 - .4 Order and delivery times for materials and equipment, where possible.
 - .5 Dates for submission of Shop Drawings, material lists and samples.
 - .6 Any other information relating to the orderly progress of Contract, considered by Contractor to be pertinent.
- .3 The schedule shall be reviewed and updated at every Site meeting.
- .4 Include with each update a written report of activity progress reflected in the revised Schedule, and the corrective actions which have been made or are to be taken to maintain progress on the schedule in the future, anticipated delays, resources availability, schedule changes, and work to be completed in the next 2 month period.

1.2 UPDATING AND MONITORING

- .1 Set up format of Construction Schedule to allow plotting of actual progress against scheduled progress.
 - .1 Allow sufficient space for modifications and revisions to the Schedule as Work progresses.
 - .2 Format shall be approved by the Consultant.
- .2 Display copy of Schedule in Site office during complete construction period and plot actual progress weekly.

01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION**.3 Updating:**

- .1 Arrange participation, on Site and off Site, with Subcontractors and Suppliers, as and when necessary for the purpose of updating schedule and monitoring progress.
- .2 Conduct reviews of progress and update schedule, distributing copies to Consultant, Owner and Sub-Trades at least once a month or as directed by Consultant.

1.3 PROGRESS REPORTS

- .1 Keep a permanent written report on the Site of progress of the Work. This record to be open to review by the Consultant. A copy to be furnished to the Consultant upon request.
- .2 Indicate daily the number of persons engaged on the work (including subtrades) and the division and section of the work upon which each group of workers is engaged, in sufficient detail to record dates of construction of each particular section of work.
- .3 Record to show dates of commencement and completion of trades and parts of the work coming under the Contract, including reports on daily weather conditions, excavation work, erection and removal of forms, and other similar pertinent information.
- .4 Report delays (and potential delays) giving reason for delay and action being taken to resolve the problem.

1.4 PROGRESS PHOTOGRAPHS

- .1 Concurrently with monthly application for payment, submit electronic format colour images clearly showing overall progress of Work. Include, in particular, any work completed since the most recent site meeting and Consultant field review.

1.5 QUALITY OF WORK / STATUS REPORTS

- .1 The Contractor shall take full responsibility for the quality of work on site. The Contractor shall furthermore notify workers of deficient work immediately upon receipt of notification of deficiencies by the Consultant, Subconsultants and/or Owner.
- .2 The Contractor shall provide a monthly status report on the status of deficiencies identified by the Consultant and Subconsultants. The report shall include a description of each deficiency, status of the deficiency, description of corrective action taken, value (cost) to the correct deficiency and trade (person) responsible for deficiency. The report shall be typewritten on the Contractors letterhead. A copy of the report format shall be submitted at least 2 weeks prior to the first progress draw, for review. Submit monthly status reports with each progress draw.
- .3 After Substantial Performance, the Contractor shall continue provide the deficiency status reports on a monthly basis, including updated lists of deficiencies identified by the Owner and consultants.

END OF SECTION

PART 1 - GENERAL

1.1 BEFORE COMMENCEMENT OF WORK

- .1 Obtain the documents listed under this heading and supply to Consultant within the time stipulated in the Specification, or if not so stipulated, before issue of the first Certificate.
 - .1 Performance Bond/Labour and Material Bond.
 - .2 Insurance Policies required under General Conditions of Contract - Insurance.
 - .3 Certificates of good standing from the Workplace Safety & Insurance Board for the Contractor and all Subcontractors.
 - .4 Shop Drawing Schedule.
 - .5 Permits required for work of Mechanical Trades (Divisions 21, 22 23, and 25) and Electrical Trades (Divisions 26, 27 and 28).
 - .6 Permits for temporary structures, hoists, etc.
 - .7 Schedule of Values: Refer to General Conditions of Contract.
 - .8 Estimate of monthly progress claims (cash flow schedule).
 - .9 Construction Schedule.
 - .10 Equipment Delivery Schedule.
- .2 Concurrently, with schedule of values, submit cash flow schedule broken down on a monthly basis, indicating anticipated monthly progress billings for duration of the Contract.
- .3 Submit schedule in a format acceptable to the Consultant. Indicate anticipated submission dates and review periods. Highlight critical items.
- .4 Submit, in a format acceptable to the Consultant, a list of manufactured equipment complete with order dates, anticipated delivery dates, and dates required on site to meet progress schedule. Update schedule at least once a month or more often if directed by the Consultant. Clearly indicate late deliveries and anticipated impact on construction schedule. Include in schedule required delivery dates for products supplied by Owner.
- .5 Schedule of Values:
 - .1 Before submitting first request for payment, submit a detailed breakdown of the Contract price, as directed by the Consultant and as per the Owner's format. Breakdown must equal Contract price. After approval by Consultant, cost breakdown will be used as basis for progress payments.

01 33 00 - SUBMITTAL PROCEDURES**1.2 DOCUMENTS AND ACTION REQUIRED DURING PROGRESS OF CONTRACT**

- .1 Perform the action and/or obtain the documents listed under this heading and supply to the Consultant, within the time stipulated in the Specification or, if not so stipulated, as soon as possible following Consultant's request.
- .2 Submit preconstruction survey, required under Section 01 71 23, Field Engineering.
- .3 Adjust Cash Allowances by award of separate Contracts, where appropriate.
- .4 Documents specified under Section 01 10 00, General Instructions and Section 01 33 23, Shop Drawings, Product Data and Samples.
- .5 Progress photographs, submitted concurrently with monthly application for payment. Refer to Section 01 32 00.
- .6 Any permits required from Authorities Having Jurisdiction enabling Owner to occupy the work (or part thereof) prior to Substantial Performance of the Contract.
- .7 As-Built Documents:
 - .1 The Owner requires as-built documents for all architectural, structural, mechanical and electrical changes on completion of the construction.
 - .2 The Contractor, and mechanical and electrical Subcontractors shall obtain, from the Consultant, a complete and separate set of white prints of Contract Drawings and Project Manual to keep on the site at all times.
 - .3 The drawing prints shall be marked up by responsible personnel of the Contractor and Subcontractors to record clearly, neatly, accurately and promptly showing all locations of buried structural, mechanical and electrical work and deviations from the contract documents.
 - .4 The Project Manual shall be similarly marked up to reflect deviations from the Contract Documents, as well as indicate materials used, colours selected, etc.
 - .5 The accurate location, depth, size and type of each underground utility and service line shall be recorded before concealment to ensure accurately directed future access to these buried lines.
 - .6 The as-built documents will be reviewed at regular intervals by the Consultant and the quality of performance by the Contractor and Subcontractors in developing these records will be taken into consideration when reviewing the monthly applications for payment submitted by the Contractor.
 - .7 Prior to the date of Substantial Performance, request from the Consultant updated drawings incorporating all changes made to the building through Change Orders and Jobsite Instructions. Transfer all recordings from the white prints to these updated drawings and return them to the Consultant, as specified in Section 01 78 00, Close-out Submittals.

- .8 Mark "as-built" changes in red coloured ink.
- .9 Record following information:
 - .1 Depth of various elements of foundation in relation to first floor level if different from contract documents.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Order or Supplementary Instructions.
- .10 Clearly mark each of the drawings, "Project As-Built Record Copy".
- .11 Final completion of these Drawings shall be a condition precedent to the issuance of Consultant's final payment certificate.
- .12 Refer to Mechanical and Electrical Specification Divisions for more specific requirements regarding preparation and submission of final Record Drawings.

END OF SECTION

PART 1 - GENERAL

1.1 SCHEDULE

- .1 Within 5 working days after award of Contract, prepare and submit to Consultant for comment, a schedule fixing the dates for the submission of all Shop Drawings, product data and samples.
- .2 Allow reasonable promptness for Consultant to review submissions, exclusive of time required for inter-office transmissions.
- .3 All shop drawings must be reviewed and stamped by the Contractor prior to submission to the Consultant.

1.2 GENERAL

- .1 Submit to Consultant, for review, Shop Drawings, Product Data, Samples, and other required submittals specified.
- .2 All shop drawings and related submittals must be reviewed and stamped by the Contractor prior to submission to the Consultant.
- .3 Until submittal is reviewed, Work involving relevant product may not proceed.
- .4 Do not use for construction, Shop or setting Drawings or diagrams which do not bear Consultant's stamp and name of reviewer.
- .5 Shop drawing reviews do not authorize changes in cost or time, which may only be accomplished by an appropriate Change Order issued through the Consultant.
- .6 Shop drawings shall be for products as specified or otherwise approved by the Consultant. The shop drawing process is not a means of requesting substitutions. Refer to Section 01 10 00, for the process for requesting approval of substitutions.
- .7 Submission and subsequent review of Shop Drawings constitute a service and does not entitle the Supplier or Subcontractor to the right to remuneration until the materials are supplied and installed on the Site in accordance with the Contract.
- .8 The Contractor must include for delivery and pick up of shop drawings to/from the Consultant by hand or courier.
- .9 The Contractor must include for reproduction of shop drawings after review by the consultants.

1.3 SHOP DRAWINGS

- .1 Drawings shall be copies of original drawings prepared by Contractor, subcontractor, supplier or distributor, for the work of the Contract which illustrate appropriate portions of the Work. Shop drawing submissions shall show pertinent information for incorporation of the products and equipment, including the following, as applicable:
 - .1 fabrication details
 - .2 dimensioned layout drawings, including clearances, with site dimensions

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- .3 relationship to adjacent work
 - .4 setting or erection details
 - .5 performance requirements
 - .6 operating weights of equipment
 - .7 installation instructions
 - .8 service connection requirements, including wiring diagrams
 - .9 single line and schematic diagrams
 - .10 additional information as may be specified in applicable Specification Sections.
- .2 Note that some shop drawings are required to be approved by a Professional Structural Engineer in the Contractor's employ. These include:
- .1 structural steel
 - .2 reinforcing steel
 - .3 mechanical and electrical equipment - structural supports
 - .4 and other items as required in the specifications.
- .3 Submit Shop Drawings with transmittal forms listing:
- .1 the project name and number
 - .2 the names of the manufacturer, supplier, subcontractor
 - .3 the applicable Drawing numbers
 - .4 the number of copies
 - .5 the names of the items included the submittals
 - .6 number of Specification section to which the Shop Drawings refer
 - .7 dates and revision numbers, and submission numbers
- .4 All dimensions on shop drawings must be in metric.
- .5 Where approvals are required by Authorities having jurisdiction, submit Shop Drawings to those authorities and obtain the approvals required.
- .6 On Shop Drawings for fire rated assemblies show required fire rating and ULC design numbers.
- .7 Submit two (2) to five (5) copies of printed shop drawings as follows:
- .1 Submissions shall be in sufficient quantities for distribution to all reviewers, plus one copy to be returned to the Contractor for reproduction and distribution.
 - .2 The prime Consultant requires one copy of every submission, of all disciplines.
 - .3 Each sub-consultant, of each discipline, will retain one copy of the shop drawings. Where one sub-consultant is responsible for the review of more than one discipline, they will require multiple copies, as applicable.
 - .4 For architectural submissions which do not need to be reviewed by sub-consultants, only two copies are required.
 - .5 Refer to sections prepared by the sub-consultants for possible variations on these requirements.

- .8 Email Submission:
- .1 Submittals that are formatted for 11" x 17" (279 x 432mm) sheets or smaller may be submitted by email, provided the total number of pages, for the entire submission, does not exceed 15.
 - .2 Submittals must be submitted in the same size and scale as they were originally prepared. Drawings may not be reduced in size for email transmission.
 - .3 If acceptable to the individual reviewers, larger format submittals and larger volume submittals may be reviewed by email submission. The Contractor must subsequently print and submit full sized, red line copies of such reviewed documents to the Consultant.
 - .4 Email submissions must be in pdf format and must be high quality documents, preferably generated by computer from the original documents (rather than scans of printed documents). If digital submissions are of insufficient quality, hard copies will be required.
 - .5 Emailed documents shall be reviewed and stamped digitally by the Contractor, or accompanied by a separate sheet from the Contractor listing the documents reviewed and bearing the Contractor's review stamp, along with copies of any revisions made.
 - .6 Email submission is only used as a convenient means of distributing drawings, in lieu of sending hard copies by courier. Reviewed drawings must still be printed for job site files, record copies, etc. All site copies shall be red line prints or colour prints.
- .9 Drawings shall be of a size and quality which will be readily reproduced. Shop drawings must be certified to have been reviewed and corrected by Contractor and sub-contractor responsible for forwarding to the Consultant.
- .10 Shop drawings are to be to scale. Scale shall be large enough to adequately review details included. Provide site measured dimensions on drawings wherever possible.
- .11 All requirements for shop drawings apply also to resubmissions of shop drawings, as may be required by the Consultant.
- .12 Revise all reviewed shop drawings to incorporate Consultant's comments. One complete set of final, revised Shop Drawings, used for construction, shall be submitted to the Consultant.

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- .13 Shop Drawings are required for the following items:

Building Layout	Hollow Metal Work
Construction Sign and Hoarding	Aluminum Windows and Doors
Concrete and Masonry Reinforcement	Hardware Schedule and Data
Masonry Anchorage and Reinforcement	Resilient Flooring
Structural Steel	Manufactured Specialties
Architectural Metals	Signage
Woodwork and Casework	Visual Display Boards
Roof Accessories	Projection Screens
Wood Doors	Window Shades

Mechanical and Electrical Equipment as listed in those specification sections
Other items as may be requested within the specifications

- .14 Refer also to the General Conditions of the Contract and Section 00 73 00, Supplementary Conditions.

1.4 PRODUCT DATA

- .1 Certain Specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of Shop Drawings.
- .2 The above will be accepted if they conform to the following:
- .1 Delete information which is not applicable to project.
 - .2 Supplement standard information to provide additional information applicable to project.
 - .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.
 - .5 Indicate operating weight of equipment.
 - .6 Show wiring diagrams and controls.
 - .7 Add to standard sheet the Project identification data.

1.5 SAMPLES AND MOCK-UPS

- .1 Where specified, shown or considered necessary, submit duplicate samples for Consultant's approval.
- .2 Where colour, pattern or texture is to be selected, submit full range of physical samples.
- .3 Samples must correspond in every respect to materials supplied for project.
- .4 Construct field samples and mock-ups at locations acceptable to Consultant.
- .5 Construct each sample or mock-up complete, including work of all trades required to finish work.
- .6 Do not proceed with fabrication or delivery of materials until samples are approved.
- .7 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.

- .8 Approval of samples does not imply acceptance of finished work.

1.6 **MOCK-UP CLASSROOM**

- .1 A typical classroom, selected by the Contractor, shall be finished out as soon as the drywall work has begun inside the building.
- .2 Classroom shall be complete with all finishes and devices including lights, electrical outlets and devices including faceplates, P.A. device, thermostats, chalkboards and tackboards. Walls shall be painted and ceiling, floor and base in place. The mock-up of typical installation must be approved by the consultant prior to commencement of finished trades in other classrooms.

1.7 **CONTRACTOR'S RESPONSIBILITY**

- .1 Prior to submission to the Consultant, review all shop drawings, samples, product data, and other required submittals as follows:
 - .1 Verify that the submission is for products as specified, or otherwise approved by the Consultant.
 - .2 Ensure that the submission is complete.
 - .3 Note any potential interference issues and co-ordinate with the trades to avoid these conflicts.
 - .4 Verify:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.
- .2 Coordinate each submittal with requirements of Work and Contract Documents. Refer to Section 01 10 00, General Instructions, and the subsection on Coordination.
- .3 Notify Consultant, in writing at time of submission of any deviations in submittal from requirements of Contract Documents.
- .4 Stamp, initial or sign each Drawing, certifying approval of submission, verification of field dimensions and measurements and compliance with Contract Documents, prior to submission to the Consultant(s).
- .5 The Contractor shall be responsible for reproducing and distributing reviewed shop drawings, except for those copies required by the Architect and Consultants.
- .6 After Consultant's review, distribute copies as follows:
 - .1 Job Site file (2 copies) - colour or redline copies
 - .2 As-built documents file.
 - .3 Other prime contractors.
 - .4 Subcontractors.
 - .5 Supplier.
 - .6 Fabricator.

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- .7 Authorities having jurisdiction, where required by Codes and/or By-Laws, i.e. structural steel and sprinklers.
- .8 Owner's Maintenance Manual (revised, as-built copies).
- .7 Distribute samples as directed by the Consultant.
- .8 Ensure that all samples are approved by authorities having jurisdiction, supplier for correct application in Project, and other parties such as Owner in time to permit approval prior to ordering of quantity delivery to Site.
- .9 The Contractor shall advise all Trades, Subcontractors and suppliers of the limits of the Consultant's responsibility with respect to Shop Drawings and other submittals, as detailed below.

1.8 CONSULTANT'S RESPONSIBILITY

- .1 With reasonable promptness from the receipt of samples and Architectural shop drawings, the Consultant shall review them and return them to the Contractor. Allow 15 working days for review of shop drawings.
- .2 Review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor, 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. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the processes or techniques of construction and installation and for co-ordination of the work of all subtrades.
- .3 Shop drawing markings shall be interpreted as follows:
 - .1 Shop drawings marked "REVIEWED" by Consultant and/or Subconsultants are released for construction.
 - .2 Shop drawings marked "REVIEWED AS NOTED" by the Consultant or his Subconsultants are also released for construction, after revisions noted are made; with final copies sent to the Consultant.
 - .3 Shop drawings marked "REVISE AND RESUBMIT" by the Consultant or his Subconsultants are NOT released for construction and must be resubmitted after being revised in accordance with the consultants' comments.
 - .4 Shop Drawings marked with the Consultant's "RECEIVED" stamp only have not been reviewed by the Consultant.
- .4 Review by the Architect does not in any way constitute review of the design of engineering elements, which form part of the Contract Document's prepared by others.
- .5 Shop drawings for products that are not a specified item, or an approved substitution, will be rejected without being reviewed.
- .6 Shop drawings which have not been requested will be returned to the Contractor with no action taken by the Consultant.

- .7 The Architect will use the following stamps in reviewing Shop Drawings:

Date:
RECEIVED
MOFFET & DUNCAN ARCHITECTS INC.

"Review by Moffet & Duncan Architects Inc. does not in any way constitute review of the design of engineering elements, which form part of the Contract Documents prepared by others."
MOFFET & DUNCAN ARCHITECTS INC.

REVIEWED	<input type="checkbox"/>
REVIEWED AS NOTED	<input type="checkbox"/>
REVISE AND RESUBMIT	<input type="checkbox"/>
<p>"This review by Moffet & Duncan Architects is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Moffet & Duncan Architects Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or his responsibility for meeting all requirements of the Construction and Contract Documents. 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 co-ordination of the work of all sub-trades."</p> <p>MOFFET & DUNCAN ARCHITECTS INC.</p>	
REVIEWED BY	
DATE	
PROJECT No.	

END OF SECTION

PART 1 - GENERAL

1.1 CONSTRUCTION SAFETY

- .1 Observe and enforce construction safety measures required by the National Building Code of Canada, Canadian Construction Safety Code, Ontario Occupational Health and Safety Act, Workplace Safety & Insurance board (WSIB) and Municipal Statutes and Authorities.
 - .1 The Contractor is again reminded that the Contractor is responsible for Occupational Health and Safety on this project. The items listed below are only guidelines of the Owner's expectations in this regard and not to be construed to be comprehensive or total in nature.
- .2 In particular, the Ontario Construction Safety Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced.
- .3 In event of conflict between any provisions of above authorities the most stringent provisions will apply.
- .4 The Owner will take every reasonable precaution to prevent injury or illness to students, employees and the public, participating in Owner activities, or performing their duties. This shall be accomplished by providing and maintaining a safe, healthy working environment and by providing the education necessary to perform these activities or duties safely.
- .5 The Owner is also vitally interested in the health and safety of Contractors and their workers performing work for the Owner. Cooperation and support of the Contractor in the protection of the workers from injury or occupational disease is a major, continuing objective of the Owner. To achieve these goals, the Owner, in concert with the Contractors, will endeavour to make every effort to ensure that the Contractors provide a work site which is a safe and healthy work environment. The Owner insists that all Contractors and their workers are dedicated to the continuing objective of reducing risk and injury.
- .6 The Contractor covenants and agrees to comply with all statutory and other obligations, including without limitation, the provisions of the Occupational Health and Safety Act (Ontario) and all Regulations thereto, and all amending and successor legislation, in connection with all work performed by either the Contractor, Sub-contractors, or any Other Contractor on, or in connection with, the Project.
- .7 Without limiting the foregoing, for the purposes of this Contract, the Contractor agrees that it shall be the "constructor" of the Project within the meaning of the Act, and as such, shall assume all the obligations and responsibilities, and observe all construction safety requirements and procedures, and duties of inspection imposed by the Act on the "constructor", as therein defined, for all work and services performed by the Contractor, Subcontractors and Other Contractors on or in connection with the Project. The Contractor further covenants and agrees that the Owner and its existing and former officers, trustees, employees and agents, and their respective heirs, executors, administrators, successors and assigns shall be released from any obligations or liabilities otherwise imposed on the Owner, or on any of them, pursuant to the Act in connection with the Project, and that the Contractor shall assume all liability and responsibility in connection with same. The Contractor agrees to save harmless and indemnify the Owner from any losses, damages, costs and expenses of any kind, or nature whatsoever, including all

SECTION 01 35 20 - SAFETY REQUIREMENTS

legal expenses, and all defence costs and related expert or consulting fees, incurred by the Owner, or any of them, arising in connection with the failure, default, or inability of the Contractor of the Owner, or any of them, to comply with any of the aforementioned statutory, or other legal requirements, or arising in connection with any breach by the Contractor of any of its covenants, agreements and obligations under this Contract.

- .8 The Contractor shall inform and instruct Other Contractors that they, while performing work on this project, are under the authority of the Contractor. Other Contractors are to discuss and co-ordinate with, and follow instructions from, the Contractor on all matters of site access, vehicles, deliveries, storage, temporary facilities, coordination with the work of other subcontractors, work methods, scheduling, labour conditions, construction safety, environmental protection, security and all other matters which relate to the safe and proper execution of construction work.
- .9 The Contractor shall ensure that all supervisory personnel on job site are fully aware of the procedures and requirements outlined herein and comply with all requirements specified.
- .10 All contractors are responsible to ensure that all machinery and/or equipment are/is safe and that the workers perform their tasks in compliance with established safe work practices or procedures. Workers must receive adequate training in their specific work tasks to protect their health and safety.
- .11 The Contractor shall be responsible for all persons and companies performing work, including other Contractors, on this project, at all times, up to and including, the date of Substantial Performance of the Work. Authority for coordination and instructions relating to all matters which relate to the safe and proper execution of construction work shall rest with the Contractor. The Contract Price will include the Contractor's fees for the coordination and supervision of the work of all other contractors.
- .12 In addition to the responsibility of all contractors as outlined in 1.1.10, above, Subcontractors will be held accountable for the health and safety of workers under their supervision.
- .13 Every worker must protect his/her own health and safety by working in compliance with the law and with safe work practices and procedures established by the authorities having jurisdiction.
- .14 All sections of the Occupational Health and Safety Act for Industrial Establishments, latest edition, and the Occupational Health and Safety Act for Construction Projects, latest edition, shall be enforced, by the Contractor, in their entirety, throughout the duration of the construction project.
- .15 The Contractor shall provide the Consultant with the telephone number where the Contractor or his representative can be reached at any time, day or night, for the duration of the contract.

- .16 Where an accident, explosion, or fire causes a person injury at the work place, and the worker is disabled from performing the usual task, the Contractor shall prepare a written notice and shall forward same to the Ministry of Labour within four days of the occurrence with a copy to the health and safety representative or the Joint Health and Safety Committee, containing such information and particulars as may be prescribed.
- .1 Where a person is killed or critically injured from any cause at the work place, the Contractor shall immediately call the Ministry of Labour. A written notice from the Contractor shall be given to the Ministry of Labour within forty-eight hours after the occurrence, containing such information and particulars as may be prescribed, with copies to the Consultant and the Owner's Representative.
- .2 The Contractor is advised that the accident scene is under the jurisdiction of the Ministry of Labour and no wreckage, articles, etc., shall be interfered with, disturbed, destroyed, altered or carried away at the scene, or connected with the occurrence, until the Ministry of Labour has given permission.

1.2 REPORT ACCIDENTS

- .1 Promptly report in writing to the Consultant all accidents which cause death, personal injury or property damage, arising out of or in connection with the performance of the work on or adjacent to the site. Where death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Consultant and to the relevant public authorities.
- .2 If any claim is made by anyone against the Contractor or Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Consultant giving full details of the claim.

1.3 FIRST AID FACILITIES

- .1 Provide at the site the equipment and medical facilities necessary to supply first-aid service to anyone who may be injured in connection with the Work, and to conform to the requirements of the authorities having jurisdiction over the Work.

1.4 FIRE SAFETY REQUIREMENTS

- .1 The appropriate clauses of the Ontario Building Code, Ontario Fire Code, National Building Code of Canada and National Fire Code relating to fire safety and protection shall be strictly followed.
- .2 Provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.
- .3 Provide sufficient temporary standpipes and connections, fire hose, valves, temporary cabinets, extinguishers, etc. to comply with the requirements of the governing Municipal and Provincial authorities.
- .4 Make necessary adjustments and modifications to temporary fire protection as required during progress of the work. Remove such temporary work when permanent system is installed and operating.

SECTION 01 35 20 - SAFETY REQUIREMENTS

- .5 Conform to "Guidelines for Maintaining Fire Safety During Construction in Existing Buildings", provided by the Office of the Ontario Fire Marshal.
 - .1 Maintain existing exits and access to exits. Where an exit must be blocked, provide an alternate exit acceptable to Authorities Having Jurisdiction.
 - .2 Provide minimum 45 minute rated fire separations at junction between existing corridors in occupied spaces and new corridors under construction. Any required access through these partitions shall be with rated doors, frames with closers and latching.
 - .3 Maintain exiting fire department access route or provide new, or temporary, access route acceptable to the fire department.
 - .4 Do not store combustible materials adjacent to existing building or where such materials could pose a fire hazard to the building or the occupants.
 - .5 Cover existing windows exposed to construction with 16mm gypsum board on steel stud framing, on interior side of such windows. Louvres shall be similarly protected. Replace doors exposed to construction with hollow metal doors.
 - .6 Where temporary openings are made in existing floors, pack with mineral wool insulation to create temporary fire barrier.
 - .7 Existing fire alarm system is to be kept operational throughout the construction period. Keep fire department informed of any temporary shutdowns and arrange for alternate fire safety measures to be implemented during that period.
 - .8 Refer to the Ontario Fire Code for requirements for temporary shutdown of fire protections systems, including sprinklers and standpipe systems.
 - .9 Modify Fire Safety Plan in accordance with the Fire Code, when required to facilitate construction. Such modifications shall be determined in cooperation with the Owner and the local fire department.

1.5 OVERLOADING

- .1 Ensure no part of Work is subjected to a load which exceeds the design live loads shown on the structural drawings. Ensure that scaffolding and false work are not overloaded. Do not cut load bearing members without approval of Consultant.

1.6 FALSEWORK

- .1 Design and construct falsework in accordance with CSA S269.1 latest version.

1.7 VISITORS

- .1 Provide hard hats for use by all visitors.

1.8 ADDITIONAL REQUIREMENTS FOR OCCUPIED SITES

- .1 Parts of the school will be occupied throughout the academic year. When school is in session, additional safety requirements will apply, as outlined below.
- .2 Flagman:
 - .1 Provide a full-time flagman during movement of construction equipment and / or materials.
 - .2 The location of the Flagman shall be coordinated with the Owner, to ensure the safe guarding of staff, students, and the general public.
 - .3 Flagman shall be a designated person, not the Site Supervisor or other construction worker, and shall not be changed during the Project unless approved by the Owner.
 - .4 Flagman must have means of communication with Site Supervisor (phone or walkie-talkie).
 - .5 Flagman shall meet and escort all construction traffic from the site entrance into and out of the construction area, from street through entrances to hoarding. No unaccompanied construction vehicles will be permitted on School Board property, outside of construction enclosure.
 - .6 Flagman shall control construction parking at the school site. Parking shall be as designated by Owner and school Principal.
 - .7 Contractor may provide a temporary shelter for the flagman, if necessary or desired, the cost of which shall be included in the Tender Price.
 - .8 Flagman shall be properly outfitted to carry out his duties, with appropriate safety clothing and equipment, including reflective vest, hand-held "Stop" sign and a visible identification tag.
- .3 Access Control:
 - .1 The Contractor shall instruct all suppliers and subcontractors that they are required to contact the Site Supervisor by cell phone prior to entering the site, and await escort by the flagman.
 - .2 Site Supervisor shall then advise the flagman to meet and escort the vehicle.
 - .3 Gates of construction enclosure must remain closed and locked at all times and only opened for the time required for access/egress of authorized vehicles or personnel.
- .4 Site Communication
 - .1 The Contractor shall provide the Owner and Principal with an emergency contact telephone number at which the Site Supervisor or other Contractor representative can be contacted directly during work hours and with voicemail available at all other times, including weekends and holidays, which will be checked regularly.
 - .2 Site Supervisor and flagman must have means of direct communication available at all times during work hours.
 - .3 Contractor shall be in daily communication with the school Principal to determine any activities which may involve safety concerns, whether school related or construction related.

1.9 SIGNAGE

- .1 Provide signage indicating " Danger - Keep Out", "Hard Hats must be worn at all times", "Safety Shoes must be worn at all times", "No Trespassing", etc., mounted on all sides of Site, and additional signs as necessary to adequately warn the public and workmen of the inherent dangers of the site and requirements to maintain personal safety. Safety Signage is also required at all construction entrances.
- .2 During the school year, signage posted at gates shall state restrictions on hours of entry and egress, as agreed to by the Owner and Principal, and under no circumstances shall construction traffic be allowed within 30 minutes prior to school start, during recess, lunch break, and within 30 minutes after school dismissal.

END OF SECTION

PART 1 - GENERAL

1.1 HAZARDOUS MATERIALS

- .1 The Ontario Occupational Health and Safety Act requires the Owner to provide a list of Designated Substances to all prospective Contractors and they in turn must supply the list to their sub-trades who are likely to handle or disturb the material.
- .2 The Owner commissioned a survey of hazardous building materials and identified asbestos and other hazardous materials in the building; refer to the Hazardous Materials Report included in the Supplementary Information volume.
 - .1 Abatement of hazardous materials is to be carried out under this Contract.
- .3 In accordance with the Ontario Health and Safety Act and regulations enacted under the Act the Contractor and sub-trades shall take appropriate precautions for the building and their work force. Such precautions may include, for the substances listed, the measures outlined below.
- .4 Remove, transport, and dispose of hazardous materials in accordance with applicable laws, including the following:
 - .1 Occupational Health and Safety Act, R.S.O. 1990, c. O.1., including the following regulations made under the Act:
 - .1 O.Reg. 213/91, Construction Projects, amended to 345/15 and
 - .2 O.Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations amended 479/10.
 - .2 Regulations for the transport of asbestos waste, including:
 - .1 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
 - .2 Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1
 - .3 Environmental Protection Act, R.S.O. 1990, C. E.19, and regulations under the Act, including:
 - .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
 - .2 O.Reg. 103/94 Industrial, Commercial and Institutional Source Separation Programs
 - .3 R.R.O. 1990, Reg. 347: General - Waste Management
- .5 Where a friable building material is found enclosed in a wall, floor or ceiling such as fireproofing, insulation on pipe or ducts etc. (that is not fibrous glass) or an acoustical textured material (stucco) or a non-friable material such as cement board or cement pipe, the Contractor shall refer to the Consultant who shall contact the Owner for further direction.
- .6 Prior to the disposal of building materials a leachate toxicity test in compliance with Water Management Regulation (Revised Regulation of Ontario 1990/Regulation 347) may be required by the local waster receiving site or the Ontario Ministry of Environment and Energy. Prior to disposal these authorities should be consulted with, and tests performed where required.

END OF SECTION

PART 1 - GENERAL

1.1 REGULATING DOCUMENTS

- .1 Conform to the Ontario Building Code (Ontario Reg. 332/12), Ontario Fire Code (Ontario Reg. 213/07), Accessibility for Ontarians with Disabilities Act (Ontario Reg. 191/11), National Building Code of Canada 2010, 2012 Canadian Electrical Code (CEC), CSA B44 - Safety Code for Elevators and Escalators, CSA W59 - Welded Steel Construction, The Occupational Health and Safety Act, Ontario (R.S.O. 1990), the National Fire Code, the local municipal Fire Code, and all other applicable Codes and Building By-Laws. Conform to the requirements of the authorities having jurisdiction, such as public utilities. Where required under The Occupational Health and Safety Act, engage a Professional Engineer to design formwork and falsework for concrete.
- .2 Contract forms, codes, standards and manuals referred to in these specifications are the latest published editions at the date of close of tenders. Meet or exceed requirements of specified standards.
- .3 Provide copies of documents referred to in the Specification for joint use of Contractor and Consultant, on site.

1.2 DOCUMENTS REQUIRED BY BUILDING INSPECTOR

- .1 Confirm with building inspector, at the commencement of construction, what documents are required for submission both during construction and for occupancy. Keep copies of such documents on site.
- .2 At the time of request for occupancy, submit a complete package of all required documents to the building inspector. The package shall contain all documents required for the inspector's sign off for occupancy, and should be expected to include the following documents:
 - .1 Copies of Consultant's General Review Reports
 - .2 Copies of General Review Reports of consulting engineers
 - .3 Geotechnical testing and inspection reports confirming bearing capacity of soils
 - .4 Consultant's and engineers' letters confirming project is ready for occupancy in accordance with the provisions of the Ontario Building Code, Division C, section 1.3.3, Occupancy of Buildings.
 - .5 Structural steel inspection reports certifying conformance to CSA Standards S16, S136 and A660.
 - .6 Concrete testing reports and inspection reports for reinforcing steel.
 - .7 Roof inspection reports.
 - .8 Verification of compliance with tested designs for rated assemblies.

SECTION 01 41 00 - REGULATORY REQUIREMENTS

- .9 Verification of Fire Protection Systems including:
 - .1 Verification of engineer supervised sprinkler, standpipe and hose system testing.
 - .2 Material and test certificates for all work, including below ground, in conformance with NFPA-13 and NFPA-14, as applicable.
- .10 Verification of Fire Alarm System as follows:
 - .1 Testing to CAN/ULC S537
 - .2 Installation to CAN/ULC S524
 - .3 Monitoring to CAN/ULC S561
- .11 Additional documents as required by the municipality.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

- .1 This section describes typical abbreviations and acronyms used in these specifications and on the drawings and schedules.
- .2 When references are made in these specifications to the standards, specifications, or other published data of various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only.
- .3 The list of abbreviations and acronyms is provided to aid in the interpretation of notations in the construction documents and shall not be used to alter the meaning of notes for which the meaning is readily inferable from the context.
- .4 Abbreviations and acronyms can have more than one meaning. Their use shall be considered with respect to different subjects and disciplines where the context in which each is used makes the meaning clear.
 - .1 Example:
 - .1 CB on floor plans typically refers to a chalkboard
 - .2 CB on site plans typically refers to a catchbasin
 - .3 CB on electrical plans typically refers to a circuit breaker
- .5 Where additional or alternate abbreviations and acronyms are listed and used on drawings, schedules, and in the specification sections prepared by subconsultants, those shall apply to the documents on which they are noted.
- .6 Discrepancies shall be noted and brought to the Consultant's attention for interpretation.

1.2 LIST OF ABBREVIATIONS

A

AB	Air Barrier
A/B	Anchor Bolt
AC	Air Conditioning
ACT	Acoustic Ceiling Tile
ADD	Addendum
ADJ	Adjustable
AFF	Above Finished Floor
AFG	Above Finished Grade
AHU	Air Handling Unit
ALM	Alarm
ALUM	Aluminum
ANN	Annunciator Panel
ANO	Anodized
AODA	Accessibility for Ontarians with Disabilities Act
AUTO	Automatic
A/V	Audio Visual or Air/Vapour
AVB	Air/vapour Barrier
AWT	Acoustic Wall Treatment
AWU	Acoustic Wall Unit

B

BD	Board
BEV	Bevelled
BF	Barrier-free
BH	Bore Hole
B/H	Bulkhead
BIT	Bituminous
BLDG	Building
BLK	Concrete Block
BM	Beam
B/M	Bench Mark
BN	Bull Nosed
BOT	Bottom
BP	Bearing Plate
BRDG	Bridging
BRK	Brick
BUR	Built-up Roofing
BV	Block Vent

DIVISION 01 - GENERAL REQUIREMENTS**NORWOOD DISTRICT HIGH SCHOOL
RENOVATIONS - PHASE 2
Tender No. PUR-19-24-ITT****SECTION 01 42 13 - ABBREVIATIONS AND ACRONYMS**

C		DISP	Dispenser
CAB	Cabinet	DL	Door Louver
CAP	Cementitious Acoustic Panel	DN	Down
CAR	Carpet	DSP	Downspout
CB	Chalkboard, or Catchbasin	DVTL	Dovetail Joint
C/B	Catchbasin	DRY	Dryer
CBMH	Catchbasin Manhole	DW	Dishwasher
C/C	Centre to Centre	DWG	Drawing
CEC	Canadian Electrical Code		
CEM	Cement	E	
CER	Ceramic	EF	Each Face or Exhaust Fan
CH	Cabinet Heater	EC	Emergency Call
CJ	Control Joint	ECS	Emergency Call Signal
CL	Centre Line	EJ	Expansion Joint
CLF	Chain Link Fence	EL	Elevation
CLG	Ceiling	ELEC	Electrical
CLR	Clear	ELEV	Elevator
CMU	Concrete Masonry Unit	EQL	Equal
COL	Column	EQ/T	Equivalent Thickness
CONC	Concrete	EQPT	Equipment
CONSTR	Construction	EX	Existing
CONT	Continuous	EXH	Exhaust
CONTR	Contract or Contractor	EXP	Expansion
CONV	Convector	EXP STR	Exposed Structure
CORR	Corridor		
CP	Control Panel	F	
CPT	Carpet	F1	Frame Type 1, etc.
CR	Coat Rack	FA	Fire Alarm
CS	Convenience Shelf	FARA	Fall Arrest Roof Anchor
CSA	Canadian Standards Association	FBD	Fibreboard
C/S	Concrete, Sealed	FD	Floor Drain
CT	Ceramic Tile	F/D	Fire Damper
cUL	UL Certified for Canada	FDC	Fire Department Connection
CTR	Centre	FDN	Foundation
CV	Condom Vendor	FEC	Fire Extinguisher Cabinet
CW	Curtain Wall	FFL	Finish Floor Level
CW1	Curtain Wall Type 1, etc.	F.G.	Fixed Glass
C/W	Complete with	FH	Fire Hydrant
CWT	Ceramic Wall Tile	FHC	Fire Hose Cabinet
		FIN	Finish
D		FIX.	Fixture
DAMP	Dampproofing	FLG	Flashing
DAT	Datum	FLEX	Flexible
DBL	Double	FLUOR	Fluorescent
DEMO	Demolish or Demolition	FPR	Fire Protection Rating
DET	Detail	FR	Fire Retardant/rated
DF	Drinking Fountain	FRG	Fire Rated Glass
DIA	Diameter	FRR	Fire Resistance Rating
DIAG	Diagonal	FS	Fire Separation
DIFF	Diffuser	FTG	Footing
DIM	Dimension	FURR	Furring

G		LVL	Level
GA	Gauge	LV-1	Louvre (Type 1)
GALV	Galvanized	LWB	Light Weight Block
GB	Gypsum Board	LWC	Linear Wood Ceiling
GL	Glass		
GRB	Grab Bar	M	
GVL	Gravel	M	Metres
GYP BD	Gypsum Board	M1	Mirror Type 1, etc.
GWG	Georgian Wired Glass	MAX	Maximum
		MDF	Medium Density Fibreboard
H		MECH	Mechanical
HB	Hose Bibb	MEMB	Membrane
HC	Handicapped	MET	Metal
HD	Hand Dryer or Heavy Duty	MEZZ	Mezzanine
HM	Hollow Metal	MH	Manhole
HOD	Hold Open Device	MIN	Minimum
HRD	Hair Dryer	MIRR	Mirror
HTD	High Traffic Doors	MISC	Miscellaneous
HVAC	Heating, Ventilation and Airconditioning	MLWK	Millwork
HWT	Hot Water Tank	MM	Millimetres
HYD	Fire Hydrant	MO	Masonry Openings
		MOD BIT	Modified Bituminous
I		MR	Moisture Resistant
ID	Inside Diameter	MTD	Mounted
INS	Insulation	MUL	Mullion
INSUL	Insulate	MWP	Membrane Waterproofing
ISOL	Isolation		
		N	
L		NAT	Natural
LAB	Laboratory	NBCC	National Building Code of Canada
LAM	Laminate	NFHB	Non-freeze Hose Bibb
LAT	Lay-in Acoustical Tile	NFPA	National Fire Protection Association
LAT-1	Lay-in Acoustical Tile (Type 1)	NIC	Not in Contract
LAV	Lavatory	NO.	Number
LBL	Label	NOM	Nominal
LDBR	Load Bearing	NSF	Non-slip Flooring
LDG	Landing	NTS	Not to Scale
LF	Light Fixture		
LH	Left Hand	O	
LHR	Left Hand Reverse	OA	Overall
LIB	Library	OBC	Ontario Building Code
LINO	Linoleum	OC	On Centre
LLH	Long Leg Horizontal	OD	Outside Diameter
LLV	Long Leg Vertical	O/H	Overhead
LNTL	Lintel	OHS	Overhead Stop
LONG	Longitudinal	OWSJ	Open Web Steel Joist
LPT	Low Point	OV	Oven
LMC	Linear Metal Ceiling		
LS	Light Standard		
LSA	Lateral Support Angles		

DIVISION 01 - GENERAL REQUIREMENTS**NORWOOD DISTRICT HIGH SCHOOL
RENOVATIONS - PHASE 2
Tender No. PUR-19-24-ITT****SECTION 01 42 13 - ABBREVIATIONS AND ACRONYMS**

P		RES	Resilient
P	Paint	REV	Revise / Revision
PAP	Prefinished Aluminum Panel	RFG	Roofing
PA	Public Address System	RFS	Room Finish Shedule
PAR	Parallel	RH	Right Hand
PB	Push Button (Door Operator)	R/H	Roof Hopper
PBD	Particleboard	RLG	Railing
PC	Precast Concrete	RM	Room, or Recess Mounted
PE	Porcelain Enamel	RMC	Reinforced Masonry Column
PER.	Perimeter	RSF	Resilient Sheet Flooring
PERF	Perforated	RPF	Resilient Plank Flooring
PERIM	Perimeter	RUBB	Rubber
PERP	Perpendicular	RUH	Recessed Unit Heater
PG	Plate Glass	RWL	Rainwater Leader
PL	Plaster		
PLAM	Plastic Laminate	S	
PLUMB	Plumbing	S-1	Stain (Type) 1
PLYWD	Plywood	SAD	Security Alarm Device
PMF	Prefinished Metal Flashing	SAN	Sanitary
PMS	Prefinished Metal Siding	SC	Security Contact or Solid Core
PMP	Prefinished Metal Panel	SCHED	Schedule
PNL	Panel	SD	Soap Dispenser
POLY	Polyethylene or Polyolefin	SEC	Special Epoxy Coating
PR	Pair	SF	Sheet Flooring
PREFIN	Prefinished	SIM	Similar
PRELIM	Preliminary	SK	Sink
PT	Porcelain Tile, or Paint	SL	Slate
PTD	Paper Towel Dispenser	SND	Sanitary Napkin Disposal
PTN	Partition	SNV	Sanitary Napkin Dispenser
PTW	Preservative Treated Wood	SOG	Slab on Grade
PVG	Paving	SP	Spandrel Panel
PWC	Plastic Wall Covering	SPEC	Specifications
		SPC	Special Coating
Q		SPF	Sports Flooring
QT	Quarry Tile	SPKR	Speaker
		SRCONV	Semi Recessed Convector
R		ST	Steel
R	Radius	ST.ST.	Stainless Steel
RA	Return Air or Roof Anchor	STAG	Staggered
RAD	Radiator	STC	Sound Transmission Class
RB	Rubber Base	STD	Standard
RCP	Reflected Ceiling Plan	STIFF	Stiffener
RD	Roof Drain	STOR	Storage
REBAR	Reinforcing Bar	STRUC	Structure or Structural
RCONV	Recessed Convector	SUPPL	Supplement/al
RCH	Recessed Cabinet Heater	SURF	Surface
REC	Recessed	SUSP	Suspended
REF	Reference / Refer	SVF	Sheet Vinyl Flooring
REFR	Refrigerator	SW	Sidewalk
REINF	Reinforce/d/ing/ment	SWF	Special Wall Finish
REM	Remove or Removable	SYM	Symbol

T

TAWF	Textured Acrylic Wall Finish
TB	Tackboard
T&B	Top and Bottom
TBD	To Be Determined
TC	Teacher's Closet, or Top of Curb
TEC	Tectum Panel
T&G	Tongue and Groove
TEMP	Tempered Glass
TERR	Terrazzo
TEL	Telephone
TEMP	Temporary or Tempered
TH	Test Hole
TM	Tilted Mirror
T/O	Top of
TOC	Top of Curb
TOCS	Top of Concrete Slab
TOS	Top of Steel
TPD	Toilet Paper Dispenser
TPG	Tempered Plate Glass
TR	Transom
TYP	Typical

U

U/C	Undercut
U/G	Underground
UH	Unit Heater
ULC	Underwriter's Laboratories of Canada
UL	Underwriter's Laboratories (USA)
UNEX	Unexcavated
UNF	Unfinished
UNO	Unless Noted Otherwise
U/P	Unpainted
UU	Urinal
U/S	Underside
UTIL	Utility

V

VAR	Variable, Varies
VB	Vapour Barrier
VCT	Vinyl Composition Tile
VERT	Vertical
VEST	Vestibule
VF	Vinyl Faced
VR	Vapour Retarder
VT	Vinyl Tile
VWP	Vinyl Wall Panel

W

W1	Window Type 1, etc.
W/	With
WAP	Wood Acoustic Panel
WASH	Washing Machine
WB	White Board
WC	Watercloset (Toilet)
WD	Wood
WDF	Wood Flooring
WF	Wash Fountain
WG	Wired Glass
W/O	Without
WP	Waterproofing, Working Point
WR	Washroom
W/R	Water Resistant
WSF	Wood Sports Flooring

END OF SECTION

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- .1 Refer also to the Quality Control Provisions of Section 00 10 00, General Instructions.
- .2 Provide a system of quality control to ensure that the minimum standards specified herein are attained.
- .3 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 recommendations in writing.
- .4 The Consultant's general review during construction and inspection by independent inspection and testing agencies 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.

1.2 NOTIFICATION

- .1 Give the Consultant advance notice of shop fabrication, field erection and other phases of the work so as to afford him reasonable opportunity to inspect the work for compliance with contract requirements. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

1.3 DEFECTIVE MATERIALS AND WORKMANSHIP

- .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, concrete cores, inspections or surveys performed, analytical calculation of structural strength made and the like in order to help determine whether the work must be replaced. Tests, inspections or surveys carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may indicate that, in the Consultant's opinion, the work may be acceptable.
- .2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where this would, in the Consultant's opinion, cause undue delay or give results not representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 TEMPORARY TELEPHONE AND INTERNET SERVICES

- .1 Install and pay for all telephone and internet services for Contractor's own use, and for the Owner's and Consultant's use.
- .2 Refer also to Section 01 52 00, Construction Facilities.

1.2 POWER AND WATER SUPPLY

- .1 Provide all temporary light and power complete with all wiring, lamps and similar equipment as required for completion of the Work. Provide adequate lighting for all workmen, sufficient for safety and for execution of good workmanship, taking particular care to observe all safety requirements. Adequate temporary lighting will be insisted upon. The Owner will not be liable for any loss, damage, delay, or claims for extra costs resulting from lack of services.
- .2 Existing building services may be used, as available. This does not include emergency generators or batteries.
- .3 Provide an adequate pure fresh water supply for the use of trades. Run supply pipe from nearest available source and maintain in good condition until the permanent system is installed and ready for use. Provide a sufficient number of faucets on each floor.
- .4 Ensure continued water and power supply to school throughout the construction period. Arrange for temporary services, including approvals from authorities having jurisdiction, where any interruption is anticipated.

1.3 TEMPORARY HEATING AND VENTILATION

- .1 Furnish heating apparatus and fuel for heating, if required.
- .2 Provide for the proper heating and drying out of the work when building systems are unavailable, until the completion of the heating system work, by the use of approved portable heating equipment. The use of Salamanders or other open flame type heaters will not be permitted.
- .3 Provide sufficient temporary piping and temporary unit heaters or radiators or other suitable heating equipment to maintain all parts of the enclosed work at not less than 15°C. or higher if required by any finishing trade. Maintain strict supervision of operation of temporary heating and ventilating equipment. The Contractor shall be fully responsible for damage caused by temporary heating equipment, such as smoke or overheating.
- .4 Maintain sufficient ventilation to prevent build up of moisture and condensation, to enable the work of the finishing trades to be correctly applied. Provide adequate ventilation during and after operation involving materials or processes involving potentially harmful fumes or orders.

SECTION 01 51 00 - TEMPORARY UTILITIES

- .5 Temporary use of the permanent heating system shall be carried out under the direction of the Heating Trade who shall be fully responsible for the safety of the system and its operation including provision of trained operators.
 - .1 The system shall be handed over in perfect condition and where necessary be overhauled to be in new condition.
 - .2 The Contractor pays operation costs and all costs incurred by compliance with these provisions.
 - .3 At completion of work, thoroughly clean equipment and system, replace all filters, and service all components, so that all guaranties and warranties on the equipment and systems used shall remain in effect for a minimum of one year from the date of Substantial Performance of the Work.
- .6 Provide local exhaust ventilation to prevent harmful accumulations of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .7 Ventilate storage spaces containing hazardous or volatile materials. Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements. Store paints & solvents in secure, locked, ventilated room at all times.
- .8 Upon completion of the work, the heating equipment and system shall be thoroughly cleaned, tested and put into operation and turned over to the Owner in perfect condition; after approval by the Consultant and their Consulting Engineers. All warranties must be valid from date of Substantial Performance of the Contract, except in the case of partial occupancy where it shall be date of occupancy.
- .9 Maintain strict supervision of operation of temporary heating and ventilating equipment.
 - .1 Enforce conformance with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.

1.4 REMOVAL OF TEMPORARY UTILITIES

- .1 Remove temporary utilities from site when directed by Consultant and/or at the completion of the project.

1.5 FIRE EXTINGUISHERS

- .1 An adequate number of ABC type fire extinguishers shall be provided for the protection of the work during construction.

END OF SECTION

PART 1 - GENERAL

1.1 CONTRACTOR'S SITE OFFICE/TRAILER

- .1 Provide and maintain a site office trailer heated to 22°C, lighted (750) Lx and ventilated, of sufficient size to accommodate 15 persons for site conference and job meetings.
- .2 The site office shall be furnished with the following as a minimum requirement:
 - .1 Desk and chair
 - .2 File cabinets as required for storage
 - .3 Plan file for storage of drawings
 - .4 Table and stacking chairs to provide seating at job meetings
 - .5 Telephone and fax machine, or other acceptable means of communication as noted below.
- .3 Mobile telephone will only be accepted in place of site telephone if the contact number for the site is available at all times when construction personnel are on site, and subject to acceptance by Owner and Consultant.
- .4 A printer and computer (or equivalent) may be accepted in lieu of a fax machine on site, subject to acceptance of provisions by Owner and Consultant.
- .5 The Contractor shall maintain the following documents, up-to-date, in site office:
 - .1 Contract Documents
 - .2 Reviewed shop drawings
 - .3 All instructions and change documents, ie Work Authorizations, Jobsite Instructions, Notices of Contemplated Change, Change Orders
 - .4 All inspection and test reports
 - .5 Permit drawings and specifications
 - .6 As-built drawings

1.2 STORAGE SHEDS

- .1 Provide adequate weather-tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.
- .2 Storage sheds shall be painted and doors shall be fitted with locks.
- .3 Locate storage sheds adjacent to building away from road to approved of the Consultant.
- .4 Material stored on site must be protected by tarpaulins until enclosed in building.
- .5 The Owner takes no responsibility for any items stored in the existing building. Any rooms used for storage must have all surfaces repaired, cleaned, and repainted prior to occupancy of the building.

SECTION 01 52 00 - CONSTRUCTION FACILITIES

1.3 SANITARY FACILITIES

- .1 One existing washroom in the work area will be designated for contractor use in July and August only. Provide portable sanitary facility at all other times. Maintain washroom in clean and sanitary condition.
- .2 If building services are unavailable at any time, furnish and maintain in a sanitary condition, suitable sanitary facilities containing adequate sanitary accommodation for all workmen in accordance with local Municipal and Provincial sanitary regulations, and to the approval of Public Health Authorities and the Consultant, with all necessary water, sewage, light and heat supplied in sufficient quantity. The use of single portable serviced units will be permitted providing siting is approved.
- .3 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.4 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Consultant and/or at the completion of the project.

END OF SECTION

PART 1 - GENERAL

1.1 SITE ENCLOSURE

- .1 Install temporary fencing at start of mobilization to fully secure Contractor's trailer and material storage.
- .2 Install temporary fencing to separate public from construction areas (eg. new building entrance, exterior window replacement, exterior masonry, etc.).
- .3 Enclose site to conform with current legislation and safety standards. Provide temporary 1.8m high galvanized chainlink fencing around entire construction site, complete with gates as required for site access. Fencing shall remain throughout construction period and until all construction debris has been removed from site. Gates shall be locked when no work is in progress.
- .4 For temporary fencing all posts, other than gate posts, shall be driven in minimum 1.5m, at maximum 3048mm spacing. Gate posts shall be set in concrete. Secure temporary fencing to new fences where they meet.
- .5 Erect enclosure so as to provide a secure compound for construction equipment & supplies. Hold the Owner harmless from any damage or expense arising from failure to properly execute such work.
- .6 Provide, erect, and maintain hoarding for construction as required for safety or as otherwise agreed to with the Consultant, or as directed by Authorities Having Jurisdiction. Confirm that hoarding is designed to resist wind loads.
- .7 Gates to be kept locked except during working hours.
- .8 Maintain hoarding during the period of the Contract.
- .9 Should the project be stopped for any reason, provide and maintain all necessary fencing and protection to protect building & site from damage.
- .10 On completion of the contract, take down and remove hoarding and gates from the site.

1.2 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and Site free from water.
- .2 Pumping of water containing silt in suspension into waterways, sewer or drainage systems is prohibited.
- .3 Dispose of water containing silt in suspension in accordance with local authority requirements. Silt fencing is required to contain silt on site.
- .4 Take full responsibility for maintenance of existing drainage, above ground and underground, adjacent to the Work or affected by the Work.

- .5 Before commencing any Work likely to affect the drainage of water from the Site, provide necessary alternative drainage systems to ensure that water will be conducted to alternative outlets. Do not block or impede any drain, roof outlet or rainwater leader until such safety precautions have been made.

1.3 SILT CONTROL

- .1 Provide silt control to prevent silt migration into water courses, municipal storm sewers and adjacent properties.
- .2 Provide, install, and maintain any additional silt fencing required by the Municipality to control run off from site.

1.4 SITE PROTECTION

- .1 Supply, install and maintain all guard rails, barriers, night lights, sidewalk and curb protection as may be necessary or as the by-law may require.
- .2 Supply, install and maintain all necessary temporary doors, screens and coverings to protect work areas. All such work shall be neatly painted. Doors shall have hasp and substantial padlock. Owners representative shall have key or combination where access is required. Provide and maintain temporary fencing at excavations, etc. as required for safety. Protect existing asphalt and concrete paving and curbs from damage and make good any damage at completion of project.
- .3 Protect masonry, mortar, concrete, and all frost susceptible materials from cold weather and rain. Protect all of the work from damage by the elements.
- .4 Properly protect floors and roofs from any damage. Take special precautions when moving heavy loads or equipment over floors and roofs.
- .5 Keep floors free of oils, grease or other such materials likely to discolour them and/or affect bonding of applied surfaces.
- .6 Ensure that no part of the Work is loaded greater than it was designed for, when completed. Make any temporary support as strong as the permanent support. Place no load on concrete structure until it has sufficient strength to safely bear such load.
- .7 Protect glass and other finishes against heat, slab and weld splatters, using appropriate protective shields and covers.
- .8 Provide and maintain, in good working order, appropriately labelled ULC fire extinguishers, to the approval of Authorities Having Jurisdiction.
- .9 Provide a minimum of two safety helmets on site at all times for the use of any other Owner authorized visitors to the site. It is the Contractor's responsibility to make certain that any such visitors wear the protective headgear and any other safety gear which may be necessary at that particular time of construction.
- .10 Should the job be stopped for any cause, the Contractor shall be responsible for and provide all necessary protection to prevent damage by weather or other cause until the cause of stoppage has been cleared.

- .11 The Contractor shall be entirely responsible for supervision of project and for protection of public from vehicles in movement, stockpiled materials and construction.
- .12 The Contractor is responsible for the prevention of vandalism and theft of all tools, equipment and materials.
- .13 Any damage to roadways must be repaired immediately, to municipal standards.
- .14 The Contractor is responsible for snow removal on sidewalks adjacent to work areas and all are as required for access to site.
- .15 Any damage to site by the Contractors forces, delivery vehicles, etc., must be made good at the end of the job. Similarly any damage to curbs, sidewalks, or other municipal property shall be made good by the Contractor.

1.5 TEMPORARY DRIVEWAY ACCESS

- .1 Ensure continuous access to all existing driveways from municipal and regional roads. Provide steel plates as required to bridge all excavations, trenches, and other site disturbances at driveway locations. All work to be coordinated with property owners and building occupants.
- .2 All work to conform to municipal and regional standards.

1.6 TEMPORARY DUST CONTROLS, DUST PROOF PARTITIONS, FIRE RATED PARTITIONS

- .1 Supply and install a dust proof fire rated partition, hollow metal door and frame in the occupied school at corridors doorways abutting new work prior to any work taking place. Call for review by Owner/Consultant after dust proof partitions are installed.
- .2 Dust proof partition shall consist of 92mm steel stud framing to the underside of deck with one layer of 13mm plywood sheathing covered by 10 mil polyethylene sheet caulked all around the partition covered by two layers of 16mm Type X gypsum board with off set joints taped and filled. The gypsum board will be painted with two coats of good quality white paint.
- .3 Dust proof partition shall be erected outside of school operating hours and shall remain in place until the new Work is ready for occupancy, and accepted by the Owner.
- .4 Place filters in return air vents in all work areas to prevent dust from entering the existing HVAC system.
- .5 Ensure interior of all new ductwork is cleaned before connection to the existing HVAC system and commencement of operation of new system components. If system is put into operation before work is complete in any area, provide temporary filters in return air vents and grills.
- .6 Minimize the amount of dirt tracked into the existing building. Provide mats at all entrances used by construction personnel to enter the school.
- .7 Keep dust, dirt, and debris away from fresh air intakes, open doors and windows, and from areas where it could be tracked into the building by students, staff, or visitors to the school. Assume responsibility for cleaning up all dirt, debris, mud, water, snow, etc., tracked in by construction personnel.

SECTION 01 56 00 - TEMPORARY BARRIERS AND CONTROLS**1.7 MAINTAINING INDOOR AIR QUALITY**

- .1 Smoking is not permitted inside the building or on the school property at any time. The Contractor shall post "No Smoking" signs throughout the work areas to enforce this requirement.
- .2 Minimize the time that vehicles are left idling on site. Keep idling vehicles away from open doorways and windows, open areas of the building addition, fresh air intakes, and areas where students are gathered.
- .3 All adhesives, sealants, paints and coatings applied onsite must be low VOC products.
- .4 Products requiring the use of adhesives, sealants, paints and other coatings, are to be assembled offsite as much as possible. Such adhesives, sealants, and coatings shall be low VOC products, where suitable products are available.
- .5 No toxic chemicals or fuels are permitted to be stored inside the building.
- .6 Refueling of equipment is to be undertaken outside the building.
- .7 Gas powered equipment is not to be used inside the building. Use electric or propane powered equipment only, and to acceptance of Owner and Consultant.

1.8 SECURITY

- .1 The Contractor shall be entirely responsible for supervision of project and for protection of public from vehicles in movement, for stockpiled materials and construction. Vehicular parking and stockpile materials must be maintained on the construction site only. No street parking or stockpiling will be allowed on the Municipal streets.
- .2 The Contractor is responsible for the prevention of vandalism and theft of all tools, equipment and materials until date of Substantial Performance of Contract.
- .3 The Contractor shall provide 24 hour surveillance on site from date of Substantial Performance to date of acceptance and occupancy by the Owner.

1.9 PROTECTION OF SODDED AREAS

- .1 Protect all new sodded areas with warning signs and temporary fencing for full duration of grow-in period, until acceptance.
- .2 Provide 1200mm high chainlink fence to completely enclose all newly sodded areas. Plastic snow fence will *not* be accepted.
- .3 If sod is not established and accepted by the Consultant before the end of the growing season, then the fencing shall remain in place over the winter and for a minimum of 30 days after the start of the next growing season, and until acceptance of the sodded areas. Refer to Section 32 92 23, Sodding, for requirements for acceptance.

1.10 REMOVAL OF TEMPORARY BARRIERS

- .1 Remove temporary barriers and enclosures from site when directed by Consultant and/or at the completion of the project.
- .2 Remove temporary enclosure around newly sodded areas once sod is fully established and/or when instructed to do so by the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- .1 Safety Requirements Section 01 35 20

1.2 SITE SIGNBOARD AND NOTICES

- .1 Provide construction sign, 2440mm x 3050mm (8'x10') in size, in location where directed by Consultant.
 - .1 Construct and paint sign as detailed and set plumb and level in neat wood framework and securely anchored in ground with posts.
 - .2 Design sign to withstand wind pressure of 160 kg/hr. Structural design to be by a registered professional engineer in the Contractor's employ.
- .2 Construct and paint sign as instructed by the Owner and set plumb and level in neat wood framework and securely anchored in ground by posts to withstand wind pressure of 160 kg/hr.
- .3 Signs and notices for safety or instruction to be in English language, or commonly understood graphic symbols.
- .4 Contractor may place his own sign on site. Other than Owner's and Contractor's signs, only safety and necessary instructional signs may be erected on site.
- .5 All signs must be removed entirely and site made good, at the time of Substantial Performance, or when so directed by the Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 LAYOUT

- .1 At the time of mobilization or immediately thereafter, the Contractor is to confirm in writing that the site is visually in general conformance with the description in the documents.
- .2 Report any dimensional discrepancies immediately to the Consultant, and confirm as soon as possible any job measurements required for shop drawings, etc. Co-ordinate all trades, including mechanical and electrical.

1.2 DIMENSIONS

- .1 Ensure that necessary job dimensions are taken and trades are co-ordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of dimensions and for all co-ordination.
- .2 Verify that work is executed in accordance with dimensions indicated, that levels and clearances are maintained, and that work installed in error is rectified before construction continues.
- .3 Check and verify all dimensions including interfacing of services. Dimensions, when pertaining to the work of other trades, shall be verified with the trade concerned. Ensure that all Subcontractors co-operate for the proper performance of the work.
- .4 Do not scale directly from the drawings; this applies all drawings, whether in paper or digital format. If there is ambiguity or lack of information, immediately inform the Consultant. Any change caused by lack of such review shall be the responsibility of the trade concerned.

1.3 SITE VERIFICATION

- .1 Include costs to X-Ray floors and surfaces which are to be cut to accommodate new work.
- .2 Include cost for underground service locates at all exterior site work locations. Modify layout of new work to suit (in consultation with Consultant).
- .3 Include cost to survey site work to confirm final layout and grades.
- .4 Coordinate with forces performing demolition work.

END OF SECTION

PART 1 - GENERAL

1.1 CUTTING AND PATCHING

- .1 Before cutting, drilling or sleeving load-bearing elements, obtain approval of location and method.
- .2 Do not endanger work or property by cutting, digging, or similar activities. No trade shall cut or alter the work of another trade who has installed it unless approved by that trade.
- .3 Cut and drill with true smooth edge to minimum suitable tolerances.
- .4 Fit construction tightly to ducts, pipes and conduit to stop air movement completely. The trade performing work that penetrates a fire, air, vapour, moisture, thermal or acoustic separation element of the building shall pack voids tightly with insulation, rated where 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 trade who has installed it. The trade requiring drilling and sleeving shall inform the trade performing the work of the location and other requirements for drilling and sleeving. The Contractor shall directly supervise performance of cutting and patching.
- .6 Replace and/or make good damaged work.
- .7 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.

1.2 CONCEALMENT

- .1 Conceal all conduit pipes, ducts and wiring in finished areas except where indicated otherwise. This includes new work in existing building.
- .2 Where furring out is required, use material similar to adjacent surfaces except where indicated otherwise.
- .3 All new horizontal runs of ducts, pipes and conduits shall be concealed in ceiling spaces.
- .4 All new duct drops and risers shall be concealed in ceiling spaces, bulkheads or furred out duct shafts. All new pipe and conduit drops and risers shall be buried in walls. New devices in walls shall be recessed.

1.3 MECHANICAL AND ELECTRICAL EQUIPMENT

- .1 Mechanical and Electrical services must be temporarily capped or terminated to permit renovation in existing areas to proceed.

SECTION 01 73 00 - EXECUTION

- .2 Cutting of holes up to 100mm in size in the existing structure and surfaces required by the trades shall be by those Subcontractors. Cutting and patching of openings greater than 100mm in size shall be by the Contractor in co-ordination with the trades. PATCHING OF ALL HOLES IN EXPOSED FINISHED SURFACES SHALL BE BY THE CONTRACTOR. Mechanical and Electrical trades shall do their own coring of existing slabs as required.

1.4 BLOCKING UP OF EXISTING OPENINGS

- .1 At existing openings in walls shown to be blocked up, masonry shall be used to provide required ratings, unless otherwise noted.

1.5 NEW OPENINGS IN EXISTING WALLS

- .1 Where new openings are shown to be cut into existing walls, provide new lintels over the opening and patch all adjacent materials. This includes new openings with lintels for Mechanical trade.

1.6 EXISTING CEILINGS

- .1 Existing ceiling components and ceiling mounted fixtures and equipment shall be carefully removed as required for new services and reinstalled when work is complete.
- .2 Any existing ceiling tiles, which are removed for services or new connections shall be replaced with new tiles. Existing tiles shall be turned over to the Owner's staff if in good condition. Transfer any markings for services from existing to new tiles.
- .3 Where new walls are constructed, remove ceilings and grid and replace with new.
- .4 Replace existing ceilings with new where indicated on drawings.
- .5 Existing ceilings are part of a one hour rated roof assembly; all new components to be fire rated.

1.7 FINISHES ON EXISTING FLOORS

- .1 Floors of existing building must be finished flush, ready for final finish in areas affected by the work.
- .2 Existing concrete floors shall be prepared according to manufacturers instructions for new adhesive applied finishes.
- .3 Existing floor finishes shall be removed and old adhesive removed from the existing concrete slab by scraping or solvent, in accordance with Health & Safety requirements. Grinding of floor finishes will not be accepted.
- .4 Where new walls are being constructed, and new flooring is not called for in the Room Finish Schedule, remove floor finish below wall to extent required for work, unless indicated otherwise on drawings. Only full tiles are to remain. Where there is a floor pattern in the room, remove sufficient tiles/flooring to replicate the pattern. Provide new floor finish to match existing, including accent tiles where applicable.

1.8 GENERAL NOTES

- .1 Refer to the Door Schedule, Section 08 06 10, and the Room Finish Schedule, Section 09 06 10, and general notes below.
- .2 Junction of different floor finishes shall occur on centre line of doors.
- .3 All masonry and drywall shall be extended to u/s steel deck. Where walls run parallel and under OWSJs the OWSJs shall be enclosed both sides with gypsum board to provide sound barrier between rooms. Fill with minimum 100 mm acoustic batt insulation.
- .4 All structural steel supporting structure above shall be spray fireproofed 1 hr.
- .5 All exposed concrete block corners shall be bullnose block.
- .6 Hardware shown on Door Schedule refers to code requirements only. Refer to Hardware Schedule for total hardware required.
- .7 Aluminum and H.M. doors and frames shall be prepared for barrier-free door operators, where indicated.
- .8 All fabric finishes on walls shall be maximum 25 flame spread rating.
- .9 All wood trim in corridors are to receive fire-retardant coating, to limit flame spread rating to maximum 25.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances, anti-pollution laws, and recommendations of Construction Safety Association.
- .2 Store volatile wastes in covered metal containers, and remove from premises daily.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.
- .5 Provide instructions designating proper methods and materials to be used in final cleaning of Work.
- .6 Do not bury or burn any rubble, waste or packaging, or surplus materials. No dumping of waste, such as oil or paint, into sewers will be permitted.
- .7 Dispose of waste materials in accordance with the Environmental Protection Act, R.S.O. 1990, C. E.19, and regulations under the Act, including:
 - .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
 - .2 O.Reg. 103/94 Industrial, Commercial and Institutional Source Separation Programs
 - .3 R.R.O. 1990, Reg. 347: General - Waste Management

1.2 MATERIALS

- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 POLLUTION CONTROL

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Remove mud deposited on public roads. Provide mud mats at all site access roads.
- .2 Prevent dust nuisance to adjacent properties, existing intermediate school, and general public by taking appropriate pollution control measures as directed by Consultant.
- .3 Include daily watering of site to maintain dust control as part of tender submission.

1.4 DISPOSAL OF WASTES

- .1 Burying of rubbish and waste materials on Site not permitted.
- .2 Disposal of waste or volatile materials, such as mineral spirits oil or paint thinner into storm or sanitary sewers prohibited.
- .3 Meet Ministry of the Environment Standards and Guidelines.

SECTION 01 74 00 - CLEANING AND WASTE MANAGEMENT

1.5 FIRES

- .1 Fires and burning of rubbish on Site is not permitted.

1.6 CLEANING DURING CONSTRUCTION

- .1 Maintain entire site and adjoining municipal and/or private property free from accumulations of waste materials and rubbish. Do not allow rubbish to accumulate in work under construction or on roofs. Clean site daily.
- .2 Maintain entire site free from accumulations of snow and ice.
- .3 Provide on-site containers for collection of waste materials, and rubbish. Empty containers on a regular basis in conformance with Municipal and Provincial Regulations.
- .4 Cleaning operations shall include those areas used for temporary site access or used on a temporary basis to facilitate the Work.
- .5 Broom clean and vacuum areas as required for application of finishes. Continue to clean on an "as needed" basis and insure that areas which receive paint, floor tile and other critical finishes are kept dry, dust free, and at acceptable temperatures.
- .6 Keep all areas of the Work clean and orderly, free from accumulation of dirt, debris, garbage, oily rags, excess material, or such other trash items. Remove such items from all areas of the Work on a daily basis.
- .7 Vacuum and/or broom interior building areas when ready to receive painting and other finishes. Continue cleaning on an "as needed" basis until the building is ready for final review and take-over.
- .8 Schedule cleaning operations so that resulting dust and other contaminants do not affect wet, newly painted surfaces, or newly installed equipment, or devices.

1.7 CLEANING AT COMPLETION OF WORK

- .1 Employ a professional cleaning company to thoroughly clean all areas immediately prior to occupancy of the Work by the Owner. Cleaning company shall be an established firm, bonded and fully insured, and acceptable to the Owner.
- .2 Provide manufacturer's printed cleaning and maintenance instructions to cleaning company. All finishes, equipment, fixtures, and other surfaces are to be cleaned in accordance with the product manufacturer's recommendations.
- .3 Use cleaning products which are non-toxic, environmentally friendly products, and which will not leave residues or odours on surfaces.
- .4 Do not apply sealers, wax, or polish to any flooring without the expressed permission of the Owner. All such products, and the methods of application, must be approved in advance by the Owner.
- .5 Remove all temporary protective coverings provided during construction.

- .6 Remove all protective film from switchplates and hardware, particularly kick plates. Remove miscellaneous labels from hardware, fixtures, equipment, and appliances, etc.
- .7 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all exposed interior and exterior finishes, including glass and other polished surfaces. Clean glass both sides. Vacuum inside all cabinets and drawers and leave millwork ready for use. Remove paint spots and smears from all surfaces, including hardware.
- .8 Remove stains, spots, marks and dirt from decorated work, electrical and mechanical fixtures, and the like. Remove protective materials.
- .9 Clean hardware, aluminum, stainless steel, and other metal surfaces.
- .10 Clean resilient and sheet flooring and all floor and wall tile.
 - .1 Vinyl composition tile (VCT) is to be broom swept only. The Owner will wash, wax, and polish VCT floors, and other resilient floors which require a wax finish.
 - .2 Clean no-wax resilient flooring in accordance with manufacturer's instructions.
- .11 Clean lighting reflectors, lenses and other lighting surfaces.
- .12 Clean all plumbing fixtures and fittings, including those located inside cabinetry or otherwise hidden from continuous view.
- .13 Vacuum clean all new carpeting, and all existing building interiors affected by construction operations.
- .14 Remove debris and surplus materials from the roof areas and accessible concealed spaces.
- .15 Replace heating, ventilation and/or air conditioning filters at Substantial Performance, whether or not the units were operated during construction operations. If any units were operated without filters, clean ducts, blowers, and coils.
- .16 Broom clean all asphalt and concrete paved surfaces and rake clean other disturbed surfaces in the area of the Work, to remove site debris caused by the Work of this Contract. Inspect for damages and make good.
- .17 Remove any snow or ice from walks and paved areas, prior to occupancy.
- .18 Ensure that all clean up operations specified in other sections has been performed.
- .19 Conduct final inspection of interior and exterior surfaces, and concealed spaces.
- .20 Leave premises ready for immediate occupation without further cleaning, all to the Consultant's approval.

SECTION 01 74 00 - CLEANING AND WASTE MANAGEMENT

1.8 REPAIR WORK

- .1 All equipment, including mechanical and electrical equipment, shall be turned over in "as new" condition. Repair any damage, including dents and scratches. Repaint or touch up paint finish as necessary to return to new condition.
- .2 Replace all broken glass.
- .3 Repair any damage incurred during cleaning operations.

END OF SECTION

PART 1 - GENERAL

1.1 TAKEOVER PROCEDURE

- .1 Subject to detailed instructions included in these specifications, conform to OAA/OGCA document 100, Take-Over Procedures.

1.2 OCCUPANCY REQUIREMENTS

- .1 Review occupancy with the building inspector well in advance of required occupancy date, and ensure that the requirements are met for occupancy, including all document submissions. Refer also to Section 01 41 00, Regulatory Requirements.
- .2 An occupancy permit is required for any project that is not deemed complete prior to the date of occupancy.
- .3 Refer to OBC Division C, section 1.3.3, Occupancy of Buildings, for occupancy requirements. The designated building official is required to issue an occupancy permit only under the conditions outlined therein. Generally, these conditions include the following:
 - .1 Completion of building structure and walls to the roof, including any balcony guardrails;
 - .2 Completion of all required fire separations and closures in all areas to be occupied;
 - .3 Completion of all required exits and fire separations, including all doors and hardware, guardrails and handrails, and exit signs, at all levels of floor areas to be occupied;
 - .4 Completion of all shafts to rated assemblies above occupied area, complete with fire separations.
 - .5 Completion of building drains, sewers, water systems, drainage systems and venting systems, including testing for areas to be occupied;
 - .6 Completion of HVAC, power and lighting for all areas to be occupied, including emergency lighting;
 - .7 Completion of fire safety systems for areas to be occupied, including sprinklers, standpipe, fire extinguishers, fire alarm system, and exterior fire route;
 - .8 Provision of service facilities, including garbage rooms, service rooms, complete with required fire separations;
 - .9 Maintenance of egress routes to and from areas to be occupied, keeping them free of materials that could present hazards to access; and
 - .10 Secure and safe separation of areas to be occupied from areas that are incomplete and not to be occupied.
- .4 In addition to the OBC requirements for occupancy, the spaces must be complete for the purposes of occupancy by the Owner.
- .5 The issue of an occupancy permit shall not imply Substantial Performance of the Contract. Determination of Substantial Performance is defined by lien legislation.

1.3 ACTION REQUIRED AT OCCUPANCY

- .1 When of the opinion that the Occupancy Requirements have been met, perform an inspection of the work, accompanied by the major subcontractors. Submit an inspection report, confirming that the occupancy requirements have been met, to the Consultant and the Owner.

SECTION 01 77 00 - CLOSEOUT PROCEDURES

- .2 Arrange for and pay related fee for all necessary inspections required for occupancy such as Hydro, Fire Department and Building Department.
- .3 Confirm with the building inspector that the occupancy requirements of the municipality have been met, and submit evidence of such to the Consultant and Owner.
- .4 Next, arrange for a review of the Work with the Consultants and Owner. The Consultant will determine whether the Work is Fit for Occupancy.
- .5 Request letters confirming General Review from Consultant, and Structural, Mechanical and Electrical Engineers, for submission to Authorities Having Jurisdiction.
- .6 Upon receipt of the required documents, confirm that occupancy of the Work is accepted by the Authorities Having Jurisdiction. Submit evidence of the permission for occupancy to the Consultant and Owner.
- .7 When partial occupancy of uncompleted project is required by the Owner, co-ordinate the Owner's uses, requirements and access with the construction requirements to complete project.

1.4 ACTION REQUIRED AT SUBSTANTIAL PERFORMANCE

- .1 Perform the actions listed below prior to issue of the Certificate of Substantial Performance of the Contract.
- .2 Submit the documents and material detailed in section 01 78 00, Closeout Submittals. Deliver all required submittals to the Consultant for approval PRIOR to Substantial Performance of the Work. Final payment will not be made until all these items have been received and approved.
- .3 Prior to applying for a Certificate of Substantial Performance, perform an inspection in accordance with OAA/OGCA Document 100, Stage 2, Contractor's Inspection for Substantial Performance. Submit a copy of the deficiency list to the Consultant.
- .4 Ensure all sub-systems ie fire alarm, security, E.M.S., are fully operational prior to Substantial Performance.
- .5 When of the opinion that the requirements for Substantial Performance have been met, submit an application for a Certificate of Substantial Performance to the Consultant. The application shall be as outline for Stage 3 of the OAA/OGCA Take-Over Procedures.
- .6 Expedite and complete deficiencies and defects identified by the Consultant. Final Certificate for Payment will not be issued until all deficiencies are satisfactorily corrected, inspected, and approved by the Consultant, and all documentation has been handed to the Consultant.
- .7 Remove all protection erected, and make good all damage to the Work and adjoining Work due to the lack or failure of such protection. In addition, all debris, surplus materials tools equipment shall be removed from the work areas and the site, and the Project shall be left clean and tidy to the full and complete satisfaction of the Consultant and Owner.
- .8 Perform final adjustment of Cash Allowance, specified in Section 01 10 00, General Instructions.

- .9 Arrange for Consultant to prepare CAD drawing files for the Board using the final as-built drawings. In addition, have the Consultant prepare an updated Project Manual, in WordPerfect format.
- .10 At time of Substantial Performance, instruct the Owner's personnel in operation, adjustment and maintenance of equipment and systems, using operation and maintenance manuals as the basis for instruction.
- .11 Prior to final site review, start up and demonstrate operation of all systems to the Owner and the Consultant.
- .12 Review cash and contingency allowances in relation to contract price, change orders, hold-backs and other contract price adjustments.
- .13 Review inspection and testing reports to verify conformance to the intent of the documents.
- .14 Review condition of all equipment, which has been used in the course of the Work to ensure turnover at completion in "as new condition" with warranties, dated and certified from time of Substantial Performance of the Contract.
- .15 When partial occupancy of uncompleted project is required by the Owner, co-ordinate the Owner's uses, requirements and access with the construction requirements to complete project.
- .16 Provide on-going review, inspection, and attendance to building call back, maintenance and repair problems during the warranty periods.
- .17 Continue to submit monthly deficiency status reports, as specified in Section 01 32 00, Construction Progress Documentation.

1.5 TOTAL PERFORMANCE

- .1 Upon completion of all items noted on the deficiency list, clean all areas, surfaces, and components affected by corrections and completion of deficient items.
- .2 Ensure that all services, equipment, and apparatus are properly tested and adjusted.
- .3 Letter of Completion:
 - .1 Submit a Letter of Completion to the Consultant stating that the Contract is complete, that all deficiencies identified by the Consultant, Subconsultants, Inspectors and Owner have been rectified, and requesting final reviews by Consultant and Subconsultants.
 - .2 Sign and return deficiency lists, issued by Consultant and Subconsultants, to confirm completion of all deficiencies identified thereon.
- .4 Final Site Review:
 - .1 Consultant will conduct one site review for Total Performance, within ten (10) working days of the request by the Contractor. Should the Contractor fail to provide the Letter of Completion, the Consultants will be under no obligation to perform a site review within the above noted time.

SECTION 01 77 00 - CLOSEOUT PROCEDURES

.2 Additional site reviews, as requested by the Contractor or as necessitated due to the Contractor's failure to complete work as required, shall be paid for by the Contractor at a rate of \$500 per visit, per consultant, plus the cost to prepare additional site review reports at per diem rates (rates as recommended by the OAA or PEO, or as negotiated in advance).

.5 Submit a final request for payment, incorporating all approved changes to the Contract price, and adjustments to the Cash Allowance.

.6 Final Certificate for Payment will not be authorized until all deficiencies are satisfactorily corrected, reviewed and signed off by the Consultant, and required submittals have been completely and accurately provided.

1.6 WARRANTY PERIOD

.1 The Warranty Period on this Project will expire **twelve (12) months** from the date of Substantial Performance of the Work, except for extended warranties as called for throughout the Specifications or equipment not certified by Consultant at time of Substantial Performance.

1.7 UTILITY CHARGES

.1 The Owner will retain responsibility for utility service billings for the building.

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS REQUIRED FOR OCCUPANCY

- .1 Refer to Section 01 41 00, Regulatory Requirements for documents required to be submitted to Authorities having Jurisdiction, for occupancy.

1.2 SUBMITTALS REQUIRED AT SUBSTANTIAL PERFORMANCE

- .1 Prior to Substantial Performance of the Contract, perform the actions detailed in section 01 77 00, Closeout Procedures, and submit the following documents and materials:
 - .1 Deficiency list prepared by Contractor for both interior and exterior areas of the project.
 - .2 Certificates of good standing from the Workplace Safety & Insurance Board for the Contractor and all Subcontractors
 - .3 Operations and Maintenance Manuals, including warranties
 - .4 One complete set of final approved Shop Drawings (bound separately) indicating corrections and changes made during fabrication and installation
 - .5 Keys and construction cores
 - .6 Maintenance materials
 - .7 As-Built Documents as specified in Section 01 33 00, Submittal Procedures
 - .8 Mechanical documents such as valve charts, frames as specified - refer to Divisions 21, 22, 23 and 25.
 - .9 Electrical panel directories (typed and mounted in panels) - refer to Division 26.
 - .10 Pressure Vessels Inspection Certificates
 - .11 Balancing Report for Ventilation System.
 - .12 Inspection Certificates required by Provincial, Municipal and other authorities having jurisdiction.
- .2 Deliver all required submittals to the Consultant for approval prior to Substantial Performance of the Work. Final payment will not be made until all these items have been received and approved.

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

1.3 MAINTENANCE MANUALS

- .1 At Substantial Performance submit to Consultant one hard copy and one digital copy of Architectural, Mechanical, and Electrical Operations Data and Maintenance Manuals made up as follows:
 - .1 Bind data in vinyl hard covered, three-ring loose leaf binders for 212.5mm x 275mm (8-1/2" x 11") size paper. Digital copy shall be submitted in pdf (portable document format) on a single USB flash drive with label or tag identifying project.
 - .2 Enclose title sheet, labelled "Operation Data and Maintenance Manual - Architectural, NORWOOD DISTRICT HIGH SCHOOL - RENOVATIONS PHASE 2", date and list of contents. Enclose similar sheet labelled Mechanical and Electrical in applicable manuals. Include the following information:
 - .1 name of project
 - .2 name of Owner
 - .3 name of Consultant
 - .4 name of Contractor
 - .5 date of Substantial Performance.
 - .3 Organize contents into applicable sections of work to parallel project specification break-down. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
 - .4 All data related to a section of work or product shall be grouped together, except for shop drawings, unless otherwise requested by the Owner. Confirm method of organization with Owner prior to assembling manuals. Typically, each section shall be organized, as applicable, as follows:
 - .1 General information; identify section of work, subcontractor(s) responsible
 - .2 Warranty
 - .3 Guarantees, Bonds
 - .4 Schedules (hardware, paint)
 - .5 Product data sheets
 - .6 Material safety data sheets (MSDS)
 - .7 Operating manual
 - .8 Maintenance instructions
 - .9 Receipts for maintenance materials, keys, etc.,
 - .10 Maintenance contracts (applicable to elevator, wheelchair lift, planting, sod, etc.)
 - .11 Inspection and testing reports
- .2 Provide one copy of each of the following in the first binder:
 - .1 Contractor's final statutory declaration on CCDC form 9A-2001
 - .2 Major Subcontractor's final statutory declarations on CCDC form 9B-2001
 - .3 Workers' Compensation and Insurance Board (WSIB) certificate
 - .4 Certificates of approval of the work by the Building Department (if available)
 - .5 Ontario Hydro certificate of inspection.

- .3 Also provide a disk or memory stick containing all construction progress photos submitted; refer to Section 01 32 00. Provide an index with printed images clearly identified with name of project, description of view and date taken. Disks are to be clearly labelled .
- .4 Include the following information, plus any additional data required within the specifications.
 - .1 List of all Subcontractors, major suppliers, and local equipment service representatives, their addresses and telephone numbers.
 - .2 Date of Substantial Performance (commencement of warranty periods) and termination dates of warranties.
 - .3 Operating manuals including lubricating, repair and other instructions to keep all mechanical and electrical/electronic equipment in good working order. Reviewed shop drawings of same. Refer to Mechanical and Electrical Specifications for further requirements.
 - .4 Door and Frame Schedule (as-built); insert in front of Division 08 section in manuals.
 - .5 Final hardware schedule, revised to include all changes during construction, including local manufacturer's descriptive and service literature. Include AHC's final inspection report.
 - .6 Final finish/colour schedule; insert in front of Division 09 section in manuals.
 - .7 Provide paint schedule indicating paint brand and formulas used.
 - .8 Maintenance instructions for all types of floor finish and other special finishes. Include instructions for cleaning, repairing, refinishing and freshening, and warnings of damaging or dangerous practices where necessary.
 - .9 Maintenance and service instructions and manufacturer's literature for all special architectural features: i.e. windows, patent glazing, handicapped lift etc.
 - .10 Description, operations and maintenance instructions for equipment and systems, including complete list of equipment and parts list.
 - .11 All warranties, guarantees, bonds, etc., properly completed and signed, which extend beyond the general warranty period, for all work and equipment as specified or as otherwise supplied and installed, from manufacturers and trades. Warranties, guarantees and bonds shall include:
 - .1 Name and address of project.
 - .2 Warranty commencement date.
 - .3 Duration of warranty.
 - .4 Clear indication of what is being warranted and what remedial action will be taken under warranties.
 - .5 Signature and seal of Contractor.
- .5 List additional material used in project showing name of manufacturer and source of supply.
- .6 Neatly type lists and notes. Use clear drawings, diagrams or manufacturer's literature.

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

- .7 Supply copies of inspection and testing reports, inspection and acceptance certificates, balancing reports, all bound in all three copies of manuals.
- .8 Supply Operations and Maintenance manuals, and other required documentation as specified for Mechanical and Electrical work.
- .9 Manuals must bear seal and signature of Contractor.
- .10 Maintenance Manuals must be delivered, complete and in one package, to Consultant. The final Certificate for payment will not be issued until ALL documentation has been received, reviewed, and approved, by Consultant.

1.4 SHOP DRAWING MANUAL

- .1 Provide one complete set of final approved Shop Drawings, bound separately. Shop drawings shall be the drawings reviewed and stamped by the consultants. Mark-up shop drawings to indicate corrections and changes made during fabrication and installation.
- .2 Provide a digital copy of the shop drawing manual, included on the USB flash drive with the digital copy of the maintenance manuals.

1.5 MAINTENANCE MATERIALS

- .1 Where supply of maintenance materials is specified, deliver items as follows:
 - .1 Materials in unbroken cartons or, if not supplied in cartons, they shall be strongly packaged.
 - .2 Clearly mark as to content.
 - .3 If applicable give colour, room number of area where material used.
 - .4 Obtain signed receipt from the Owner's designated representative and store in an assigned, lockable room.
- .2 Copies of signed receipts for maintenance materials are to be included in the maintenance manuals.
- .3 Replacement materials are for the sole use of the Owner and must not be used by Contractor to replace deficient work.

1.6 AS-BUILT DRAWINGS AND RECORD DOCUMENTS

- .1 Provide As-Built Drawings, as specified in Section 01 33 00, and Record Documents (electronic files).
- .2 Prior to the date of Substantial Performance, request updated drawings from the Consultant. Transfer all "as-built" markups from the on-site drawings to these updated drawings and return them to the Consultant for preparation of architectural Record Drawings.

- .3 Record documents shall consist of the original documents altered to reflect all changes and information indicated on as-built documents.
- .4 The Consultant shall prepare architectural Record documents and be reimbursed for costs by the Contractor through the Cash Allowance included in the Contract.
- .5 Refer to Mechanical and Electrical Specification Divisions for specific requirements regarding preparation and submission of final mechanical and electrical Record Drawings.

1.7 REVIEW OF MANUALS BY CONSULTANT

- .1 Submit all manuals for review by the Consultant. Mechanical and electrical manuals may be forwarded directly to the consulting engineers for review.
- .2 The Contractor is responsible for confirming the completion of the manuals prior to forwarding to the Consultant for review. If any items are outstanding, provide tabs at the appropriate locations and indicate the nature of the outstanding documents to be inserted.
- .3 Do not submit partially complete manuals to the Consultant; only documents which cannot be provided at the time of Substantial Performance are permitted to be flagged for later insertion. The Consultant will review manuals once for completion and will then review only one resubmission. If additional reviews are required, the Contractor will be invoiced for the Consultant's time at a rate of \$90/hour.

1.8 VALUATION OF CLOSEOUT SUBMITTALS

- .1 Due to the high value to the Owner of the closeout submittals, including maintenance manuals, for the purpose of project administration and calculation of Substantial Performance, the Closeout Submittals will be assigned a value of **\$5,000.00** per discipline (architectural / mechanical / electrical).
- .2 The full assigned value of the submittals will be held in the Contract until such time as all closeout submittals are delivered to the Consultant and are deemed complete and acceptable by the Consultant.
- .3 Architectural record drawings, to be prepared by the Consultant and paid through the Cash Allowance, are not included in the valuation of closeout submittals.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 Maintain existing fire rated separations in building.
 - .1 All ceiling tile to be fire guard type. Provide boxing of fixtures in rated ceilings as typically required for rated floor and roof assemblies.
 - .2 Provide new firestopping at tops of all corridor walls where none is existing. Where existing corridor walls do not extend to the underside of the roof deck, provide rated gypsum board enclosures, filled with mineral wool insulation, between top of wall and underside of deck and firestop perimeter and all penetrations.
 - .3 Provide new firestopping at all new penetrations through corridor walls, and at existing penetrations where no firestopping is existing.
 - .4 Examine existing building to determine the extent of the firestopping work required at existing corridors. For pricing purposes assume that all corridor walls in renovated areas require firestopping along its' entire length.
- .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 the Consultant with evidence of compliance to fire protection requirements as noted in documents or specified codes, etc.
- .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 and time rated door assemblies shall include doors, frame, anchors, and hardware and shall bear label of fire rating authority showing opening classification and rating.
- .6 Construct new fire rated assemblies in accordance with applicable fire test report information issued by fire rating authority. Deviation from fire test report will not be allowed. Where existing conditions do not conform to current tested assemblies, conform to similar assemblies acceptable to Authorities Having Jurisdiction and the Consultant.
- .7 Construct fire rated assemblies as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from floor to underside of structural deck above.
- .8 Materials which have a fire hazard classification shall be applied or installed in accordance with fire rating authority's printed instructions.
- .9 Provide firestopping as specified in Section 07 84 00.
 - .1 Firestopping shall be a tested system consisting of non-combustible materials, smoke sealant, and means of support, used to fill gaps between fire-rated separations or between fire separations and other assemblies, and used around items that penetrate a fire separation.
 - .2 Firestopping system shall be tested for the time period required for the fire separation; ie. 1 hour, 2 hours, etc.

- .3 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.
- .10 Provide fire blocks to compartmentalize concealed spaces as required by the OBC.
 - .1 Fire block means a material, component or system that restricts the spread of fire within a concealed space or from a concealed space to an adjacent space.
 - .2 Fire blocks are also referred to as fire stops in the OBC.
- .11 The Contractor shall ensure that all fire safety features called for in the Contract Documents are supplied and installed to meet fire safety standards established by those authorities having jurisdiction. The Contractor shall ensure that the work of Subcontractors is properly coordinated to achieve the intent of this Specification.
- .12 Nothing contained in the Drawings or Specifications shall be construed as to be in conflict with any law, by-law, or regulations of municipal, provincial, or other authorities having jurisdiction. Work shall be performed in conformity with all such laws, by-laws, and regulations.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 The Contractor shall be responsible for the commissioning process identified in the Mechanical Specification and Electrical Specification.

1.2 PRODUCTS

- .1 Provide all material, equipment and instrumentation to complete the commissioning process specified.

1.3 EXECUTION

- .1 Provide an experienced M&E co-ordinator who will supervise the commissioning work specified in the mechanical and electrical specifications.
- .2 Provide a commissioning schedule which shall identify all tests to be performed. The schedule shall be in three parts; a master commissioning schedule, a detailed mechanical commissioning schedule, and a detailed electrical commissioning schedule.
- .3 Ensure co-ordination and co-operation between divisions and trades to complete the commissioning process.
- .4 Ensure all tests identified are conducted, the associated forms completed and forwarded to the Consultant.
- .5 Ensure the building and systems are ready for testing and that the building is clean and safe for equipment operation.
- .6 Prepare the building and documentation for the acceptance procedure when all systems have been completed and tested.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Hazardous Materials	Section 01 35 43
.2	Temporary Barriers and Controls	Section 01 56 00
.3	Execution	Section 01 73 00
.4	Cast-in-place concrete	Section 03 30 00
.5	Concrete block	Section 04 22 00
.6	Gypsum Board	Section 09 29 00
.7	Repainting	Section 09 92 00
.8	Site Clearing	Section 31 10 00
.9	Grading	Section 31 22 00

1.2 REFERENCES

- .1 Conform to all laws, By-Laws and regulations of the authorities having jurisdiction and, in particular, the Ontario Occupational Health and Safety Act; The Environmental Protection Act; The Ontario Building Code, (Ontario Reg. 332/12); The Ontario Fire Code; The National Building Code, 2010; and the National Fire Code. Refer to current editions of all standards.
- .2 CSA S350-M, code of practice for safety in demolition of structures.
- .3 Environmental Protection Act, R.S.O. 1990, C. E.19, and regulations under the Act, including:
 - .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
 - .2 O. Reg. 103/94: Industrial, Commercial And Institutional Source Separation Programs
 - .3 R.R.O. 1990, Reg. 347: General - Waste Management
- .4 Occupational Health and Safety Act, and regulations under the Act, including:
 - .1 O.Reg. 213/91 Construction Projects
 - .2 O.Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations amended 479/10.
 - .3 O.Reg. 860/90 Workplace Hazardous Materials Information System (WHMIS)
 - .4 All regulations regarding "Designated Substances"
- .5 Regulations for the transport of asbestos waste, including:
 - .1 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
 - .2 Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1
- .6 Resilient Floor Covering Institute (RFCI)
 - .1 Recommended Work Practices for Removal of Resilient Floor Coverings.
- .7 Conform to "Guidelines for Maintaining Fire Safety During Construction in Existing Buildings", provided by the Office of the Ontario Fire Marshal.

1.3 EXAMINATION OF EXISTING SITE AND STRUCTURE

- .1 Examine the existing site and building before tendering to be familiar with the detailed extent of demolition, dismantling, relocation and reassembly required.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .2 Copies of the original working drawings for the construction of the building are available to the Contractor. Refer to Section 00 31 00.
- .3 An inventory of hazardous materials has been conducted for the existing building; a copy of which is included in the Supplementary Information volume. Contractor to coordinate removal of asbestos and other hazardous materials, which is to be performed by one of the firms prequalified by the Owner.
- .4 No allowance will be made for failure to obtain complete information prior to close of tenders.

1.4 SUMMARY OF WORK

- .1 Removal of partitions, walls, doors, frames, and ceilings and slab on grade concrete floors.
- .2 Removal of exterior windows, and masonry where noted in drawings. Note: Demolition Contractor shall salvage brick for reuse by mason.
- .3 All removed materials shall become property of the Contractor and shall be removed from the site.
- .4 Carry out all alteration and demolition work required to accommodate new work indicated on drawings. Make good any damage caused by alterations required.
- .5 Repair or replace existing damaged surfaces scheduled to be repainted. Finished surfaces to be ready for finish painting.
- .6 Remove HVAC equipment, electrical fixtures and all other items so noted on drawings as required to accommodate new work.
- .7 Unless noted otherwise, building materials resulting from demolition under this contract shall become the property of the Contractor, and shall be removed by the Contractor.
- .8 Removal of hazardous materials indicated in Supplementary Information (Volume 3). If the Contractor uncovers additional materials within that building which are suspected to be hazardous, they shall inform the Consultant, and the Owner. The Owner will arrange to have materials tested and, if necessary, removed. Removal of any hazardous materials is to be performed by forces appointed by the Owner and paid through the Cash Allowance included in the Contract for additional removals; refer to Section 01 35 43.
- .9 Remove, transport, and dispose of hazardous materials in accordance with applicable laws.
- .10 Upgrade to Cafetorium, Science Room, Art Room and Classrooms.

1.5 PROTECTION

- .1 Erect fencing, as specified, interior barriers, notice and warning boards and maintain all protection of all kinds for the protection of the workmen on the Work, for the protection of adjoining property and for protection of public.
- .2 Protect all existing paving and site amenities not designated for removal. Make good damage to the approval of the Consultant.

- .3 Prevent movement, settlement, and damage to existing building to remain, services, paving, landscaped areas to remain, and adjacent structures. Provide temporary supports, including shoring and bracing, as required. All shoring must be designed by a professional engineer licenced in the Province of Ontario.
- .4 Protect adjacent properties against damage which might occur from falling debris or other cause. Make good damage to adjacent public or private properties resulting from Work of this Contract.
- .5 Protect existing building from damage and contamination during demolition activities. All openings must be made weatherproof. Provide temporary barriers, dust control measures, security controls, supports, and such additional protection as may be required by specific demolition work. Cover existing windows, doors, louvres, etc., opening to construction areas with minimum 16mm Type X gypsum board on steel stud framing to prevent exposure to construction activities.
- .6 Employ licensed rodent and vermin exterminators to destroy all discovered vermin and rodents.
- .7 Remove contaminated and dangerous material from the site and dispose of safely and legally. Meet all M.O.E. requirements.
- .8 During demolitions operations, keep work wetted down to prevent dust and dirt from rising. Provide water line for this purpose, furnish connections that may be required. Upon completion, remove installed temporary water lines.
- .9 Take precautions to guard against movement or settlement of adjacent land, existing building, and remaining services and utilities. Provide and place bracing or other means of support.
- .10 Take precaution against contamination of air and adjacent properties.

1.6 MAINTAINING FIRE SAFETY IN EXISTING BUILDING

- .1 Maintain all required exiting for safe operations within the existing building. Where an exit is closed off due to construction activities, provide alternate exit acceptable to both the Consultant and to Authorities Having Jurisdiction. If access to exit must be through an area under construction, provide smoke tight enclosure with minimum 45minute fire resistance rating. Any temporary exits must be clearly identified with appropriate signage.
- .2 Maintain access roadways for fire department vehicles, acceptable to the fire department. Access must be approved prior to commencement of construction activities.
- .3 Store all combustible materials in accordance with the Fire Code and the Occupational Health and Safety Act. Do not store combustible materials within the existing building or against the building. All combustibles shall be stored in a manner which minimizes risks to building and occupants.
- .4 Maintain protection at openings, as specified above, with fire separation ratings as required by Authorities Having Jurisdiction.
- .5 Maintain fire alarm system in operating condition in existing building. Notify the fire department and Owner of any temporary shutdowns of service and provide alternative measures during such periods of time.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .6 Coordinate with Owner and Authorities Having Jurisdiction for all changes to fire emergency procedures as may be required during construction.

1.7 SCHEDULE OF WORK

- .1 Construction enclosures must be installed and construction area secured before any work is undertaken. Enclosure must conform to Ministry of Labour and Municipal requirements as well as these specifications.

1.8 SERVICES

- .1 Before commencing demolition, seal and cap mechanical and electrical services serving the building section to be demolished, unless otherwise noted. Mark location and type of service of all capped services at the site. Submit record drawing showing locations and dimensions of all capped services.
- .2 Maintain and preserve any service utilities traversing the site unless otherwise noted.
- .3 In building areas to be renovated, seal and cap mechanical and electrical services as required to facilitate removals indicated on drawings. Mark location and type of service of all capped services.
- .4 Include cost to X-Ray concrete floors and walls to determine locations of buried hidden services.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Paintable, elastomeric filler:
 - .1 For filling of holes in masonry.
 - .2 Mor-Flexx by Sashco, in colour to coordinate with substrate.

PART 3 - EXECUTION**3.1 DEMOLITION**

- .1 Refer to drawings for demolition plans and notes.
- .2 Coordinate with asbestos abatement contractor to facilitate asbestos removals and to ensure asbestos is removed where required to permit demolition and alteration Work to proceed.
- .3 Demolish masonry walls in small sections. Do not permit masonry to fall in mass from one level to another.
- .4 Remove and carefully lower wood or structural steel framing if applicable.
- .5 Remove interior masonry walls, partitions, ceilings and stairways, as indicated on drawings, and as required to accommodate new construction.

- .6 Cut terrazzo floors and concrete floor slabs as required to accommodate installation of new services.
- .7 Remove glass, metals and combustible materials from walls being demolished.
- .8 In areas of building to be altered under the scope of Work of this Contract, remove all washroom partitions and accessories, and all other items not indicated or noted to remain or be re-used.
- .9 Remove existing windows and curtain wall complete with all framing, hardware and accessories. Coordinate removals with forces providing new exterior wall assembly. Ensure building is immediately made weather tight and secure.
- .10 Remove mechanical and electrical equipment and piping including propane storage tanks and similar materials. Refer to mechanical and electrical demolition drawings.
- .11 Any items noted to be re-used or re-located are to be removed carefully, cleaned, packaged appropriately, and handed over to Contractor.
- .12 Upon discovery of mould or mouldy materials remove and dispose of these separately.
- .13 If any additional materials suspected to contain asbestos and other designated substances are encountered, do not disturb these materials. Inform the Consultant of the location and extent of suspect material.
 - .1 Do not resume work in this area until it has been cleared by an Abatement Consultant.
 - .2 Coordinate removal of any identified designated substances by trained forces appointed by the Owner; to be paid through the Cash Allowance. Hazardous material abatement is to be completed prior to recommencing demolition work in the area.
- .14 At the end of each day's work, leave work in a safe condition so that no part of the remaining structure is in danger of collapse.
- .15 Do not burn any refuse or debris at the site.

3.2 SALVAGING OF BRICK

- .1 Coordinate with mason to determine the amount of clay brick required for masonry work.
- .2 Brick will be required for repairs to the exterior of the building for infill as indicated on exterior elevation drawings, and for infill at exposed brick masonry within the building.
- .3 Clean salvaged masonry and stockpile on platforms as specified in Section 04 01 20.

3.3 CLEANING OF EXPOSED BRICKWORK

- .1 Scrape mortar from face of existing brick. Cut back all redundant flashings as far as possible and remove grout, ready for regrouting by mason. Remove any penetrating steel ties and supports associated with demolished walls.
- .2 Cleaning of masonry is to be undertaken when temperature, site and wind conditions are favourable.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .1 Confirm environment conditions required for application of cleaning solutions with product manufacturer.
- .2 Do not allow cleaning solutions to dry on brickwork; particular care must be taken in hot weather.
- .3 Do not undertake cleaning when site is dusty.
- .4 Remove any loose contaminants with non-metallic hand tools.
- .5 Select the appropriate cleaning solutions and follow the manufacturer's recommended instructions. Do not use unbuffered muriatic acid.
- .6 Protect adjacent materials and nearby plants and grass from damage as noted above.
- .7 Saturate the area to be cleaned, flushing with water from top down. Keep masonry saturated to avoid absorption of the cleaning solution or dissolved particles. Keep surfaces below the area being cleaned wet until after the final rinse to prevent streaking.
- .8 Apply the cleaning solutions in accordance with the manufacturers printed instructions. Use a long handled stiff fibre brush or other type as recommended by the cleaning solution manufacturer. Do not use metal brushes.
- .9 Rinse thoroughly. Flush walls with large amounts of clean water from top to bottom before cleaned surfaces can dry.

3.4 REPAIRS AND NEW OPENINGS IN EXISTING WALLS

- .1 Where new openings are shown to be cut into existing walls, break open the wall to the sizes required, provide new lintels over the opening and patch all adjacent materials. This includes new openings with lintels for Mechanical trade.
- .2 Repair damage to existing walls in areas scheduled to be repainted, where damage is to substrate, not just the coating. Repairs to deteriorated coatings are specified in Section 09 92 00. Repair masonry surfaces with patching compounds and fillers. Cut out and replace damaged sections of gypsum panels; refer to section 09 29 00 for gypsum board work. All repairs to be completed to level required for finish painting.

3.5 CUTTING OF CONCRETE SLAB ON GRADE

- .1 Cut slab and remove sections as required to do new plumbing and drainage work, and as indicated on drawings. Assume minimum 225mm slab thickness.
- .2 For pricing purposes, assume that 10% of the cutting required for removals of slab on grade will have to be performed using hand tools in order to avoid damaging electrical conduit located within the slab.

3.6 REMOVAL OF EXISTING FLOOR FINISHES

- .1 Existing floor finishes shall be removed and old adhesive removed from the existing concrete slab by wet scraping, and in accordance with Health & Safety requirements. Use of solvents, or grinding of floor finishes will not be accepted.
- .2 Existing concrete floors shall be prepared according to manufacturer's instructions for new adhesive applied finishes.
- .3 Repair damaged areas of concrete floors by use of patching compounds and fills. Refer to Section 09 01 61 for flooring restoration.
- .4 Protect existing flooring, to remain, from damage.

3.7 CUTTING AND PATCHING OF EXISTING CONCRETE FLOORS

- .1 Cut existing slab-on-grade as required to install new service connections.
- .2 Excavate below slab to depth required for installation of services. Coordinate with mechanical.
- .3 After completion of installation and testing of new services, repair concrete slab-on-grade as follows:
 - .1 Backfill with clean, clear crushed stone, 19mm size, imported from approved source. Compact to refusal with manually operated vibratory tampers.
 - .2 Provide new 15mm polyolefin vapour barrier over granular backfill.
 - .3 Provide dowels to tie existing and new slab sections together; drill into edge of existing slab as required to insert dowels. Provide 19mm diameter x 450mm long smooth steel dowels and install half way into existing slab edges at 400mm on centre, grouted in with non shrink grout. Grease exposed half of dowels before pouring new concrete slab.
 - .4 Pour new slab to match depth and level of existing slab on grade.
- .4 Concrete shall be 25MPa at 28 day strength. Use ready mix concrete only.
- .5 Drypack concrete grout shall consist of 1 part Portland cement, 1 ½ parts sand, 2 parts 6mm gravel, with water as required to dampen the mix.
- .6 Reinforcing steel shall be deformed bars of 400 MPa yield strength. Detail reinforcing in accordance with ACI 315.
- .7 Supply and install concrete, reinforcing steel and formwork, including placing, finishing, and curing, in accordance with CSA-A23 and CSA-G30.
- .8 Chip out slab on grade and prepare concrete floors to receive new floor finishes.

3.8 REMOVAL OF CEILINGS

- .1 Remove existing ceilings and bulkheads in areas where new ceilings and bulkheads are indicated, and as shown on drawings.
- .2 Ceilings to be demolished shall be removed complete with all finishes, framing, suspension system, trim, and accessories.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .3 Where ceilings are to be removed to accommodate work, and later reinstalled, carefully disassemble ceilings to the extent required. Clean all components, wrap for protection, clearly label package contents, and store in a safe location until they are to be reinstalled.
- .4 Where ceilings are to remain after adjacent walls or bulkheads are demolished, remove ceiling components as required to complete demolition work. Coordinate with forces doing new ceiling work, to confirm what components are to be retained for reuse. Cut ceiling tiles may not be used; new full or appropriately cut tiles will be required.
- .5 Where ceiling mounted equipment is indicated to be removed and reused, or where it must be temporarily removed to accommodate the Work, it is to be carefully removed, cleaned, wrapped, labelled as to contents, and stored in a safe location, ready for reinstallation.
- .6 Repair damaged gypsum board ceilings to remain, in renovated areas, to level ready for finish painting.
- .7 Existing ceilings are fire rated; retain fire rating when repairing and replacing ceilings.

3.9 ROOF OPENINGS

- .1 Remove all roof curbs, abandoned vents and flashings, abandoned gas lines, and all associated supports, sleepers, and accessories, where indicated on drawings.
- .2 Cut openings required for new rooftop units, vents, and other rooftop equipment indicated in the documents. Coordinate cutting of new openings to correspond with installation of new work; ensure roof remains watertight at all times.
- .3 Coordinate with roofing trade to ensure that openings in the roof, resulting from demolition work, are made watertight immediately.
- .4 Cover redundant openings in steel deck as follows:
 - .1 Openings up to 300mm in any dimension:
 - .1 Provide minimum 20 gauge galvanized steel plate extending minimum 300mm beyond opening in each direction. Mechanically fasten to roof deck using stainless steel fasteners.
 - .2 Provide wood decking (38mm thick) at wood deck.
 - .2 Openings up to 450mm:
 - .1 Cut back existing roof deck to nearest joists and provide new galvanized steel deck spanning minimum 2 joists, and mechanically fasten using stainless steel fasteners, unless indicated otherwise on structural drawings.
 - .3 Openings over 450mm:
 - .1 As indicated on structural drawings, or as directed by the structural consultant. Structural framing is required.

3.10 MECHANICAL AND ELECTRICAL WORK

- .1 Mechanical and Electrical services must be temporarily capped or terminated to permit renovation in existing areas to proceed.

- .2 Refer to mechanical and electrical drawings for the extent of removals, relocations, and alterations required.
- .3 Ceiling mounted mechanical and electrical equipment which is to be removed and reused is to be carefully removed and stored as specified above.
- .4 Cutting of holes up to 100mm in size in the existing structure and surfaces required by the mechanical and electrical trades shall be by those Subcontractors. Cutting and patching of openings greater than 100mm in size shall be by the Contractor in co-ordination with those trades. PATCHING OF ALL HOLES IN EXPOSED FINISHED SURFACES SHALL BE BY THE CONTRACTOR. Mechanical and Electrical trades shall do their own coring of existing slabs as required.

3.11 REMOVAL OF ALUMINUM WINDOWS & HOLLOW METAL DOORS & FRAMES

- .1 Remove aluminum windows and hollow metal doors and frames where indicated. Take care not to damage masonry .
- .2 Immediately fill all holes in structure, resulting from removals, with paintable, elastomeric sealant specified above.
 - .1 Colour of sealant shall be closest available match to the substrate.
 - .2 Install sealant in accordance with manufacturer's instructions for the substrate type.
 - .3 Touch-up paint cured sealant with exterior latex paint, colour matched to existing substrate.

3.12 COMPLETION OF WORK

- .1 Remove all surplus materials, equipment and rubbish from the site.
- .2 Leave site in condition to meet approval of the Consultant.
- .3 On completion of Demolition work, thoroughly clean all existing surfaces to remain, including ceiling space. No debris or dirt shall remain to be enclosed by new construction.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 All formwork for cast-in-place concrete including falsework.
- .2 Shoring existing construction to carry concrete construction loads.
- .3 Pullout Testing.
- .4 Waterstops.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Concrete Reinforcement, Section 03 20 00
- .2 Cast-in-Place Concrete, Section 03 30 00

1.3 REFERENCES

- .1 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .2 CSA-A23.2, Methods of Test and Standard Practices for Concrete.
- .3 CSA O121, Douglas Fir Plywood.
- .4 CAN/CSA-O141, Softwood Lumber.
- .5 CSA S269.1, Falsework for Construction Purposes.
- .6 CAN/CSA-S269.3, Concrete Formwork.
- .7 ASTM C900, Standard Test Method for Pullout Strength of Hardened Concrete.
- .8 ASTM D412-98a, Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .9 ASTM D624-00e1, Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .10 ASTM D746, Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00 - Submittals.
- .2 Submit to the Consultant for review before the start of Work, 4 white prints of shop drawings. Leave room on drawings for the stamps of the Consultant and the Structural Engineer. Check and sign before submission. Only 2 copies will be returned to General Contractor.
- .3 For multi-storey construction, ensure that sufficient reshoring is provided to prevent overloading of the structure while constructing the work above.

SECTION 03 10 00 - CONCRETE FORMWORK

- .4 Provide seal and signature of qualified professional engineer registered in Ontario on each shop drawing.
- .5 Structural design of formwork, falsework and reshoring will not be reviewed by the Consultant.

1.5 **TOLERANCES**

- .1 Conform to CSA A23.1 unless more stringent tolerances are specified for interfacing materials, in which case the more stringent tolerances apply.

PART 2 - MATERIAL2.1 **MATERIALS**

- .1 Falsework materials: to CSA S269.1.
- .2 Formwork materials: to CAN/CSA S269.3 and as follows
 - .1 For concrete without special architectural features, use plywood and wood formwork materials to CSA O121 and CAN/CSA O141.
 - .2 For architectural concrete use high density overlay plywood to CSA O121. Not required if concrete is to be sandblasted.
 - .3 Circular forms for architectural concrete and no spiral pattern:
 - .1 Redline Poli-Permaform with poli-liner by Perma Tubes Ltd.
 - .2 Burke Smooth Tube with PVC liner by Aluma International
 - .4 Circular forms when not architectural concrete: spirally wound laminated fibre forms internally treated with release material.
 - .5 Square fibre forms:
 - .1 Sonotube Square Fibre Forms by Sonoco Ltd. with square fibreboard insert locked with polystyrene inside round form.
- .3 Form ties:
 - .1 For concrete not designated architectural, use removable or snap ties, fixed or adjustable length, free of devices leaving holes larger than 25mm dia. in concrete surface.
 - .2 For architectural concrete, use galvanized ties complete with temporary plastic cones and permanent light grey concrete plugs recessed 6mm.
 - .3 Form ties to be metal designed to act as ties and spreaders and having a minimum working strength of 13 kN (3000 pounds).
 - .4 Snap ties to snap cleanly at least 25mm from concrete surface without damage to the concrete.
 - .5 Cone ties to be internal disconnecting type which snap cleanly at least 38mm from concrete surface without damage to the concrete.
- .4 Form liner: High density overlay plywood to CSA O121 or other special materials to achieve the required concrete finish.
- .5 Form release agent: Chemically active release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps.

- .6 Form stripping oil: Colourless mineral oil, free of kerosene, with viscosity between 15 to 24mm²/s (70 and 110 s Saybolt Universal) at 40°C, flashpoint minimum 150°C, open cup.
- .7 Grooves, reglets and chamfers: White pine selected for straightness and accurately dressed to size.
- .8 Void Form: Cellular cardboard with minimum compressive strength of 62 kPa (9 psi) designed to carry weight of wet concrete and loads associated with placing concrete and also designed to disintegrate and create an air space below the fully hardened concrete.

2.2 ACCESSORIES

- .1 PVC Waterstops:
 - .1 CPD PVC Waterstop by CPD
 - .2 Sealtight PVC Waterstop by W.R. Meadows of Canada
Use 100mm wide in construction joints and 225mm wide with 31mm O.D. centre bulb in expansion joints.
- .2 Bentonite Waterstops:
 - .1 Waterstop RX 101 by CETCO (distributor: DRE Industries)
 - .2 Waterstop by W.R. Meadows
- .3 Dovetail anchor slots: minimum 0.6 mm thick galvanized steel with insulation filled slots.
- .4 Weep hole tubes: plastic.

PART 3 - EXECUTION

3.1 CONSTRUCTION REVIEW

- .1 Review of construction by Consultant is to ascertain general conformity with contract documents. It does not relieve the Contractor of his contractual responsibilities. The review is based on representative samples of the work and does not relieve the Contractor from carrying out his own quality control and making the work in conformity with the drawings and specifications.
- .2 Construction reviews are undertaken by the Consultant and the Inspection and Testing Agency so that the Owner may be informed in writing as to the quality of the Contractor's performance and for the protection of the Owner. They will be carried out by examination of representative samples of the Work.
- .3 The Contractor will receive copies of the construction review reports and the results of material tests. He will thereby be informed of any defects or deficiencies found.
- .4 Bring to the attention of the Consultant, any defects or deficiencies in the Work, which may occur during construction together with a proposal for remedy. The Consultant will decide what corrective action may be taken and will issue the necessary instructions.

3.2 FABRICATION AND ERECTION

- .1 Conform to CSA A23.1.

SECTION 03 10 00 - CONCRETE FORMWORK

- .2 Fabricate and erect falsework in accordance with CSA S269.1. Do not place falsework and reshores on frozen ground.
- .3 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within required tolerances.
- .4 Make formwork tight and flush faced to prevent the leakage of mortar and the creation of unspecified fins or panel outlines.
- .5 Form sides of footings unless otherwise noted on the Structural Drawings.
- .6 See drawings for any camber required in hardened concrete. Measure cambers relative to member supports.
- .7 Obtain Consultant's approval for formed openings not indicated on Structural Drawings.
- .8 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .9 Clean forms before placing concrete.
- .10 Provide water stops and keys around temporary openings in basement and retaining walls for shoring rakers or similar purposes.
- .11 Use internal form ties.
- .12 Do not permit loads from formwork to be transmitted to adjacent existing structure.
- .13 Apply a form coating and release agent uniformly to the contact surface of formwork panels before reuse.
- .14 Construction joints:
 - .1 Provide construction joints where specified or shown on the drawings. Locate and make other joints so as not to impair the required strength of the structure. Joints are subject to the review of the Consultant.
 - .2 Locate construction joints near third of spans of slabs, beams and girders unless a beam intersects a girder at this point. In that case offset the girder joint twice the beam width and provide additional shear reinforcement to the acceptance of the Consultant.
 - .3 Slabs on steel deck: Locate construction joints in slabs at centre of supports unless there are composite beams.
 - .4 Walls: Provide vertical construction joints in walls at 30m (100 feet) maximum. Provide vertical control joints in walls at 9m (30 feet) maximum.
 - .5 Outside walls: Provide vertical keyed expansion joints in walls at 14.6m (48 feet) maximum. Provide vertical control joints in walls at 4.8m (16 feet) maximum.
 - .6 Slabs: Provide construction joints in slabs at 30m (100 feet) maximum in both directions.
- .15 PVC Waterstops:
 - .1 Install waterstops in all expansion, construction and control joints in exterior walls, basement walls, retaining walls, slabs supporting earth, and other locations shown.

- Locate construction joints with waterstops at least 300mm away from corners and wall intersections.
- .2 Heat splice all sections of waterstops for continuity over the full length of runs. Use prefabricated splice sections where two runs intersect.
- .3 Securely wire waterstops to reinforcing bars at 1m (3 feet) maximum centres to keep them in alignment when concrete is placed.
- .16 Bentonite Waterstops:
 - .1 Install bentonite waterstops in all construction joints in exterior walls, basement walls, retaining walls, slabs supporting earth, and other locations shown. Use PVC waterstops at expansion joints.
 - .2 Locate bentonite waterstops 75 mm from outside face of concrete to avoid spalling of concrete due to swelling pressure of bentonite.
 - .3 Butt strips together. Do not overlap.
 - .4 Fasten to concrete at 600 mm maximum.
- .17 Void form: Conform to recommendations of manufacturer. Place on sand leveling bed. Protect from moisture until concrete is about to be placed. Protect from excessive construction loads. If void form collapses during construction, remove and replace affected area.
- .18 Dovetail anchor slots: Provide vertical dovetail anchor slots at 600 mm on centre where masonry covers face of concrete. Provide vertical dovetail slots at centre of masonry wythe where masonry abuts concrete.

3.3 REMOVAL AND RESHORING

- .1 Conform to CSA A23.1.
- .2 Survey tops of slabs and submit survey plan to Consultant before removal of supporting falsework. Survey slabs at supports, at midspans between supports and at centres of bays.
- .3 Remove falsework supporting beams and slabs only after concrete has reached at least 75% of its specified 28 day strength. For beams and slabs exceeding 6 m span, reshore at least until concrete has reached its 28 day strength.
- .4 Construction gaps: Do not remove falsework supporting beams and slabs adjacent to construction gaps until the gaps are filled and concrete in gaps has reached at least 75% of its specified 28 day strength.
- .5 Use pullout tests to determine in-situ strength of concrete prior to removal of falsework. Retain a testing company to supply, locate and test the inserts in accordance with ASTM C900. See CSA A23.2 Appendix A.
- .6 For multi-storey construction, reshore beams and slabs to prevent overloading of the structure while constructing the work above.

3.4 FIELD QUALITY CONTROL

- .1 Obtain field review of falsework and reshoring by a professional engineer registered in Ontario prior to each pour. The Consultant will not field review the formwork, falsework or reshoring

SECTION 03 10 00 - CONCRETE FORMWORK

3.5 PITS, CURBS, BASES

- .1 Construct all concrete sumps, pits, trenches, curbs and machinery bases forming part of floor construction that are required within the building by other trades.

3.6 MECHANICAL AND ELECTRICAL WORK

- .1 Construct all concrete underground electrical duct banks, underground water service thrust blocks and supports for underground piping in unstable fill. Also construct all concrete pads for pipes passing through foundation walls, manholes and catch basins. See mechanical and electrical drawings and specifications for details and extent of work.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 All reinforcement for cast-in-place concrete.
- .2 Supply of reinforcing bars for masonry.

1.2 RELATED WORK

- .1 Concrete Formwork, Section 03 10 00.
- .2 Cast-in-Place Concrete, Section 03 30 00.
- .3 Masonry, Division 4.

1.3 REFERENCES

- .1 Reinforcing Steel Manual of Standard Practice published by the Reinforcing Steel Institute of Canada.
- .2 ACI SP-66, ACI Detailing Manual published by the American Concrete Institute.
- .3 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .4 CSA-A23.3, Design of Concrete Structures.
- .5 ASTM A82, Standard Specification for Steel Wire, Plain, for concrete reinforcement.
- .6 ASTM A185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- .7 CSA G30.18, Billet-Steel Bars for Concrete Reinforcement.
- .8 CAN/CSA G40.21, Structural Quality Steels.
- .9 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .10 ASTM D3963/D3963M, Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.

1.4 SOURCE QUALITY CONTROL

- .1 Upon request, provide the Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
- .2 Upon request, inform the Consultant of proposed source of material to be supplied.
- .3 Upon request, provide the Consultant with a copy of plant certificate by the Concrete Reinforcing Steel Institute for epoxy coating of reinforcement.

- .4 Upon request, provide the Consultant with a copy of manufacturer's instructions for patching factory applied epoxy coating.
- .5 Use welding firm certified by the Canadian Welding Bureau under the requirements of CSA W186.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 23 Shop Drawings, Product Data and Samples. This applies to all reinforcement including reinforcing bars for masonry to be installed by the Masonry Trade.
- .2 Submit to the Consultant for review before the start of Work, 4 white prints of shop drawings. Leave room on drawings for the stamps of the Consultant and the Structural Engineer. Check and sign before submission. Only 2 copies will be returned to General Contractor.
- .3 Allow a minimum of 10 working days for review of each submission of shop drawings in the Structural Engineer's office. Shop drawings received after noon will be date-stamped as received the following working day.
- .4 If required, CAD diskettes of the Structural Drawings are available "as-is", and at cost, for use in the preparation of shop drawings provided that the title blocks are removed and provided that the Owner and the Owner's Consultants are not held responsible for any errors or omissions on the drawings. These CAD drawings are not to be scaled.
- .5 Submit plans, elevations, sections, and bar lists necessary to show reinforcing and to facilitate review and placing. Show location of construction joints and detail reinforcement at joints. Dimension strips for flat slabs and flat plates. Draw elevations of walls including reinforced masonry walls. Show concrete cover on the diagrams. Draw to scale not smaller than 1:50.
- .6 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacing, locations of reinforcement and splices with identifying code marks to permit correct placement without reference to Structural Drawings.
- .7 Conform to CSA A23.1 and the Reinforcing Steel Manual of Standard Practice, unless the Contract Documents contain a more stringent requirement, in which case the latter shall govern. Provide accessories as required by the Standard. Conform to ACI, SP-66 Detailing Manual whenever a detail condition is not covered by any of the above, but is covered by the ACI Manual.
- .8 Design and detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated. Provide standard hooks at ends of hooked bars.
- .9 Do not release for fabrication reinforcing bars whose length may be affected by field conditions, such as the final elevation of footings, until the governing field dimensions have been ascertained.
- .10 Review of shop drawings by the Consultant is on a sampling basis for general conformity with contract documents. It is not a detailed check and must not be construed as

relieving the Contractor of responsibility for making the work accurate and in conformity with the Contract Documents.

.11 Design for which the Contractor is responsible under the contract will not be reviewed. Work done prior to the receipt of the reviewed shop drawings will be at the risk of the Contractor. Review comments are not authorization for changes to the contract price.

.12 After review, drawings will be returned to the Contractor stamped to show one of the following:

- | | | | |
|----|----------|---|--|
| .1 | Reviewed | - | Released for fabrication. |
| .2 | Noted | - | Released for fabrication after revisions noted are made.
Submit revised drawing for Consultant's records. |
| .3 | Resubmit | - | Correct and resubmit for review. |

Conform to the requirements of each authority that has reviewed the drawings.

.13 Keep on site at all times a set of reviewed shop drawings and use only these drawings and the Structural Drawings to place reinforcing steel. Neatly mark on the Structural Drawings changes issued during the course of construction.

1.6 TOLERANCES

- .1 Conform to CSA A23.1.
- .2 Cover to be not less than required for fire rating.

1.7 SUBSTITUTES

- .1 Substitute different size bars only if permitted in writing by the Consultant.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400 MPa, deformed bars to CSA-G30.18, unless otherwise indicated.
- .2 Weldable reinforcing steel: weldable steel, grade 400MPa, deformed bars to CSA G30.18. Required only where welding is indicated.
- .3 Cold-drawn annealed steel wire ties: to CSA G30.3.
- .4 Welded wire fabric: to CSA G30.5. Provide in flat sheets only.
- .5 Epoxy coated reinforcement: Apply fusion bonded epoxy coating conforming to the requirements of ASTM D3963/D3963M. Provide colour which contrasts sharply with reinforcing steel and rust colours. Brown is not acceptable. All bars must be supplied by plants certified by the Concrete Reinforcing Steel Institute for epoxy coated steel. Certified plants include:

- .1 Harris Rebar - Stoney Creek, Ontario
 - .2 Teme Rebar Concepts - Fruitland, Ontario
- Provide patching material for areas where the epoxy coated is damaged or omitted in accordance with the coating manufacturer's written instructions using material supplied by the manufacturer.

- .6 Bar supports and side form spacers: to CSA-A23.1. For exposed concrete surfaces and for floor and roof slabs with directly applied ceiling finish: use either plastic bar supports or plastic tipped bar supports for at least the bottom 25mm; use plastic side form spacers; and use plastic with colour to match concrete. For epoxy coated reinforcement, use plastic bar supports, epoxy coated support bars and plastic coated tie wires.
- .7 Epoxy coating of existing reinforcement: Amerlock 400 High-Solids Epoxy by Amercoat Canada Inc. or an equivalent material acceptable to the Consultant. Provide colour which contrasts sharply with steel and rust colours.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .3 Where indicated, weld reinforcement in accordance with CSA-W186. Use weldable reinforcing steel.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar lists.

PART 3 - EXECUTION

3.1 PLACING REINFORCEMENT

- .1 Handle epoxy coated bars in accordance with CSA S413.
- .2 Place reinforcing steel in accordance with CSA-A23.1.
- .3 Do not drive or force reinforcement into fresh concrete.
- .4 Concrete cover to be not less than required for fire rating.
- .5 Use only reviewed shop drawings and the Structural Drawings for placing of reinforcement. Report discrepancies to the Consultant before proceeding.
- .6 Before placing, remove all loose scale, dirt, oil or other coatings, which would reduce bond.
- .7 Turn the ends of tie wire towards the interior of the concrete.

.8 Use bar supports for beams and slabs. Use precast concrete chairs where supports rest on the ground. Where welded wire fabric is used in slabs-on- grade, place precast concrete chairs at 600 mm on centre each way. Use side form spacers for walls and columns.

.9 No splicing of reinforcement is permitted other than shown on the Structural Drawings.

.10 Do not cut reinforcement without written approval of Consultant.

.11 Ensure concrete cover to reinforcement is maintained during concrete pour.

3.2 FIELD BENDING

.1 Do not field bend reinforcement except where indicated or authorized by the Consultant. Do not field bend epoxy coated reinforcement.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure. Replace bars, which develop cracks or splits.

3.3 FIELD WELDING

.1 Do not field weld reinforcement except where indicated or authorized by the Consultant. Do not weld epoxy coated reinforcement.

.2 Conform to CSA A23.1 and CSA W186.

3.4 PATCHING FACTORY APPLIED EPOXY COATING

.1 If factory applied epoxy coating is damaged or omitted, patch in accordance with coating manufacturer's written instructions using material supplied by manufacturer.

3.5 REVIEW OF CONSTRUCTION

.1 Provide the Consultant with a minimum of 24 hrs notice of intended concrete pours to allow review of reinforcement.

.2 Review of construction by Consultant is to ascertain general conformity with contract documents. It does not relieve the Contractor of his contractual responsibilities. The review is based on representative samples of the work and does not relieve the Contractor from carrying out his own quality control and making the work in conformity with the drawings and specifications.

.3 Reviews are undertaken so that the Owner may be informed in writing as to the quality of the Contractor's performance and for the protection of the Owner.

.4 The Contractor will receive copies of the construction review reports and the results of material tests. He will thereby be informed of any defects or deficiencies found.

.5 Bring to the attention of the Consultant, any defects or deficiencies in the Work, which may occur during construction together with a proposal for remedy. The Consultant will decide what corrective action may be taken and will issue the necessary instructions.

3.6 REINFORCED MASONRY

- .1 Supply reinforcing bars required for the construction of masonry lintels, beams, walls, columns and piers. Provide shop drawings. Note that Structural Drawings do not show all openings. Refer to lintel notes on structural drawings.

3.7 PITS, CURBS, BASES

- .1 Construct all concrete sumps, pits, trenches, curbs and machinery bases forming part of floor construction that are required within the building by other trades.
- .2 Unless otherwise shown on drawings, reinforce curbs with 10M @ 400 dowels plus 2 - 10M continuous horizontal.
- .3 Unless otherwise shown on drawings, reinforce bases with 10M at 300 each way placed 50 mm below top of concrete.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 All cast-in-place concrete including supply, placing, finishing and curing.
- .2 Moisture vapour reduction admixture in concrete for interior slabs on grade.
- .3 Installing embedment.
- .4 Grouting under base plates and bearing plates.

1.2 RELATED WORK

- .1 Concrete Formwork, Section 03 10 00.
- .2 Concrete Reinforcement, Section 03 20 00.
- .3 Structural Steel, Section 05 10 00
- .4 Under Slab Vapour Barrier, Section 07 26 16.

1.3 REFERENCES

- .1 ASTM C260, Standard Specification for Air-Entraining Admixtures to Concrete.
- .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
- .4 ASTM D1751, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- .5 ASTM E 1745-09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- .6 ASTM E 1643-11 Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
- .7 CSA A5, ASTM C150 Standard Specification for Portland Cement.
- .8 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .9 CSA-A23.2, Methods of Test and Standard Practices for Concrete.
- .10 CAN/CSA A3000, Cementitious Materials for Use in Concrete.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

- .11 CAN/CSA S448.1, Repair of Reinforced Concrete in Buildings.
- .12 CSA A283, Qualification Code for Concrete Testing Laboratories

1.4 QUALITY ASSURANCE

- .1 Concrete supplier to have a valid "Certificate of Ready Mixed Concrete Production Facilities" as issued by the Ready Mixed Concrete Association of Ontario.

1.5 PROJECT RECORDS

- .1 Batch Logs: Concrete supplier to keep record of each batch delivered to site.
- .2 Concrete Delivery Slips: Keep all concrete delivery slips ("driver's tickets") on site until building is completed. Record on delivery slip where concrete was placed including time and date.
- .3 Record Drawings: Record on a set of Structural Drawings extent of each pour including pour date and falsework removal date. Also record all changes to that shown on drawings including footing elevations.
- .4 Keep project records up to date and make available to Consultant at all times.

1.6 SUBMITTALS

- .1 Submit to the Consultant for review before the start of Work, 4 white prints of shop drawings. Leave room on drawings for the stamps of the Consultant and the Structural Engineer. Check and sign before submission. Only 2 copies will be returned to General Contractor.
- .2 Minimum 2 weeks prior to starting concrete work, submit certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.
- .3 Minimum 2 weeks prior to starting concrete work, submit all concrete mix designs, including pump mixes, and indicate where each concrete mix is to be used. Where Class C1, C2 or F1 mix designs are required, submit test data to confirm that air-void system conforms to CSA A23.1 for each mix design.
- .4 Minimum 2 weeks prior to starting concrete work, submit a written confirmation that all admixtures used in concrete will not have any adverse impact on the long term durability and performance of concrete, or any other materials embedded or in contact with concrete. Also provide a written statement that any admixtures used in concrete will not have any adverse effect on human health and the environment.
- .5 Minimum submission requirements for each concrete mix design shall include the following:
 - .1 minimum specified compressive strength at 28 days
 - .2 maximum aggregate size
 - .3 aggregate type (if not normal density)
 - .4 alkali-aggregate resistance
 - .5 concrete density range, wet and dry (if not normal density)
 - .6 CSA exposure class
 - .7 cement type (if not type 10)

- .8 maximum water/cement ratio
 - .9 plastic air content range air-void system test data
 - .10 assumed method of placement of concrete
 - .11 slump range
 - .12 percentage and type of any supplementary cementing materials
 - .13 admixtures (type and name only)
 - .14 certificate of compatibility between admixtures unless all admixtures are supplied by same manufacturer
- .6 Minimum 2 weeks prior to starting concrete work, submit proposed quality control procedures for Consultant's approval for following items:
- .1 Finishing, curing and protection
 - .2 Hot weather concreting
 - .3 Cold weather concreting
- .7 Minimum 4 weeks prior to placing any slabs-on-grade, submit drawings showing proposed locations of construction joints and control joints in slabs-on-grade.

1.7 WARRANTY

- .1 Provide manufacturer's 10 year warranty for moisture vapour reduction admixture placed in interior slab-on-grade. Warranty shall cover repair or removal of failed flooring system, including application of a moisture remediation coating system on concrete subfloor, and supply and installation of new flooring to match existing. Warranty shall commence at the date of Substantial Performance of the Contract.

PART 2 - MATERIAL

2.1 CONCRETE MIX MATERIALS

- .1 Portland cement: to CSA-A5.
- .2 Cementitious hydraulic slag: to CSA-A363.
- .3 Flyash: to CSA-A23.5, Type CI.
- .4 Water: to CAN/CSA-A23.1.
- .5 Aggregates: to CSA-A23.1. Coarse aggregates to be crushed stone or gravel which is suitable for type N concrete as defined by Supplementary Guidelines to OBC 2006, SG-2, . Do not use recycled concrete as aggregate.
- .6 To ensure compatibility, all admixtures to be supplied by a single manufacturer or certificate of compatibility to be provided with mix design.
- .7 Air entraining admixture: to ASTM C260.
- .8 Chemical admixtures: to ASTM C494. Do not use admixtures containing chlorides.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

- .9 Corrosion inhibiting admixture: Containing calcium nitrite:
 - .1 DCI by W.R. Grace (use DCI-S with ambient temperatures above 20°C)
 - .2 Rheocrete CNI by Master Builders (add set retarder with ambient temperatures above 20°C).
- .10 Shrinkage reducing admixture: Eclipse Floor for non-air entrained concrete and Eclipse Plus for air entrained concrete by W.R. Grace. Confirm compatibility with superplasticizer if being used.
- .11 Plastic fibre additive: fibrillated polypropylene fibres at least 19mm in length:
 - .1 Fibremesh by Master Builders
 - .2 ConLoc Fibres by Pro Technologies
 - .3 Fiberforce by Ampro
 - .4 Promesh by Canada Cordage

2.2 OTHER MATERIALS

- .1 Grout: Premixed, non-metallic, non-shrink:
 - .1 Euco NS Grout by Euclid Admixture Canada
 - .2 Masterflow 713 by Chemrex (M.B.T.)
 - .3 V-3 Grout by W.R. Meadows of Canada
 - .4 Sikagrout 212 by Sika Canada
 - .5 M-Bed Standard by Sika Canada
 - .6 CPD Non-Shrink Grout by CPD
- .2 Dry pack grout: Use 1:2 mix of Portland cement and concrete sand. Add sufficient water for the mixture to retain its shape when made into a ball by hand. When thickness of grout exceeds 50mm, use 1:1½:2 mix of Portland cement, concrete sand and 10mm pea gravel instead. Compressive strength at 28 days to be 30 MPa.
- .3 Liquid curing/sealing compound: to ASTM C309 Type 1, Class B, water based acrylic, compatible with surface hardener where hardener is used:
 - .1 Sealtight CS 309 by W.R. Meadows of Canada. Apply two (2) coats where exposed concrete floor is called for in Room Finishing Schedule. Apply first coat as soon as concrete sets - Apply second coat just prior to occupancy by Owner.
- .4 Premoulded joint fillers: Bituminous impregnated fibre board: to ASTM D1751.
- .5 Evaporation reducer: Confilm by Chemrex (M.B.T.)
- .6 Bonding agent: synthetic latex :
 - .1 Surfacrete Concentrate by Sika Canada
 - .2 Intralok by W.R. Meadows of Canada
 - .3 Acryl-Set by Chemrex (M.B.T.)
 - .4 CPD Concentrated Latex Adhesive by CPD
- .7 Drilled concrete expansion anchors:
 - .1 Kwik-Bolt by Hilti
 - .2 Wedge Anchor by Ucan Fastening Products

- .8 Drilled concrete adhesive anchors:
 - .1 HVA Adhesive Anchor by Hilti.
 - .2 ADH Adhesive Anchor by Ucan Fastening Products
- .9 Epoxy for bonding anchors and dowels into predrilled holes in concrete:
 - .1 HIT-HY-150 by Hilti
 - .2 Epcon Ceramic 6 by ITW Construction Products
 - .3 Flo-Rok FR1-22 & FR3-22 by Ucan Fastening Products
- .10 Vapour barrier: Refer to Section 07 26 16
- .11 Rigid insulation: Extruded polystyrene boards: Refer to Section 07 21 13 for perimeter insulation and insulation below slabs.
 - .1 Styrofoam SM by Dow Chemical
 - .2 Styrofoam HI-100 by Dow Chemical
- .12 Control joint filler: semi-rigid filler to protect against slab edge breakdown:
 - .1 For sawcuts and joints in interior slabs:
 - .1 Rezi-Weld Flex by W. R. Meadows
 - .2 Loadflex by Sika Canada
 - .2 For sawcuts and joints in exterior slabs:
 - .1 Sikaflex 2C NS/SL by Sika Canada
- .13 Elastomeric bearing pads: Virgin natural polyisoprene or virgin polychloroprene conforming to CAN/CSA-S6,
- .14 Controlled density concrete fill, $f'c = 4$ MPa:
 - .1 K-Crete by Dufferin Concrete Products or equivalent
- .15 Prefabricated Seepage Protection System:
 - .1 Terradrain 200 by Terrafix Geosynthetics Inc.
 - .2 Weeperwick by Subsurface Systems Inc.
- .16 Bentonite Geotextile Waterproofing:
 - .1 Voltex by CETCO (distributor : DRE Industries)
- .17 Crack Filler Epoxy: Capweld 524 by Cappar Ltd.
- .18 Base under concrete Slabs on Grade: Clean, crushed stone, 20 to 22mm.

2.3 CONCRETE MIXES

- .1 Use ready-mix concrete. Proportion concrete in accordance with CSA A23.1. Use a water-reducing agent in all concrete except where MVRA admixture is required. Obtain approval of the Consultant for the use of admixtures other than water-reducing and air entraining agents. Add moisture vapour reduction admixture (MVRA) in accordance with manufacturer's recommendations to all ready mix concrete to be placed in interior slab on grade. Do not add plastic fiber to concrete containing MVRA.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

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- .2 Supplementary cementing materials: Conform to the directions of the slag and fly ash manufacturers for the proportioning and mixing of concrete. Except as otherwise required, limit supplementary cementing materials to no more than 25% of total cementitious content and limit the fly ash component to no more than 10% of total cementitious content. The limit on supplementary cementing materials may be increased for Class N exposure concrete provided that the effects of the resulting concrete properties, including finishing, rate of early-age strength gain, curing and protection, are considered by the Contractor and a letter describing these effects and any special construction procedures is submitted for review with the mix design. Do not use supplementary cementing materials in architectural concrete.
- .3 For columns less than 300mm in least dimension and for walls less than 200mm thick, reduce nominal size of coarse aggregate to 10mm.
- .4 Interior above grade slabs, beams, walls and columns: Provide normal density concrete to give following properties unless otherwise noted:
- .1 Class of exposure: N
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 25MPa unless specified otherwise on Structural Drawings
 - .4 Nominal size of coarse aggregate: 20mm. See also clause 2.3.3.
 - .5 Slump at time and point of discharge: 50mm to 110mm
- .5 Footings, piers, and foundation walls: Provide normal density, frost resistant concrete to give following properties:
- .1 Class of exposure: F-2
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 25MPa unless specified otherwise on Structural Drawings
 - .4 Maximum water/cementing material ratio: 0.55
 - .5 Nominal maximum size of coarse aggregate: 20mm. See also clause 2.3.3.
 - .6 Slump at time and point of discharge: 50mm to 110mm
 - .7 Air content: 4 to 7%
- .6 Lean concrete and mud slabs: Provide normal density concrete to give following properties:
- .1 Class of exposure: N
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 10 MPa
 - .4 Nominal maximum size of coarse aggregate: 20mm.
 - .5 Slump at time and point of discharge: 50mm to 110mm
- .7 Exterior, exposed walls and columns exposed to freezing and thawing, but not exposed to chlorides: Provide normal density, frost resistant concrete to give following properties:
- .1 Class of exposure: F-2
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 25MPa unless specified otherwise on Structural Drawings
 - .4 Maximum water/cementing material ratio: 0.55

SECTION 03 30 00 – CAST IN PLACE CONCRETE

- .5 Nominal maximum size of coarse aggregate: 20mm. See also clause 2.3.3.
- .6 Slump at time and point of discharge: 50mm to 110mm
- .7 Air content: 4 to 7%

- .8 Structurally reinforced concrete exposed to chlorides, including exterior reinforced slabs: Provide normal density concrete to give following properties:
 - .1 Class of exposure: C-1
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 35MPa
 - .4 Maximum water/cementing material ratio: 0.40
 - .5 Nominal maximum size of coarse aggregate: 20mm. See also clause 2.3.3.
 - .6 Slump at time and point of discharge: 50mm to 110mm
 - .7 Air content: 5 to 8%

- .9 Interior slabs-on-grade: Provide normal density concrete to give following properties:
 - .1 Class of exposure: N
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 25MPa unless specified otherwise on Structural Drawings
 - .4 Maximum water/cementing material ratio: 0.52
 - .5 Nominal maximum size of coarse aggregate: 20mm. Increase to 40mm where slab-on-grade thickness exceeds 130mm
 - .6 Slump: 50mm to 110mm
 - .7 Add moisture vapour reduction admixture in accordance with manufacturer's recommendations to all ready mix concrete to be placed in interior slab on grade, at the plant or at the job site. (Note: plastic fibre additive is not permitted with MVRA admixture).
 - .8 Slump at time and point of discharge, after addition of plasticizer: 50mm to 110mm
 - .9 Provide curing/sealing coat to all slabs-on-grade; two coats where slab exposed-refer to 2.2.3. above.

- .10 Interior slabs-on-grade with resilient floor finishes: Provide normal density concrete to give following properties:
 - .1 Class of exposure: N
 - .2 Cement: Type 10
 - .3 Minimum compressive strength: 25 MPa
 - .4 Nominal maximum size of coarse aggregate: 20mm
 - .5 water/cementing material ratio: 0.42 – 0.52
 - .6 Slump at time and point of discharge: 50mm to 110mm
 - .7 Add moisture vapour reduction admixture in accordance with manufacturer's recommendations to all ready mix concrete to be placed in interior slab on grade, at the plant or at the job site

- .11 Construction Method:
 - .1 Place & compact 250mm of clean, crushed stone, 20 to 22mm size.
 - .2 Construct slab-on-grade on 15 mil polyolefin sheet vapour barrier placed directly below concrete. Terminate vapour barrier by extending vertically up the abutting concrete walls and sealing to wall.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

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- .3 ASTM E 1643-11 Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
 - .4 Saw cuts should be done with a dry process (soft-cut on the same day of a pour).
 - .5 Curing: Apply 24 hours of wet curing. Start curing immediately after finishing slab. Cover slab-on-grade for at least 72 hours using plastic sheets with joints taped and free edges covered.
 - .6 Protection: Protect finished and cured slab from surface water (ie. rain, snow).
 - .7 Refer to Architectural Specifications for acceptable moisture content and testing methods prior to placing floor finishes.
-
- .12 Interior and roof concrete toppings, curbs and bases: Provide normal density concrete to give following properties:
 - .1 Class of exposure: N
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 25 MPa
 - .4 Nominal size of coarse aggregate for:
 - .1 Toppings between 25 and 35 mm thick: 10mm
 - .2 Toppings between 35 and 50mm thick: 14mm
 - .3 Thicker toppings: 20mm
 - .5 Slump at time and point of discharge: 20mm to 60mm

Where topping is less than 25mm thick, no coarse aggregate is allowed and a bonding agent shall be provided within the mix and to bond the topping to the substrate.
 - .13 Exterior unreinforced slabs, driveways, sidewalks, curbs and gutters, parking slabs on grade: Provide normal density, chloride resistant concrete to give following properties:
 - .1 Class of exposure: C-2
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 32 MPa
 - .4 Maximum water/cementing material ratio: 0.45
 - .5 Nominal maximum size of coarse aggregate: 20mm
 - .6 Slump at time and point of discharge: 50mm to 110mm
 - .7 Air content: 5 to 8%
 - .14 Exterior, unreinforced pavements: Provide normal density concrete to give following properties:
 - .1 Class of exposure: C-2
 - .2 Cement: Type 10
 - .3 Minimum compressive strength at 28 days: 32 MPa
 - .4 Maximum water/cementing material ratio: 0.45
 - .5 Nominal maximum size of coarse aggregate: 20mm
 - .6 Slump at time and point of discharge: 40mm to 80mm. Use plasticizer if necessary to increase slump for placement.
 - .7 Air content: 5 to 8%

PART 3 - EXECUTION

3.1 CONSTRUCTION REVIEW

- .1 Construction reviews are undertaken by the Consultant and the Inspection and Testing Agency so that the Owner may be informed in writing as to the quality of the Contractor's performance and for the protection of the Owner. They will be carried out by examination of representative samples of the Work.
- .2 The Contractor will receive copies of the construction review reports and the results of material tests. He will thereby be informed of any defects or deficiencies found.
- .3 Bring to the attention of the Consultant, any defects or deficiencies in the Work, which may occur during construction together with a proposal for remedy. The Consultant will decide what corrective action may be taken and will issue the necessary instructions.

3.2 PREPARATION

- .1 Obtain written approval of each footing bearing surface by Geotechnical Engineer prior to placing concrete for footings/mud slabs.
- .2 Confirm that subgrade and backfill meets specifications and is free of frost and surface water before placing slab-on-grade.
- .3 Provide vapour barrier under all slabs placed on the ground including slabs-on-grade and framed slabs.
- .4 Grout column base plates and beam bearing plates as soon as steelwork is completed. Do not add load on steelwork until grouting is completed and grout strength has reached at least 20 MPa.

3.3 SLEEVES, OPENINGS AND EMBEDMENTS

- .1 Ensure that sleeves and openings do not impair the required strength of the member, and unless shown on the Structural Drawings, are accepted by the Consultant for size, location, and reinforcement before concrete is cast. No trade shall cut holes through existing concrete unless acceptable to the Consultant.
- .2 Do not embed in slabs and walls any conduit or pipe whose outside diameter is greater than one-quarter the concrete thickness. Do not space less than 3 diameters on centre. Locate so as not to impair the required strength of the member. Do not install in or below columns, conduit which displaces more than 3 percent of the cross-section.
- .3 Cooperate with any trade applying finishes to concrete surfaces to obtain a surface, which will ensure adequate bond. Provide chases, chamfers and reglets where required.
- .4 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated on Structural Drawings or approved by the Consultant.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

- .5 Where approved by Consultant, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Unless indicated on the Structural Drawings, sleeves and openings greater than 100 x 100 mm must be approved by Consultant.
- .6 Do not eliminate, cut or displace reinforcement to accommodate openings or hardware. If openings or hardware cannot be located as specified, obtain approval of modifications from Consultant before placing of concrete.
- .7 Check locations and sizes of sleeves and openings shown on Structural Drawings with Architectural, Mechanical and Electrical Drawings. Notify Consultant of any discrepancies.
- .8 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .9 Anchor bolts: Set anchor bolts using templates under supervision of appropriate trade prior to placing concrete. Locate each anchor bolt group to within 6 mm of required location with no accumulation of tolerances allowed between groups.

3.4 **PLACING CONCRETE**

- .1 Notify Consultant 24 hours before placing concrete and 24 hours before closing wall forms.
- .2 Do cast-in-place concrete work in accordance with CSA-A23.1.
- .3 Remove water and disturbed soil from excavations before placing concrete therein.
- .4 Do not overload forms.
- .5 Use rubber tipped vibrators for concrete containing epoxy coated reinforcement.
- .6 The geotechnical/concrete Inspection and Testing agent on site will provide representation for the MVRA manufacturer and must be present at the job site during placement of all MVRA treated concrete. Do not proceed without this representative being present.

3.5 **FINISHING FLATWORK**

- .1 Finish flatwork in accordance with CSA-A23.1, and following clauses.
- .2 Protect concrete during finishing process in accordance with CSA-A23.1. Also use evaporation reducer during severe drying conditions.
- .3 Cast slabs with a top surface that is level or sloping as required by the Drawings. Allow for cambering where required. Set top of slab below finished floor level by the distance required for the type of applied finish.
- .4 Provide final finish in accordance with proposed use and as follows:
 - .1 Screeded and bull floated for: mud slabs and footings.
 - .2 Screeded and bull floated with scratch finish for: base slabs, which receive mortar setting beds or bonded toppings.
 - .3 Powered float finish for: roofs and slabs, which receive a membrane.
 - .4 Wood float finish with brooming for: exterior exposed slabs.

- .5 Powered steel trowel finish for: interior exposed slabs; slabs which receive resilient flooring, carpet, epoxy-based finishes, thin-set tiles, etc.
- .5 Steel trowel exposed interior concrete floors at least twice. Provide final spin trowelling when non-slip finish is required.
- .6 Except as noted, conform to finish tolerance Class A for floors and Class B for exterior slabs and base slabs for toppings. For wood flooring, conform to finish tolerance Class C. Compliance will be considered satisfactory if 80% of the measurements, using the straightedge method, are less than or equal to the tolerance and no measurement exceeds the tolerance by more than 25%. When requested by Consultant, make measurements within 3 days of placing concrete and before falsework is removed and submit results to Consultant.

3.6 CURING AND PROTECTION

- .1 Cure and protect concrete in accordance with CSA A23.1. In addition to Cold-Weather Protection requirements in A23.1, provide protection so that temperature of concrete surfaces is maintained at not less than 21 degrees C for 3 days after placement, not less than 10 degrees C for the next 2 days and above freezing for the next 2 days. Vent exhaust gases from combustion type heaters to atmosphere outside heated enclosure.
- .2 Cure slab surfaces immediately after finishing is completed. Use a curing compound compatible with applied finishes except where bonded topping to be applied. Where curing compound is not used, cover slab surfaces with absorptive mat or fabric and keep continuously wet. At interior slab on grade (with MVRA), cover slab surfaces with plastic film or waterproof paper per ACI 302.2R for minimum 24 hours.
- .3 Extend basic curing period until concrete has reached following strength levels for structural safety:
 - .1 Framed slabs and beams: 75% of specified 28 day strength.
 - .2 Columns, piers and footings: 75% of specified 28 day strength.
 - .3 Walls: 50% of specified 28 day strength.

3.7 FINISHING FORMED SURFACES

- .1 Finish formed surfaces in accordance with CSA A23.1. Completely fill holes left by through-bolts with grout.
- .2 Do not patch surfaces until instructed in writing by Consultant.
- .3 Where honeycombing has cut out in accordance with CSA A23.1. do not patch until reviewed by Consultant.
- .4 Provide smooth-form finish for all exposed concrete surfaces.
- .5 Provide smooth-rubbed finish to all concrete surfaces exposed to public view. Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .6 Provide galvanized finish to all concrete surfaces exposed to public view at the exterior concrete columns at the entrance canopy.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

3.8 SLABS ON GRADE

- .1 Determine that the compacted granular fill supporting slabs-on-grade has been approved before starting work.
- .2 Over compacted granular fill, place & compact 250mm of clean crushed stone, 20 to 22mm size. Refer to Fill Type F1 – Section 31 23 00.
- .3 Over crushed stone, lay 15mil polyolefin sheet vapour barrier. Lap all joints 150mm and seal any punctures prior to placing concrete. Seal all joints and punctures with tape. Repair all tears or holes with layers of sheeting, tapping all seams. Extend vapour barrier 200mm up walls at edge of slabs. Refer to Section 07 86 16.
- .4 Provide and install joint filler between slab and masonry walls.
- .5 See Drawings for thickness of concrete and slab reinforcing.
- .6 Provide slab depressions and slopes as indicated on the Architectural Drawings. Slope floors to drain.
- .7 Testing & Inspection Company must inspect vapour barrier and reinforcing just prior to placement of concrete and Contractor must rectify any deficiencies noted prior to pour.

3.9 GROUTING UNDER BASE PLATES AND BEARING PLATES

- .1 Grout under base plates and bearing plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .2 Grout column base plates and beam bearing plates as soon as steelwork is completed. Do not add load on steelwork until grouting is completed and grout strength has reached at least 20 Mpa.

3.10 JOINTS

- .1 Slabs-on-grade: Provide joints in both directions. Maximum spacing of construction joints to be 30m with sawcut joints in-between spaced at 30 times slab thickness maximum, but not more than 5m maximum. Locate joints on column centre lines wherever possible and on intermediate lines, which result in approximately square panels. Protect edges of sawcuts from breakage. Clean out sawcuts in exposed slabs and fill with control joint filler after concrete is at least 120 days old. At construction joints in exposed slabs, sawcut top 25 mm for a width of 5 mm and fill with control joint filler after concrete is at least 120 days old. Clean out sawcuts in other slabs and fill with a sand-cement paste one month prior to installing floor coverings.
- .2 Construction Joints and Control Joints: See Section 03 10 00.
- .3 Expansion Joints: See Structural Drawings for widths, locations and details. Remove all forming and filler material used during construction and provide clear space between structural elements equal to width specified.

- .4 Construction Gaps: See Structural Drawings for widths, locations and details. Do not place concrete in gaps in beams and slabs until all concrete at that level is at least 28 days old. Do not fill wall gaps until all adjoining framed slabs, above and below, are at least 28 days old.
- .5 Isolation Joints: Provide 10mm thick premoulded joint filler of the same depth as the thickness of the concrete wherever slabs-on-grade abut foundation walls, columns and piers. Omit if slab is chased or dowelled into structure.

3.11 **CRACKS IN SLABS-ON-GRADE**

- .1 Extensive cracking of slabs-on-grade or cracks in excess of 3 mm in width shall be cause for rejection of slab or portion of slab at the discretion of the Consultant.
- .2 Protect edges of cracks in slabs-on-grade from breakage.
- .3 Unless slab is rejected, repair cracks that are over 0.4 mm wide in exposed slabs-on-grade in unfinished areas after concrete is at least 120 days old. Repair by filling crack with a sand-cement grout and then, after 7 days, cutting out top 20 mm of crack for a width of 5 mm and filling with control joint filler.

3.12 **INSPECTION AND TESTING**

- .1 Inspection and testing of concrete and concrete materials will be carried out in accordance with A23.1 by a Testing Agency designated by Consultant. Testing agency shall be certified under CSA A283 with category to suit testing provided.
- .2 Agency will review all submittals pertaining to concrete mix designs and certification of plant, equipment and materials.
- .3 Agency will take additional test cylinders during cold weather concreting. Assist Agency by curing these cylinders for 7 days on site adjacent to the work which they represent and under the same conditions as the concrete which they represent.
- .4 Samples will be taken prior to the addition of steel fibre reinforcement or superplasticizers to the mix on site.
- .5 Methods for testing concrete will be in accordance with CSA-A23.2.
- .6 Inspection or testing by Agency will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.
- .7 Assist the Agency in its work. Notify Agency as to the concreting schedule and before each pour. Provide concrete samples.
- .8 The Agency will report to the Consultant, with copies to the Structural Engineer, Contractor, Concrete Supplier and Municipal Authorities. Reports will include the locations in structure to which tests relate, comments on abnormal results and conditions, and the Supplier's mix design numbers. Test reports shall be provided within five working days.

SECTION 03 30 00 – CAST IN PLACE CONCRETE

3.16 PITS, CURBS, BASES

- .9 Construct all concrete sumps, pits, trenches, curbs and machinery bases forming part of floor construction that are required within the building by other trades.
- .10 Provide isolation joints between machinery bases and slabs-on-grade.

3.17 MECHANICAL AND ELECTRICAL WORK

- .11 Construct all concrete underground electrical duct banks, underground water service thrust blocks and supports for underground piping in specified fill. Also construct all concrete pads for pipes passing through foundation walls, manholes and catch basins. See mechanical and electrical drawings and specifications for details and extent of work.

3.18 REJECTED WORK

- .12 Do not deliver to the site materials which are known not to meet the requirement of the Specifications. If rejected after delivery, they shall be immediately removed.
- .13 Where review reveals materials or workmanship which appear to have failed to meet the specified quality or tolerances, the Consultant shall have the authority to order additional curing; to have tests made of in-situ concrete, concrete cores, reinforcement or other materials; to order a structural analysis of the existing elements; and to load test the structure. All such work will be carried out in order to assist in determining whether the structure may, in the opinion of the Consultant be accepted, with or without strengthening or modification. Testing shall meet the requirements of the Ontario Building Code. All expenses incurred shall be chargeable to the Contractor regardless of the results.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|-----------------------|------------------|
| .1 | Concrete block | Section 04 22 00 |
| .2 | Mortars for tile work | Section 09 30 16 |

1.2 REFERENCE STANDARDS

- | | | |
|----|--------------|---|
| .1 | CAN/CSA A179 | Mortar and Grout for Unit Masonry |
| .2 | CAN/CSA A371 | Masonry Construction for Buildings |
| .3 | CSA A3000 | Cementitious Materials Compendium |
| .4 | ASTM C 780 | Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry |
| .5 | ASTM C 1357 | Standard Test Methods for Evaluating Masonry Bond Strength |

1.3 QUALITY ASSURANCE

- .1 Arrange for representative of mortar manufacturer to meet with mason on site prior to commencement of masonry work, to review proper mixing procedures of mortar. Mixing must conform to instructions from supplier of pre-mixed mortar materials.
- .2 Mason shall warrant that only mortar containing integral water-repellent mortar admixture, added at the manufacturer's recommended rate, has been placed in exterior concrete masonry walls.
- .3 Submit test data as specified below.

1.4 COLD WEATHER REQUIREMENTS

- .1 During cold weather, lower than 5°C, when danger of freezing exists, heat all masonry materials using methods accepted in the industry, in conformance to CSA-A371, and approved by the Consultant.

1.5 SUBMITTALS

- .1 Submit three (3) copies of performance data sheet for mortar mixtures. Indicate related standards and mortar properties in terms of compressive strength, water retention and air content. Provide all test certificates required for mortar mixture lots delivered to site..
- .2 At the completion of the masonry work, submit letter of certification from the mason, certifying that only mortar containing integral water-repellent mortar admixture, added at the manufacturer's recommended rate, has been placed in exterior concrete masonry walls.

1.6 TESTING

- .1 Testing of mortar materials will be carried out by Testing Laboratory designated by Consultant.
- .2 Pay for tests from Cash Allowance, Section 01 10 00.

SECTION 04 05 13- MASONRY MORTAR AND GROUT

- .3 Submit samples of sand and water for testing to ensure that mortar will not produce efflorescence.
- .4 Test all mortar to be mixed with sand on site according to CSA-A179, aggregate to cementitious ratio test. Testing Company to supervise mason in preparation of a sample mix which will act as the control ratio, as determined by testing company. "Sample ratio" tests will be conducted throughout construction and compared to control ratio. These ratios must not differ by more than 15%.
- .5 Test for compliance with the performance requirements for integral mortar water-repellence. Mortar shall be capable of achieving a Class E Rating when evaluated using ASTM E 514 with the test extended to 72 hours, using the rating criteria specified in ASTM E 514.
- .6 Perform compressive strength tests on all mortar and grout in accordance with the requirements of CSA S304.1. Compressive strengths must conform to the property specifications of CSA-A179.
- .7 Perform tests for flexural bond strength of masonry in accordance CSA S304.1. Flexural bond strengths shall not be less than 0.20MPa, in conformance with CSA-A179.

PART 2 MATERIAL**2.1 MATERIALS**

- .1 Sand: fine grain aggregate, graded in accordance with CSA A179
- .2 Water: potable, free off ice and any contaminants, to CSA A179.
- .3 Portland cement: to CAN/CSA-A5 normal Type 10.
- .4 Hydrated lime: type 'S', in accordance with ASTM C207
- .5 Water-repellant admixture: Dry-Block II Mortar Admixture by Grace Construction Products, for exterior concrete masonry

2.2 MORTAR

- .1 Mortar:
 - .1 Bulk preblended silo mix as supplied by Max-Mix. Preblended, factory calibrated mortar; Betomix Plus by Daubois Inc., or equivalent by King Masonry Products will also be accepted.
 - .2 Colourants to be premixed with mortar materials. Colours shall match existing.
- .2 Mortars for clay brick and concrete unit masonry to be Portland cement/ hydrated lime/ sand mortars to the property standards of CSA A179.
- .3 Mortar for masonry foundations, load bearing walls and partitions, and lateral force-resisting system components for seismic design, to be Type 'S' as per property specifications of CSA A179.

- .4 Mortar for exterior masonry veneer, and non-load bearing walls and partitions to be Type 'N' as per property specifications of CSA A179, unless indicated otherwise on the Structural Drawings.
- .5 Compressive strengths of mortars shall conform to the values indicated on Tables 8 and 9, for solid brick and concrete block respectively, of CSA Standard A179. Compressive strength of mortars must not exceed the compressive strength of the masonry units with which they are being used.

2.3 GROUT

- .1 Grout:
 - .1 Coarse grout to CSA A179, with maximum aggregate size of 12.5mm.
 - .2 Use fine grout where least dimension of void is less than 50mm.
 - .3 All grout to CSA A179, with sufficient water to produce pouring consistency without segregation of ingredients, but to retain cohesiveness.
 - .4 Slump is to be 200mm to 250mm. Minimum compressive strength is to be 20 Mpa.
- .2 Refer to structural drawings for grout requirements at reinforcing steel.

2.4 SOURCES

- .1 Use same manufactured brands and sources of mortar materials for entire project, in order to ensure uniformity of mix and coloration.

2.5 PARGING

- .1 Cement mortar parging: 1 part cement, 1 part lime to 6 parts sand by volume with sufficient water for a trowelable mix.

PART 3 - EXECUTION

3.1 MIXING OF MORTARS

- .1 Mason to review mixing procedures with mortar manufacturer.
- .2 Mix mortar thoroughly, in quantities only as needed for immediate use.
- .3 Mix mortar in mechanical mixer operated until homogeneously blended, but not less than 3 minutes after all materials are in mixer.
- .4 For mortar for concrete masonry units in face of exterior wall, add Dry-Block to water prior to charging mortar mix. Add at rate recommended by Grace Construction Products and reduce water accordingly.
- .5 Obtain manufacturer's approval for any additives.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Concrete & Masonry Reinforcement	Section 03 20 00
.2	Masonry Accessories	Section 04 05 23
.3	Clay Masonry Units	Section 04 21 00
.4	Concrete Masonry Units	Section 04 22 00

1.2 SUBMITTALS

- .1 Submit product data sheets for all reinforcement types proposed for use in this project, in accordance with Section 01 33 23.
- .2 Include a copy of the data sheets in the shop drawing manual at the conclusion of the project.
- .3 Submit samples of anchors, ties, and fasteners for approval of Consultant.

PART 2 MATERIALS

2.1 MATERIALS

- .1 All steel components specified herein for installation in exterior wall assemblies shall be hot dipped galvanized after fabrication, or shall be stainless steel.
- .2 Stainless steel shall be type 304 or 316.
- .3 Reinforcing bars: to CSA G30.18, Grade 400.
- .4 Masonry Reinforcement:
 - .1 This Specification is based on products manufactured by Blok-Lok Limited. Products listed by Hohmann and Barnard, Inc. and Wire-Bond are approved equivalents.
 - .2 Size: Wall thickness less 50mm.
 - .3 Weight :
 - .1 Standard Ladder type reinforcement shall be extra heavy duty, with 4.8mm side wires and 3.8mm (9 ga) cross wires, welded.
 - .2 Ladder type reinforcement shall be super heavy duty where noted below or on drawings, with both side and cross wires 4.8mm thick, welded.
 - .3 Truss type reinforcement shall be super heavy duty, with both side wires and cross wires 4.8mm thick, welded.
 - .4 Finish:
 - .1 Hot dipped galvanized after fabrication to ASTM A153-B2 and CSA G164, minimum 1.5 oz/sq. ft.
 - .2 Provide stainless steel where indicated below, or on drawings.

SECTION 04 05 19 - MASONRY ANCHORAGE AND REINFORCEMENT

- .5 Type: For multi-wythe solid walls above & below grade:
 - .1 Blok-Lok Cavity-Lok BL12, extra heavy duty, 4 wire; H&B #240; or Wire-Bond Series 200 Ladder 4 Wire.
- .6 For multi-wythe solid walls above grade consisting of brick and block.
 - .1 Blok-Lok Tri-Lok BL11, extra heavy duty, 3 wire; H&B #230; or Wire-Bond Series 200 Ladder 3 Wire.
- .7 For cavity walls:
 - .1 Blok-Lok Econo-Cavity Lok BL21, super heavy duty, with 4.76 mm wire; H&B #250; or Wire-Bond Series 400 Ladder Fixed Tab.
- .8 For single wythe, solid, interior masonry walls:
 - .1 Blok-Lok BL10; H&B #220, or Series 200 Ladder 2 Wire by Wire-Bond.
- .9 For cavity walls when block wythe is constructed in advance of brick:
 - .1 Blok-Lok BL42 providing rigid two way anchorage of both wythes, with System 2000 ties; H&B #280 Dub'l Loop-Lok; or Wire-Bond Tab Lock Ladder with 4.8mm diameter locking pintles.
- .10 For cavity walls where joints in exterior and interior wythes do not align and adjustable reinforcing specified above cannot be used:
 - .1 Interior wythe block reinforcement: extra heavy duty reinforcement as specified above.
 - .2 Ties between wythes: Blok-Lok BL-507 Anchor and Flex-O-Lok Tie, HB DW-10 with VBT tie.
 - .3 Fasteners for anchors: Hilti "Kwik-Con II" -14-114 THWH stainless steel, or Ucan "Scru-it" SSH 14114 stainless steel.
 - .4 All reinforcing and ties hot dipped galvanized, anchors to be stainless steel.
- .11 Provide prefabricated tees and corners.
- .5 Wall Ties:
 - .1 Masonry to Masonry (Interior only):
 - .1 Corrugated Wall Ties of 1.2 mm (18 ga.) galvanized steel, 22mm wide, by length required for the application.
 - .2 Length to be long enough to embed minimum 75 mm into each bearing or to fit dovetail anchor slots, unless otherwise noted on drawings.
 - .2 Masonry to Steel Studs (Cavity Wall):
 - .1 H&B thermal 2-seal wing nut anchor (Type 304) with 16mm offset and 16 gauge screw pull out.

- .2 Install anchors at 400mm o.c. vertically and 400mm o.c. horizontally.
- .3 Masonry to Structural Steel:
 - .1 Blok-Lok Flex-O-Lok BLT9, sized to suit wall thickness less 50mm, with continuous weld-on anchors Flex-O-Lok, type A; H&B VEE-Byna Tie with 359 weld-on ties; or Wire-Bond Triangular Tie 1100 with Type 1 Weld-On Anchor.
 - .2 Ties minimum to be minimum 4.76mm stainless steel wire. Weld-on anchors to be minimum 6.35mm diameter stainless steel wire.
- .4 Dovetail anchor slots and ties: Hot dipped galvanized anchor slots with minimum 9 gauge hot dipped galvanized ties.
- .6 For Securing Insulation: Wedge-Lok by Blok-Lok

PART 3 - EXECUTION

3.1 INSTALLATION OF MASONRY ANCHORAGE AND REINFORCEMENT

- .1 Refer to Section 04 22 00 for installation of masonry anchorage and reinforcement.
- .2 Refer to structural drawings for additional requirements. All reinforcing shall conform to structural requirements as a minimum. Where structural requirements differ from these specifications, the most stringent requirements shall apply.
- .3 Note that "solid wall" describes a masonry wall consisting of 1 or more wythes of brick and/or block (which may be solid or hollow core) with mortar joint only between wythes - no air space.
- .4 Install reinforcement as indicated above for the materials specified, in conformance with structural drawings and manufacturer's instructions.
- .5 Provide and install prefabricated tees and corners at wall corners and intersections.
- .6 At exterior walls where coursing results in non-alignment of interior and exterior wythe horizontal joints, each wythe shall be reinforced in every second horizontal joint. Interior and exterior wythes shall be tied together with ties anchored to exterior face of interior block and vee wall ties laid into horizontal joints of exterior wythe.
- .7 Install ties in accordance with Ontario Building Code.
- .8 Pre-drill for anchors using appropriate type and size of bit. Provide two anchors per tie with minimum embedment of 25mm. Conform to manufacturers specifications.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Masonry Anchorage and Reinforcement	Section 04 05 19
.2	Clay Unit Masonry	Section 04 21 00
.3	Concrete Unit Masonry	Section 04 22 00
.4	Vapour Barrier	Section 07 26 00

1.2 SUBMITTALS

- .1 Submit colour charts to Consultant for colour selections.

PART 2 MATERIALS

2.1 MATERIALS

- | | | |
|----|-------------------------|--|
| .1 | Control joint filler: | Blok-Lok "Exp-Joint", closed cell neoprene expansion joint material. |
| .2 | Masonry flashing: | membrane specified for through wall flashing at masonry walls; refer to Section 07 26 00. |
| .3 | Cavity weep hole vents: | Blok-Lok "Cellvent" ventilator, Hohmann & Barnard QV-Quadro-Vent, or CellVent by Mortar Net Solutions, 9.5mm thick x 86mm deep x height of masonry units; colour to be selected by the Consultant to coordinate with masonry colour. |
| .4 | Brick/Block vents: | Refer to mechanical. |

PART 3 - EXECUTION

3.1 INSTALLATION OF MASONRY ACCESSORIES

- .1 Refer to Sections 04 21 00 and 04 22 00 for installation of masonry accessories.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Salvaging and cleaning of existing brick for reuse, in coordination with demolition forces.
- .2 Cleaning of existing masonry.
- .3 Masonry infill and repairs with new block and salvaged brick.
- .4 Salvage brick and clean. Remove mortar from salvaged brick.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-------------------------------------|------------------|
| .1 | Demolition | Section 02 40 00 |
| .2 | Masonry Mortar and Grout | Section 04 05 13 |
| .3 | Masonry Anchorage and Reinforcement | Section 04 05 19 |
| .4 | Masonry Accessories | Section 04 05 23 |
| .5 | Concrete block | Section 04 22 00 |
| .6 | Structural Metal Stud Framing | Section 05 41 00 |
| .7 | Insulation | Section 07 21 00 |
| .8 | Vapour Barrier | Section 07 26 00 |
| .9 | Joint Sealants | Section 07 92 00 |

1.3 REFERENCES

- | | | |
|----|----------------------------|--|
| .1 | CAN/CSA-A82 | Fired Masonry Brick Made From Clay or Shale |
| .2 | CAN/CSA A179 | Mortar and Grout for Unit Masonry. |
| .3 | CAN/CSA A370 | Connectors for Masonry. |
| .4 | CAN/CSA A371 | Masonry Construction for Buildings. |
| .5 | CAN/CSA-A3000 | Cementitious Materials Compendium |
| .6 | Brick Industry Association | |
| | .1 | BIA Technical Note 18A Accommodating Expansion of Brickwork. |
| | .2 | BIA Technical Note 20 Cleaning Brickwork |
| .7 | Meridian Brick: | Weatherproofing Masonry for the Northern Climates |

1.4 QUALIFICATIONS

- .1 Masonry Subcontractor shall be a company specializing in commercial masonry work, with minimum five (5) years documented experience.
- .2 Masonry work shall be executed under the continuous supervision and direction of a competent foreman.
- .3 Perform masonry work to CSA-A371.
- .4 Refer to Section 04 22 00 and comply with all items therein.

SECTION 04 21 00 - CLAY UNIT MASONRY**1.5 SUBMITTALS**

- .1 Submit, for approval, clearly labelled samples of materials to be used.
- .2 Obtain Consultant's final approval of brick samples prior to ordering materials and constructing the sample wall.
- .3 Submit test reports for unit masonry.
- .4 Submit shop drawings of all special shapes.

1.6 STORAGE AND HANDLING

- .1 Store masonry units on timbers or platforms, at least 75mm above grade, in such a manner as to prevent damage and staining of units. Cover to protect from weather.
- .2 Do not use salt of calcium chloride to remove ice from surface of masonry.
- .3 Split twin packs into single cubes before loading on to scaffold.
- .4 Extra on-site care should be used when handling smooth finished brick. Handle on wooden pallets.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Brick:
 - .1 Brick at new cavity wall shall be burned clay brick to CAN/CSA A82.1, Type FBX, Grade SW, as manufactured by Meridian Brick (Forterra Brick) or Brampton Brick, in size, texture, and colour similar to existing brick. Existing brick is imperial size.
 - .2 Salvaged brick is to be used for small infill areas, as needed to match the existing masonry. New masonry is only to be used in larger infill areas.
- .2 Metal Anchors: Conforming to Ontario Building Code and Section 04 05 19.
- .3 Vapour Barrier and Through Wall Flashing: Refer to Section 07 26 00.
- .4 Weep Hole Vents: As specified in Section 04 05 23.
- .5 Brick/Block Vents: As specified in Section 04 05 23.
- .6 Cavity Wall Ties: As specified in Section 04 05 19.
- .7 Mortar: As specified in Section 04 05 13.
- .8 Special Shapes: as required to match existing conditions

- .9 Control joints for brick: Sealant and backing rod, with filler specified in Section 04 05 23.
- .10 Brick Stain: Stain shall be the products of Nawkaw Corporation, or PermaTint.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Co-ordinate all Work of this Section with applicable Masonry Sections.
- .2 Coordinate installation of vapour barrier and insulation in cavity walls.
- .3 Verify that site conditions are ready to receive work, before commencing work of this section.
- .4 Verify that items specified in other sections are properly sized and located.
- .5 Commencement of installation of unit masonry shall be construed as acceptance of site conditions.

3.2 INSTALLATION

- .1 Exposed brickwork on the exterior, and interior, of the building shall be as specified above and indicated on drawings.
- .2 Co-ordinate all Work of this Section with the other masonry sections and with demolition work.
- .3 Bond: Lay up exterior face brick to match existing bonding. Provide Soldier and stack bond special colour band courses where required to match existing. Provide Soldier course return at outside corners at these locations. 45 degree, cut brick will not be acceptable.
- .4 Pointing: All exposed brick - Tooled - Concave.
- .5 Tooling of joints shall consist of compressing mortar as the work proceeds with a non-staining (plastic or stainless steel) tool to produce a dense, perfectly flush or concave joint.
- .6 Rake out all joints of sill 12.5mm and fill with nonshrink mortar grout.
- .7 Completely fill joints with mortar. This is a mandatory requirement. If inspection reveals that this requirement has not been met the complete masonry panel, partition or wall wherein the omission occurs shall (if so instructed by the Consultant) be pulled down and rebuilt in accordance with this Specification at no additional cost to the Owner.
- .8 Through Wall Flashing:
 - .1 Supply and install through wall flashing in locations indicated.
 - .2 Flashing must extend up wall a minimum of 410mm, 150mm higher than the top of the mortar net.

SECTION 04 21 00 - CLAY UNIT MASONRY

- .9 Reinforcing:
 - .1 Place reinforcing, as specified, at first mortar joint above flashing and immediately below top of walls.
 - .2 Locate reinforcing minimum 400mm lengths at intermediate horizontal joints at openings to provide placement at 200mm intervals vertically.
- .10 Weep Hole Vents:
 - .1 Install weep hole vents in exterior masonry immediately above dampproof courses including over doors and windows, at top of walls and elsewhere as shown or required to ensure cavity is vented at top and bottom.
 - .2 Place weep hole vents, as specified, at base of cavity walls, set in vertical joints located at maximum 600mm on centre.
 - .3 Place weep hole vents over lintels at same spacing.
 - .4 At top of cavity walls, locate vents at maximum 600mm centres. Vents shall generally be placed at second brick course below top of wall, or the first fully exposed brick course below the flashing; refer to drawings.
 - .5 Place vents at additional locations where indicated on drawings.
- .11 Install brick vents where indicated on drawings.
- .12 Provide control joints in brick wythe, at locations of control joints in concrete unit masonry back-up. Refer to section 04 22 00. Leave head joints at control joint locations free of mortar, ready for bond break and sealant. Refer to drawing detail. Horizontal reinforcement is to stop each side control joints; not continue through.
- .13 Refer to Section 04 22 00 for requirements at junction of clay unit masonry and exterior concrete unit masonry.

3.3 PROTECTION

- .1 Cover all unfinished or unflashed masonry walls at the end of each day's work, to protect from weather. Maintain such protection as long as necessary and replace if removed or damage for any reason. Provide protective plastic sheeting, held in place with metal wall cover clamps.
- .2 Protect both exterior and interior brick work from staining. Cover brick with 6mil polyethylene sheets to protect brick finishes.
- .3 Protect all adjacent materials (i.e. precast concrete, aluminum windows, metal cladding hollow metal frames etc.) from mortar droppings.

3.4 REPAIRS TO EXISTING MASONRY

- .1 Removal of windows and walls may result in some damage to existing brick.
- .2 Replace damaged brick with new after completion of demolition activities and window and / or masonry removal.
- .3 Perform final cleaning of all new masonry areas as specified below.

3.5 TINTING OF BRICK

- .1 As the infill brick colour will not match the existing brick exactly, provide staining of infill brick that will be exposed in the wall.
- .2 Stain shall be applied with brush or roller to new areas of brick and individual new bricks.
- .3 Coordinate with forces cleaning the masonry. Stain is to be applied after cleaning.
- .4 Stain/tint the exterior of the Library Learning Commons. .

3.6 CLEANING

- .1 Clean clay masonry units as work progresses.
- .2 Do all cleaning at completion of work in conformance with Section 01 74 00.
- .3 Point or replace defective mortar, as required or as directed by the Consultant.
- .4 Clean clay unit masonry walls exposed in the finished work in accordance with manufacturer's recommendations and BIA Technical Notes #20.
- .5 Repeat cleaning operations until work is satisfactory.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Masonry Mortar and Grout	Section 04 05 13
.2	Masonry Anchorage and Reinforcement	Section 04 05 19
.3	Masonry Accessories	Section 04 05 23
.4	Clay Masonry Units	Section 04 21 00
.5	Loose Angle Lintels	Section 05 52 00
.6	Lateral Support Angles	Section 05 52 00
.7	Building Insulation	Section 07 21 00
.8	Vapour Barrier	Section 07 26 00
.9	Joint Sealant	Section 07 92 00

1.2 REFERENCE STANDARDS

.1	CAN/CSA-A165 Series	CSA Standards for Concrete Masonry Units
.2	CAN/CSA-S304.1	Design of Masonry Structures
.3	CAN/CSA-A371	Masonry construction for Buildings
.4	CAN/CSA-A370	Connectors for Masonry
.5	National Concrete Masonry Association	
.1	NCMA TEK 10-2C	Control Joints for Concrete Masonry Walls - Empirical Method
.2	NCMA TEK-2A	Removal of Stains from Concrete Masonry
.3	NCMA TEK-3A	Control and Removal of Efflorescence
.4	NCMA TEK-4A	Cleaning Concrete Masonry

1.3 SUBMITTALS

- .1 Submit duplicate samples of masonry units in accordance with Section 01 33 23.
- .2 Construct sample panel of total exterior wall work, 1200 x 1800mm located on site where directed and showing use of reinforcement, through-wall-flashing, jointing, coursing, insulation, vapour barrier, mortar and inner and outer wythe materials.
- .3 Submit Spec-Data Sheet on Grace Construction Products' Dry-Block System of Integral Water-Repellent Admixtures for Block and Mortar.
- .4 Submit certification from manufacturer of exterior block that units shipped to site contain integral water repellent, added at appropriate rate.
- .5 Submit certification from Masonry Subcontractor that only concrete block units containing integral water-repellant have been used in construction of the exterior face wall, and that the mortar used for these units also contained the specified water-repellant additive.
- .6 Submit Technical Bulletin on Cleaning Masonry Containing Dry-Block.

1.4 EXTREME WEATHER REQUIREMENTS

- .1 During cold weather, lower than 5°C, when danger of freezing exists, heat all masonry materials using methods accepted in the industry and conforming to CAN/CSA-A371, and approved by the Consultants.

SECTION 04 22 00 - CONCRETE UNIT MASONRY

- .2 Protect scaffolds from cold and wind with polyethylene or other barricades. Use heaters on the scaffolds where necessary to protect workmen and materials. PROVIDE PROTECTION WHENEVER NECESSARY TO PREVENT CESSATION OF WORK.
- .3 During hot weather protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings. Wet units during hot drying weather so that mortar does not dry too rapidly. Units must be free of water adhering to their surfaces when they are laid. Conform to Hot Weather Requirements in CAN/CSA-A371.

1.5 PROTECTION

- .1 Cover completed and partially completed wall not enclosed or sheltered, with water proof coverings at end of working day. Drape cover over wall and extend 600mm down both sides. Anchor securely in position with metal wall clamps.
- .2 Protect adjacent surfaces from marking or damage due to masonry work.

PART 2 - MATERIALS**2.1 MATERIALS**

- .1 Concrete blocks:
 - .1 to CAN/CSA-A165 Series, metric modular, Type H/20/A/M for foundations, Type H/15/A/M in concealed spaces, and H/15/D/M lightweight for exposed walls above grade.
 - .2 Provide block of higher compressive strength where indicated on structural drawings.
 - .3 Blocks for fire rated partitions to have required percentage of solid material necessary to provide rating.
 - .4 Sizes as indicated on drawings.
- .2 Curing of lightweight block:
 - .1 Autoclave or low pressure steam curing is acceptable, provided that masonry units comply with linear shrinkage and moisture content requirements of CSA A165.1 for type M units at time of delivery to site.
 - .2 Age all units, prior to delivery to site, as follows:
 - .1 Autoclaved units: minimum 7 days.
 - .2 Low pressure steam cured units: minimum 28 days
- .3 Special Shapes:
 - .1 Bond beam, lintel beam, corner and other shapes as required or indicated on drawings.
 - .2 Provide external corner units as a single unit, with required architectural face appearance on one side and one end.
- .4 Metal Anchors: Conforming to Ontario Building Code and Section 04 05 19.
- .5 Through Wall Flashing: Refer to Section 07 26 00.
- .6 Weep Hole Vents: As specified in Section 04 05 23.
- .7 Block Vents: As specified in Section 04 05 23.

- .8 Cavity Wall Ties: As specified in Section 04 05 19.
- .9 Mortar: as specified in Section 04 05 13.
- .10 Control joints: Sealant and backing rod, with filler specified Section 04 05 23.

2.2 EXPOSED MASONRY FACES

- .1 Notwithstanding visual inspection requirements of CSA standards, masonry units shall be free of surface indentations, surface cracks due to manufacture, or chipping. Units so delivered shall be culled from use for exposed purposes, but may be used where concealed.
- .2 Concrete masonry units exposed both sides, such as at interior partitions walls, must be visibly uniform in width, so that both faces of the wall are smooth, with all block faces in plane. Total variation in width must not exceed 2mm. Mason shall reject blocks which do not conform to this size requirement.
- .3 All exterior concrete masonry units shall have Dry-Block integral water repellant.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- .1 Build masonry work true-to-line, plumb, square and level, with vertical joints in proper alignment.
- .2 Assume complete responsibility for dimensions, plumbs and levels of this work and constantly check same with graduated rod.
- .3 Masonry courses to be of uniform height, and both vertical and horizontal joints to be of equal and uniform thickness.
- .4 Extend non-loadbearing partitions to underside of floor or roof structure above, providing 25mm deflection clearance. Install lateral support angles, as specified in Section 05 52 00, and insulation filler as detailed.
- .5 Carry wall up in uniform manner, no one portion being raised more than 1200mm above another at any time. Build no more than 1500mm of wall measured vertically in any one day.
- .6 Buttering corners of units, throwing mortar into joints, deep or excessive furrowing of bed joints not permitted. Do not shift or tap units after mortar has taken initial set. Where adjustments must be made after mortar has started to set, remove mortar and replace with fresh supply.
- .7 Isolate masonry from vertical structural steel framing in exterior walls using 6mm thick asphalt impregnated rigid board cemented to steel columns.
- .8 Where new masonry abuts old or fully set masonry, clean existing surfaces and dampen if necessary to obtain bond.
- .9 Evidence of non compliance with Contract Documents including the following will require replacement and/or repair:

SECTION 04 22 00 - CONCRETE UNIT MASONRY

- .1 Shrinking
- .2 Curling
- .3 Spalling
- .4 Poor color blend
- .5 Poor texture blend
- .6 Discolouration of mortar
- .7 Chipping

3.2 BLOCKWORK

- .1 Refer to exterior elevation drawings for block locations and coursing. Lay concrete block in running bond, except as noted on Drawings, with thicker end of face shell upward. Standard coursing to be modular 200mm for one block and one joint.
- .2 Use lightweight concrete blocks for exposed interior surfaces of walls and partitions. Regular concrete blocks may be used for concealed surfaces.
- .3 Use special shaped, and finished units where indicated, specified or required. Use bull-nosed units for exposed external corners, window jambs, etc. Exposed open cells not permitted.
- .4 Concrete masonry units shall have face shells and their end joints fully filled with mortar, and joints squeezed tight. Also fill webs at cores, to be reinforced and grouted, and strike flush at core taking care to prevent mortar from falling into core.
- .5 Tie intersecting non-bearing walls together with masonry reinforcing every second course.
- .6 Do not tie intersecting bearing walls together in masonry bond, except at corners.
- .7 Exercise special care laying up concrete block in locations where plastic wall coating finish is indicated. Block walls in these locations shall be plumb with joints tooled, concave.
- .8 Where resilient base is indicated, tool the joints to within 100mm of the floor. Cut joints flush behind the base.
- .9 All concrete block at parapets shall be filled solid. Install building paper and wire mesh reinforcing in the bed below solid fill.

3.3 MORTAR AND POINTING

- .1 Mortar is specified in Section 04 05 13. Ensure that only mortar with Dry-Block admixture is used for exterior block work.
- .2 Make all joints uniform in thickness, straight, in line, with mortar compressed to form concave joints.
- .3 Strike joints flush where walls are to receive insulation, ceramic tile, or similar finishes.
- .4 Point faced blockwork by filling holes and cracks in exposed mortar joints. Cut out defective joints, refill solidly with mortar and tool to form neat concave joint.

3.4 BUILDING IN COMPONENTS

- .1 Build in door and window frames, steel lintels, sleeves, anchor bolts, anchors, nailing strips and other items to be built into masonry. Install windows using clip angles supplied by window manufacturer and co-operate with subcontractors installing windows, entrances and screens.
- .2 Do not distort metal frames. Bed anchors of frames in mortar and fill frame voids with mortar or grout as wall is erected.

3.5 BEARING POINTS

- .1 Fill concrete block solid with 20 MPa concrete grout at the following locations:
 - .1 for two courses below bearing points of structural members;
 - .2 where ladders are bolted to walls;
 - .3 where benches, shelves, cubbies, coat racks, J-hooks and other items are supported on walls;
 - .4 behind wall-hung mechanical fixtures;
 - .5 and elsewhere as indicated on drawings.
- .2 Install building paper over wire mesh reinforcing in the beds below solid block section.
- .3 Use 100% solid concrete blocks where indicated.

3.6 CONTROL JOINTS

- .1 Provide continuous vertical control joints in concrete block and brick partitions and walls at locations indicated, and at maximum 4.0m o.c. Control joints may be at 6.0m o.c. for autoclaved block only.
- .2 Control joints are required at changes in wall height, at pilasters and changes in wall thickness, at movement joints in foundations and floors and roofs, at one side of door or window openings under 1.8m wide, on both sides of openings over 1.8m wide, and adjacent to corners.
- .3 Confirm all control joint locations with the Consultant prior to wall construction. Provide drawings marked up to show locations of all control joints.
- .4 Form control joints as detailed. Stop masonry reinforcing each side of joints; except where structural reinforcing is required, such as at bond beams.
- .5 Provide bond breaker at each control joint, of building paper or black polyethylene. Continue bond breaker over lintels at openings.
- .6 Control joints and bond breaker to be continuous from floor to roof, including any horizontal portions of a control joint. Review details with Consultant on site.

SECTION 04 22 00 - CONCRETE UNIT MASONRY**3.7 HORIZONTAL REINFORCING**

- .1 Refer to structural drawings for requirements for masonry reinforcing.
- .2 Cavity wall and concrete block walls above and below grade shall be continuously reinforced and tied together with horizontal masonry reinforcing in every second block bed joint.
- .3 Additionally place masonry reinforcing in first and second bed joints above and below openings. Reinforcing in first bed joint shall be continuous. Second bed joint reinforcing shall extend 600 mm beyond each side of opening.
- .4 Place continuous reinforcing in second bed joint below top of wall.
- .5 At stack bond brick, provide reinforcing in every block bed joint, to provide reinforcing every 3 courses of brick.
- .6 Lap reinforcement minimum of 150mm at splices. Supply & install prefabricated sections at corners and intersection of walls to insure continuity of reinforcing.
- .7 At accent bands of concrete masonry in clay masonry panels, reinforce the concrete masonry with bed-joint reinforcement to help control cracking in the concrete masonry due to differential movement.

3.8 FIRE-RATED INTERIOR PARTITIONS

- .1 Block shall be of density required to achieve fire rating, in accordance with the Ontario Building Code.
- .2 At door openings in fire rated masonry partitions, fill concrete block solid with 20 MPa concrete for a distance of 400mm at each side and 400mm above openings.

3.9 REINFORCED MASONRY WALLS

- .1 Construct reinforced masonry walls to conform to the requirements of the Ontario Building Code and CSA-A371, and as indicated on Structural drawings.
- .2 Lay units so as to maintain an unobstructed vertical continuity in the cells. All walls and cross webs shall be fully bedded. No over-hanging mortar or debris shall be allowed inside the reinforced cells unless otherwise on the drawings.
- .3 Vertical reinforcing shall be provided full length without splicing. It may be installed after the first 1200mm of masonry is erected. Locate rods accurately in the cells as shown on the Drawings. Hold in position top and bottom. Fill cells containing reinforcement solidly with 20 MPa concrete grout, unless noted otherwise on Structural drawings. Consolidate by puddling when placing and again reconsolidate before plasticity is lost. Place concrete grout in lifts not exceeding 1200mm. Stop each lift 38mm below the top of a masonry unit.
- .4 Refer to Structural and Architectural drawings for locations and grout strength.

3.10 THROUGH-WALL FLASHINGS

- .1 Install masonry flashing in locations where brick or block is bearing on foundation walls and elsewhere as indicated.
- .2 Carry through-wall flashings minimum 150mm up backing material and turn top edge into joint or anchor top edge continuously. Keep flashing 12mm from exterior exposed face. Lap joints minimum 150mm.
- .3 Lap and completely seal joints with adhesive to manufacturer's instructions. Bond flashing to vertical surfaces over whole area using flashing material manufacturer's recommended adhesive.

3.11 CUTTING MASONRY

- .1 Cutting of masonry units exposed in finished work shall be done with approved type power saw. Where electrical conduit outlet or switch boxes occur, grind and cut units before services installed. Quick saw not permitted for cutting block above grade.
- .2 Obtain Consultants approval before cutting any part or area which may impair appearance or strength of work.
- .3 Patching of masonry not permitted without Consultants approval.

3.12 BOND BEAMS

- .1 Install concrete block bond beams where indicated and where required for bearing of structural members.
- .2 Unless more stringent requirements are noted on Structural drawings, make bond beams of special channel blocks with two 15M reinforcing bars placed in bottom, and filled with 20 MPa concrete grout. Extend a minimum length of 200mm, each side of structural member.

3.13 REINFORCED LINTELS

- .1 Install reinforced concrete block lintels at openings where steel lintels are not indicated.
- .2 Cast and cure lintels on a plank. Set special channel lintel blocks using specified mortar. Place wood stops at each end of lintel to prevent movement.
- .3 Refer to Structural drawings for lintel sizes and dimensions. As a minimum, place 25mm of 20 MPa concrete grout in voids, lay in two 15M reinforcing bars and place concrete to level of block sides. Rod and tamp concrete well without disturbing reinforcing. Allow lintels to cure 7 days before loading.

3.14 CAVITY WALLS

- .1 Coordinate with Insulation Trade to ensure that location of horizontal cavity wall reinforcing permits installation of cavity insulation without cutting (reinforcement to occur in joints of insulation board).

SECTION 04 22 00 - CONCRETE UNIT MASONRY

- .2 Make provision for and clean out base of cavity on completion; every third block at base of cavity to be left out for cleaning and inspection. Do not insert blocks into opening until directed by the Consultant.
- .3 Build in cavity wall reinforcing, as specified, at 400mm o.c. vertically at running bond locations and 200 mm o.c. at stack bond locations. Provide 600 mm lengths of additional reinforcing to intermediate mortar joints at openings and as required by Ontario Building Code, local By-Laws, and CAN/CSA-B370, Connectors for Masonry .
- .4 The width of cavity wall reinforcing shall be fabricated to extend to within 25mm of the exterior face of the outer wythe and 25 mm of the interior face of the inner wythe. Do not crimp reinforcement to form drips.
- .5 Reinforcement shall be placed at top of cavity wall flashings and at last mortar joint at top of walls in addition to the locations specified above.
- .6 Refer to Section 07 21 00, Thermal Insulation, for application of cavity wall insulation. Install closure strips at cavity wall control joints, vertically and at bottom of wall openings. Closure strips to be continuous for full height of wall.
- .7 Weep Hole Vents:
 - .1 Install weep hole vents in exterior masonry immediately above dampproof courses, including over doors and windows, at top of walls and elsewhere as shown or required to ensure cavity is vented at top and bottom.
 - .2 Place weep hole vents, as specified, at base of cavity walls, set in vertical joints located at between 400mm and 600mm on centre, to suit block size.
 - .3 Place weep hole vents over lintels at same spacing.
 - .4 At concrete masonry units at top of cavity walls, locate vents at between 600mm and 800mm centres, to suit block size. Where exterior masonry at top of cavity wall is clay brick, refer to Section 04 21 00.
 - .5 Place vents at additional locations where indicated on drawings.
- .8 Install block vents where indicated on drawings.
- .9 Maintain cavity free of mortar to ensure a continuous and uninterrupted air space between the insulation and masonry.
- .10 Provide control joints in exterior masonry wythe, at locations of control joints in concrete unit masonry back-up. Leave head joints at control joint locations free of mortar, ready for bond break and sealant. Refer to drawing details. Horizontal reinforcement is to stop each side control joints; not continue through.

3.15 COORDINATION

- .1 Provide openings in masonry walls where required or indicated. Provide reinforced lintels over all openings in both loadbearing and non-loadbearing walls.
- .2 Accurately locate chases and openings, and neatly finish to required sizes. Refer to Mechanical and Electrical drawings and co-operate with all trades.

- .3 Where masonry encloses conduit or piping, bring to proper level indicated and as directed. Do not cover any pipe or conduit chases or enclosures until advised that work has been inspected and tested.
- .4 Extend vapour barrier at window, door, and louvre openings and at tops of walls for building in to frames and flashings as detailed.
- .5 Build in frames and anchor bolts, and metal brackets for vanities, benches, coat racks and gym equipment, etc.
- .6 Coordinate with forces installing lateral support angles and acoustic insulation at the tops of non-load bearing masonry partitions.

3.16 **CLEANING**

- .1 On completion, remove excess mortar and smears using wood paddles or scrapers.
- .2 Point or replace defective mortar to match existing, as required or directed.
- .3 Clean concrete masonry walls exposed in the finished work in accordance with manufacture's recommendations and NCMA TEK Bulletin #8-4A.
- .4 Remove efflorescence from masonry walls exposed in the finished work in accordance with manufacturer's recommendations and NCMA TEK Bulletin #8-3A.
- .5 Remove dirt and stains from masonry walls exposed in the finished work in accordance with manufacturer's recommendations and NCMA TEK Bulletin #8-2A.
- .6 Repeat cleaning operations until work is satisfactory.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 Coordinate this work with the work of other trades. Provide all necessary dimensions and structural steel shop drawings for the completion of their work.

1.2 WORK FURNISHED AND INSTALLED

- .1 Separate column base plates
- .2 Columns, beams, purlins, and girts
- .3 Bracing
- .4 Steel framing around roof and floor openings
- .5 Diagonal supports at columns for deck or slabs
- .6 Structural steel door frames and sill angles
- .7 Weldable reinforcing steel bars attached to structural steel
- .8 Field connections to concrete and masonry

1.3 WORK FURNISHED BUT NOT INSTALLED

- .1 Anchor bolts
- .2 Connection assemblies set in concrete
- .3 Loose angle lintels that bear on concrete or masonry

1.4 RELATED WORK SPECIFIED ELSEWHERE

- .1 Grouting under base plates, Section 03 30 00.
- .2 Steel deck, Section 05 30 00.
- .3 Metal fabrications, Section 05 50 00.
- .4 Fireproofing

1.5 REFERENCES

- .1 CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Quality Steel / Structural Quality Steels.
- .2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA S16.1, Limit States Design of Steel Structures.

SECTION 05 10 00 – STRUCTURAL STEEL

- .4 CSA S136, North American Specifications for the Design of Cold Formed Steel Structural Members.
- .5 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .6 CSA W48.1, Filler Metals and Allied Materials for Metal Arc Welding.
- .7 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .8 CAN/CGSB 1.171, Inorganic Zinc Coating.
- .9 CAN/CGSB 1.181, Ready Mixed Organic Zinc Coating.
- .10 CISC/CPMA 1.73a, A Quick-Drying One-Coat Paint for Use on Structural Steel.
- .11 CISC/CPMA 2.75, A Quick-Drying Primer for Use on Structural Steel.
- .12 ASTM A53/A53M, Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- .13 ASTM A108, Standard Specification for Steel Bars, Carbon and Alloy, Cold Finished.
- .14 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength.
- .15 ASTM A325, Standard Specification for Bolts for Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.
- .16 ASTM A570/A570, Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
- .17 SSPC, Steel Structures Painting Council.

1.6

QUALITY ASSURANCE

- .1 Structural steel fabrication shall be carried out by a firm that has been in structural steel business (for buildings) for at least five years and that is certified by the Canadian Welding Bureau under the requirements of CSA W47.1, Division 1 or 2.
- .2 Erection of the structural steel and steel joists shall be carried out by the steel fabricator's own forces, unless written permission to sublet the Work is obtained from the Consultant. Welding shall be carried out by CWB approved welders under the supervision of a CWB approved firm.
- .3 Engage a Professional Engineer to be responsible for the design, detailing and installation of all connections related to structural steelwork. Before submitting shop drawings, submit a letter signed and sealed by that Engineer stating that he has been engaged to undertake the responsibility for the above. Also submit a copy of that Engineer's Certificate of Authorization, and proof of his liability insurance. When requested, submit calculations signed and sealed by that Engineer. On completion of

erection, submit a letter signed and sealed by that Engineer to certify that Work has been completed in accordance with all shop drawings reviewed by the Consultant and the Structural Engineer.

- .4 Before the start of fabrication, supply the independent inspection and testing agency with mill test certificates or producer's certificates satisfactorily correlated to the materials or products to which they pertain. The onus for ensuring that the materials and products can be properly identified according to grade or specification rests with the Contractor.
- .5 Do not splice sections without the prior acceptance of the Consultant and the submission of pertinent shop drawings. Accepted splices will be required to develop the section. Each splice shall be given a non-destructive test by an independent inspection company acceptable to the Consultant. Testing shall be at the Contractor's expense. Evaluate results in accordance with CSA W59 and report to the Consultant.

1.7 **TOLERANCES**

- .1 Conform to the fabrication and erection tolerances of CAN/CSA S16.
- .2 In addition if more stringent tolerances are specified elsewhere to suit interfacing materials, the latter shall govern in such cases.

1.8 **SHOP DRAWINGS**

- .1 Refer to Section 01 30 00 - Submittals. "Shop drawings" means erection diagrams and shop details. Shop drawings received after noon will be date-stamped as received the following working day.
- .2 Submit to the Consultant for review before fabrication, 4 white prints of erection diagrams. Leave room on drawings for the stamps of the Consultant and the Structural Engineer. Check and sign before submission. Only 2 copies will be returned to General Contractor. The first submission of the erection diagrams to include a complete materials list indicating steel grades, paints, etc.
- .3 Show orientation of bearing plates on erection drawings.
- .4 In addition to beam designation marks, show beam sizes on erection drawings.
- .5 Submit to the Consultant for review before the start of Work, 4 white prints of shop drawings. Leave room on drawings for the stamps of the Consultant and the Structural Engineer. Check and sign before submission. Only 2 copies will be returned to General Contractor.
- .6 All shop drawings shall bear the seal and signature of the Professional Engineer responsible for designing the connections.
- .7 The Professional Engineer designing the connections shall hold a Certificate of Authorization, and shall carry min. \$1,000,000.00 in liability insurance.
- .8 It is advisable to submit erection diagrams for review before preparing shop details. Include details of special conditions. Make erection diagrams. Copies of section details developed by Ravens Engineering Inc. will not be accepted as erection diagrams. If

SECTION 05 10 00 – STRUCTURAL STEEL

required, CAD diskettes of the structural plans are available “as-is” for use in the preparation of shop drawings provided that the title blocks are removed and provided that the Owner and the Owner’s Consultants are not held responsible for any errors or omissions on the drawings. CAD files of the structural sections, elevations and schedules will not be made available for the preparation of shop drawings.

- .9 Show the sizes, spacing and the locations of structural steel, connections, attachments, reinforcing and anchorage. Include all necessary plans, elevation and details. Indicate size and type of fasteners. For welded connections use welding symbols in compliance with CISC and indicate clearly the length of weld. Prepare shop drawings using metric sizes and units. All documents shall carry the seal of a Registered Professional Engineer licensed to practice in the Province of Ontario, who shall be responsible for the design of connections and details, and the fabrication, temporary shoring and erection of all structural steel. Show also vent holes required for galvanizing process.
- .10 Review of shop drawings by the Consultant and Structural Engineer is a precaution against oversight or error and solely to review conformance with general design intent. It is not a detailed check and must not be construed as relieving the Contractor of responsibility for making the Work accurate and in conformity with the Contract Documents. Design for which the Contractor is responsible under the Contract will not be reviewed. Work done prior to the receipt of the reviewed drawings will be at the risk of the Contractor. Review comments are not authorization for changes to the Contract price.
- .11 Provide the office preparing shop drawings with a complete set of Contract Drawings and Specifications plus all Addenda and Change Orders.
- .12 Do not release column shop details for fabrication before establishing on site the final elevations of the tops of supporting piers.
- .13 Make corrections required by previous review before resubmitting drawings. Clearly indicate all changes and additions to previous submission. Do not add new details to drawings which have been stamped as reviewed or noted.
- .14 After review, erection diagrams will be returned to the Contractor stamped to show one of the following:
- | | | | |
|----|----------|---|--|
| .1 | Reviewed | - | Reviewed with no comments. |
| .1 | Noted | - | Reviewed with comments noted on drawing. Submit two final record prints as soon as corrections are made. |
| .2 | Resubmit | - | Reviewed with comments noted on drawing. Correct and resubmit for review. |

Conform to the requirements of each authority that has reviewed the drawings.

- .15 Allow a minimum of 15 working days for review of each submission of shop drawings in the Structural Engineer’s office. Allow more time when large quantities of shop drawings are submitted. Submit in general conformity with the sequence of construction intended. Co-ordinate with the Consultant. Shop drawings received after noon will be date-stamped as received the following working day.

- .16 Keep on site at all times a set of shop drawings bearing the review stamps of the Consultant and the Structural Engineer and use only these drawings and the Structural Drawings to erect structural steel. Neatly mark on the Structural Drawings changes issued during the course of construction.
- .17 Show details by which steel assemblies, which are set in concrete, are to be connected to the formwork.
- .18 If additional instructions are required from the Consultant, allow a minimum of five working days for the Structural Engineer to review and respond to the request for instruction.

1.9 **SUBSTITUTIONS**

- .1 Submit all proposals for substitutions to the Consultant in writing in advance of shop drawings. Identify each item clearly. Do not proceed with a proposed change unless it is accepted in writing.
- .2 Substitution of alternative sections will be allowed provided the new members have equal or greater capacity and stiffness and are of dimensions acceptable at proposed locations.

1.10 **SITE CONDITIONS**

- .1 Determine any potential interference with existing services and protect from disruption and damage.

PART 2 - PRODUCTS

2.1 **MATERIALS**

- .1 Rolled shapes and plates:
 - .1 Wide flange sections: CAN/CSA G40.21, Grade 350W.
 - .2 Hollow structural sections: CAN/CSA G40.21, Grade 350W, Class C.
 - .3 Channels, angles and plates: CAN/CSA G40.21, Grade 300W
 - .4 Cold formed shapes: ASTM A570/A570M Grade 50, $F_y=345$ MPa
 - .5 Standard S beams: ASTM A992, A572, Grade 50, $F_y=345$ MPa
 - .6 Structural pipe: ASTM A53, Grade B, $F_y=241$ MPa
- .2 Welded wide flange shapes: CAN/CSA G40.21, Grade 350W.
- .3 Weldable reinforcing steel: weldable steel, grade 400W, deformed bars to CSA G30.18.
- .4 Arc welding electrodes and equipment: CSA W48.1. Electrode Classification Number: E480XX.

SECTION 05 10 00 – STRUCTURAL STEEL

- .5 High-strength bolts: ASTM A325M and CAN/CSA S16. Bolts shall be identifiable by their head markings and galvanized whenever used to connect members which are galvanized or painted with zinc-rich paint.
- .6 Machine bolts: ASTM A307.
- .7 Anchor bolts: CAN/CSA G40.21, Grade 300W
- .8 Stud anchors, headed: ASTM A108, Grades 1010 through 1020, $F_y=345$ MPa (50 ksi). Lengths of studs given on drawings are the lengths after welding.
- .9 Load indicating washers: Coronet - Cooper + Turner
- .10 Cast-in-place concrete anchor with threaded bolt: Structural Connection Insert Type EC-2FW - Acrow - Richmond.
- .11 Drilled concrete anchor:
 - .1 Kwik-Bolt 3 – Hilti Carbon steel anchors to be used unless otherwise noted.
- .12 Drilled masonry anchor:
 - .1 Hilti HIT HY20 with threaded HIT-A Rods and screen tube (for hollow masonry).
 - .2 Hilti HIT HY150 with HAS –E Standard rods (for solid or grouted masonry)
- .13 Joint filler for exposed steelwork: Epoxy resin.
- .14 Shop primer paint for steel receiving finish coat of paint on site: CISC/CPMA 2-75 except no lead-based paints allowed.
- .15 Shop primer paint for steel receiving intumescent paint on site: Primer compatible with intumescent paint to be used. See Section 07800 (Fireproofing).
- .16 Shop paint for steel without finish coat: CISC/CPMA 1-73a except no lead-based paints allowed.
- .17 Zinc-rich primer and touch-up paint:
 - .1 inorganic: CGSB 1-GP-171M, or
 - .2 organic, ready mixed: CAN/CGSB 1.181-92.
- .18 Ensure compatibility with specified topcoat.
- .19 Galvanizing: CAN/CSA G164
- .20 Grating: Galvanized safety grating. Minimum thickness of material 2mm. Banded ends. Bolted connections. Capacity 4.8 kPa unless noted otherwise on drawings. Maximum deflection 1/180th of span. Provide:
 - .1 Type W/F by Borden Products (Canada) Ltd.
 - .2 Type 19-2 by Fisher and Ludlow

- .21 Checker plate: CAN/CSA G40.21, Grade 300W. Plate with rolled-in embossments to provide non-slip surface.
- .22 Sliding bearing assembly: Galvanized top steel plate with a type 304 stainless steel highly polished lower surface and bottom elastomeric pad with a polytetrafluoroethylene (Teflon) upper surface. Static and kinetic coefficients of friction not to exceed 5% under 7MPa to 14MPa working stress. Assembly to have a working stress capacity of 7 MPa) on lower pad. Elastomeric bottom pad to allow a 2% rotation of upper plate and still maintain a substantially uniform bearing pressure between plate and pad. . Manufactured by:
 - .1 Fabreeka Canada Ltd.
 - .2 Goodco Ltd.
 - .3 Structural Tech Corp. Ltd.
- .23 Elastomeric bearing pad: Structural grade 50 durometer neoprene.

2.2 CONNECTIONS

- .1 Design connections to conform to CAN/CSA S16. Conform also to the CISC Handbook of Steel Construction, except as otherwise required by the specifications.
- .2 Retain a Professional Engineer to be responsible for the design of all connections.
- .3 In general, make shop and field connections with high-strength bolts or by welding. Use machine bolts only for secondary connections and at slotted holes with finger-tight bolts that are intended to accommodate movement.
- .4 Pretension all high-strength bolts used in:
 - .1 wind bracing connections;
 - .2 connections where bolts are subject to tensile loadings;
 - .3 connections using oversized or slotted holes unless finger-tight bolts are required to accommodate movement; and
 - .4 connections required by CAN/CSA S16 to be pretensioned.
- .5 Design non-composite beam connections for an end reaction due to the uniformly distributed load capacity of the member unless a greater reaction is noted on the Drawings.
- .6 Use double angle headers or end connection plates whenever possible. Do not use single angle headers for beams greater than 530mm deep. Make minimum depth of headers and end plates one-half the beam depth. Provide seated beam connections with top clip angles. Cantilevered plate connections will only be accepted for secondary members carrying minor loads. Provide all eccentrically loaded spandrel beams with top and bottom flange connections for torsional restraint.
- .7 Provide connections designed for a pass-through force equal to the smaller axial force where axial forces occur in beams framing in on opposite sides of a supporting member. Axial force is centred in smaller beam if beam sizes differ.

SECTION 05 10 00 – STRUCTURAL STEEL

- .8 Install web and flange stiffener plates at moment connections as required by connection design and detail but in every case when indicated on the drawings. If the shear generated in column web exceeds its shear capacity, reinforce the web.
- .9 Provide at least one stiffener plate each side of web of beams continuous over columns unless another type of stiffener is shown on the Drawings.
- .10 Design gusset plates at compression members for the force equivalent to twice the specified compression member force, or provide stiffeners to prevent gusset plate buckling.
- .11 Provide moment connections at splices to maintain continuity of cranked beams. Provide stiffener plates to resist unbalanced flange forces at splices.
- .12 Provide all wall supporting members (shelf angles, hangers, stubs, back braces, etc) which are attached to floor beams with adjustable connections capable to compensate for the deflection of the floor beams due to self weight of concrete slabs. Anticipate beam deflection to be 20 mm. Alternatively, fabricate based on actual deflected shape of the beams as measured after concrete slabs are installed.
- .13 Complete welded shop connections prior to galvanizing.
- .14 Where slotted holes are required to accommodate deflection, provide slotted holes long enough to allow for deflection indicated plus construction tolerance assuming bolts are in centre of slots. Use A307 bolts. Bolts are to be finger-tight with burred threads to allow for movement during life of structure without bolts loosening.
- .15 Where indicated on the drawings, connect to concrete using cast-in weld plates with headed stud anchors. Design and supply assemblies. Determine capacity of each anchor group considering edge distance, spacing and embedment.
- .16 Connect new steel members to masonry or concrete using drilled anchors. Design, supply and install anchors. Determine the capacity of each anchor group considering edge distances, spacing, and a factor of safety of 4 minimum against failure. Activate wedge type anchors by applying pre-determined torque recommended by the manufacturer. Do not use epoxy anchors unless approved by Consultant. Do not field weld at connections with epoxy anchors.
- .17 Where drilled anchors are shown on the drawings, but the embedment length is not shown, provide manufacturer's standard embedment length.

2.3 FABRICATION

- .1 Conform to CAN/CSA S16 and CSA W59.
- .2 Orientate straight beams, which have cambers within allowable mill tolerances so that the resulting beam camber is up.
- .3 Install stud anchors in the shop with end welds in accordance with the recommendations of the stud manufacturer. Lengths of studs given on drawings are the lengths after welding. Replace studs that crack in the weld or shank.

- .4 Increase thickness of curved sections at no extra cost where necessary to fabricate and galvanize the required curvature or fabricate curved sections from plates at no extra cost where necessary to accommodate the required curvature.
- .5 Reinforce holes through webs of beams as indicated on drawings or in accordance with design procedure set forth in the CISC Handbook of Steel Construction provided calculations are submitted as part of the shop drawings.
- .6 Provide 16 mm diameter weep holes in base plates at all HSS columns, which are not made watertight or that are to be exposed to temperature changes.
- .7 Provide vent holes in HSS sections where required for galvanizing process. Holes are not to exceed 16 mm diameter and are to be located so that any water inside HSS will drain away when HSS is in its final position. After galvanizing, fill vent holes with weld material, grind smooth and touch-up with two coats of zinc-rich paint.
- .8 Where shop inspection is required, do not ship material to the site before it has been inspected.

2.4

LINTELS

- .1 Structural Drawings do not show all lintels required. Refer to lintel notes and Typical Details on the Drawings.
- .2 Provide lintels with a minimum of 150 mm bearing at each end but not less than the length of any specified bearing plate.
- .3 Weld or bolt together multiple member lintels. Provide spacers if separated. If angle seats are at different elevations provide steel packing.
- .4 Connect ends of suspended lintels to the structure and/or build into masonry to provide adequate restraint.
- .5 Connect ends of steel lintels to columns where openings are adjacent to columns.

2.5

PLATES AND ANCHORS

- .1 Provide beams bearing on walls with bearing plates and wall anchors as specified.
- .2 Weld steel members to bearing plates as required..
- .3 Where bearing plate sizes are not noted on the Drawings, design bearing plates for a maximum factored bearing pressure of 1.65 MPa (240 psi) on masonry and 7.5 MPa (1100 psi) on concrete.
- .4 Set beam bearing plates 12 mm back from edge of support.
- .5 Extend beams for full length of bearing plates.

SECTION 05 10 00 – STRUCTURAL STEEL

2.6 SUPPORTS AT COLUMNS

- .1 Provide cap plates at tops of columns where required for support of deck, slab, joists or beams.
- .2 Provide diagonal or cantilevered angles at sides of columns where required for support of deck or slab.
- .3 Provide seat angles for support of masonry lintels above openings adjacent to columns. Unless otherwise noted on the Drawings, provide 76 x 76 x 9.5 steel angles attached to sides of columns. Length of seat to equal width of lintel minus 25 mm.
- .4 Provide additional angle welded to column for support of precast or deck interrupted by column.

2.7 PAINTING AND GALVANIZING

- .1 Clean steelwork prior to application of paint. Refer to CAN/CSA S16.
- .2 Surface preparation in shop for paints shall be as follows:
 - .1 Shop paint CISC/CPMA 1-73a: Clean off all grease and oil to SSPC SP1 and remove all loose rust, loose scale, dirt, weld flux, etc. by any suitable method.
 - .2 Shop primer paint CISC/CPMA 2-75: Clean off all grease and oil to SSPC SP1. Clean steel to SSPC SP7 Brush-Off Blast Cleaning.
 - .3 Zinc-rich primer paint and intumescent paint: Clean off all grease and oil to SSPC SP1. Clean steel to SSPC-SP6 Commercial Blast Cleaning, to an average surface profile of 0.04 mm (1.5 mils) or more.
- .3 Apply paint under cover. Steel shall be dry when painted and paint shall be dry before loading for shipment.
- .4 Apply zinc-rich primer paint not more than 24 hours after blast cleaning, but prior to any visible rust occurring on the surfaces. Do not apply when relative humidity exceeds 80%. Apply to achieve a dry film thickness of 0.08 mm (3 mils).
- .5 Apply one coat of shop paint CISC/CPMA 1-73a to steelwork in the shop with the exception of:
 - .1 Members to receive a finish coat of paint on site for which a CISC/CPMA 2-75 shop primer is required
 - .2 Members to receive intumescent paint on site for which a compatible shop primer is required
 - .3 Members for which zinc-rich paint is specified
 - .4 Galvanized members
 - .5 Surfaces encased in or in contact with cast-in-place concrete including top flanges of beams supporting slabs
 - .6 Surfaces and edges to be field welded for a distance of 50 mm from the joint.
 - .7 Contact surfaces of slip-resistant type joints assembled with high-strength bolts.
 - .8 Surfaces to receive spray fireproofing

- .6 Unless otherwise noted, apply one coat of primer paint (CISC/CPMA 2-75) in the shop for steel to receive a finish coat of paint on site.
- .7 Unless otherwise noted, apply one coat of compatible primer paint in the shop for steel to receive intumescent paint on site.
- .8 Only paints tested to ASTM E736 and approved by the spray fireproofing supplier may be used for steel which will receive spray fireproofing.
- .9 Apply galvanizing to:
 - .1 Shelf angles and hangers in exterior walls
 - .2 Lintels in exterior walls
 - .3 Exposed exterior steel members
 - .4 Other steel noted on the Drawings
- .10 When welding after galvanizing is in place, grind away galvanizing at areas to be welded. Touch up with two coats of zinc-rich paint.
- .11 Apply primer paint to architecturally exposed surfaces without runs or sags. Sand down and repaint areas not acceptable to the Consultant.
- .12 Apply touch-up paint after erection to all areas which have been missed, field welded, scraped or chipped using the same paint as the shop coat or primer.
- .13 Clean surfaces down to bare metal and apply two coats of zinc-rich touch-up paint to any galvanized surface, which has been damaged or field welded, and which is accepted by the Consultant as being capable of repair without galvanizing.
- .14 Clean and prepare surfaces of bolts, which will receive a finished coat of paint in the same manner as the connected steelwork.

2.8 EXPOSED STEEL

- .1 Conform to the requirements of the A.I.S.C. Specification for Architecturally Exposed Structural Steel and to the additional requirements given below when fabricating and erecting steel members which will remain permanently exposed to view.
- .2 Remove all imperfections which are unsightly from members permanently exposed to view. Remove mill and shop marks.
- .3 Provide continuous welding at exposed joints or fill between welds with an approved epoxy resin filler finished to the same profile as the adjacent weld. Joint shall be weather tight and suitable for painting.
- .4 Exposed welds shall be smooth. Hide bolts in bolted connections. Where exposed bolted connections are permitted, adjacent bolt heads shall be on same side and extensions of shank beyond nuts shall be uniform and not exceed 20 mm.
- .5 Do not mark surface with marks that are visible after painting.

SECTION 05 10 00 – STRUCTURAL STEEL

PART 3 - EXECUTION**3.1 CONSTRUCTION REVIEW**

- .1 General Review During Construction by the Consultant and Structural Engineer and the services of the independent inspection and testing agencies appointed by the Owner are undertaken so that the Owner may be informed as to the quality of the Contractor's performance and for the protection of the Owner. They will be carried out by examination of representative samples of the Work.
- .2 The Contractor will receive copies of the construction review reports and the results of material tests. He will thereby be informed of any defects or deficiencies found. The provision of this information does not relieve the Contractor of his responsibility for the performance of the Contract and he shall implement his own supervisory and quality control procedures.
- .3 Bring to the attention of the Consultant and Structural Engineer any defects or deficiencies in the Work, which may occur during construction together with a proposal for remedy. The Structural Engineer will decide what corrective action may be taken. The Consultant will issue the necessary instructions.

3.2 COOPERATION

- .1 Cooperate with all engaged on the Project. Exchange with related trades shop drawings and other data required to coordinate and schedule Work. Deliver material for installation by other trades when required.
- .2 Provide where shown or required, holes and copings for connection and clearance of the Work of other trades. Show on shop drawings before submitting for review. Holes in members shall not cause any appreciable reduction in strength.
- .3 Do not cut holes in the field unless sizes and locations are accepted by the Consultant in each case. Accepted field cutting and welding shall be undertaken by this Trade.
- .4 Supply and install framing around openings in steel roof and steel floor decks in accordance with Typical Details and Drawing Notes.
- .5 Maintain horizontal bracing and its connections below the underside of the deck so as not to interfere with the seating of the latter.

3.3 EXAMINATION OF WORK

- .1 Do not begin operations before making a thorough examination of existing conditions and the Work of related trades. Report inconsistencies before proceeding.

3.4 INSPECTION AND TESTING

- .1 The Consultant will appoint an independent inspection and testing agency. Notify the Consultant two weeks in advance of the date when the first Work will be ready for inspection.
- .2 Pay for the cost of inspection from the Cash Allowance.

- .3 Assist the agency in its work. Do not commence fabrication until details of inspection have been worked out with the inspection agency.
- .4 Work will be inspected when erected. Items to be cast into concrete will be inspected on site before being installed.
- .5 The inspection agency will submit reports to the Consultant, Structural Engineer, Contractor and Municipal Authorities covering the Work inspected and provide details of errors or deficiencies observed.
- .6 Inspection will include:
 - .1 Checking that the mill test certificates or producer's certificates are satisfactorily correlated to materials and products supplied for the project or that legible markings were made on the material and products by the producers in accordance with the applicable material or product standards. Where this is not possible, notify the Structural Engineer and carry out sample tests as described below when required by the Structural Engineer.
 - .2 Confirming that all materials meet specifications.
 - .3 Sampling fabrication and erection procedures for general conformity with the requirements of the Contract.
 - .4 Checking welders' CWB Certification.
 - .5 Checking fabricated members against specified member shapes.
 - .6 Checking fabricated members against allowable sweep and camber.
 - .7 Checking fabricated members against specified camber.
 - .8 Visual inspection of all welded connections including spot checking of joint preparation and fit up.
 - .9 Sample checking bolted joints.
 - .10 Sample checking stud anchors.
 - .11 Sample checking of drilled concrete and masonry anchors.
 - .12 Sample checking that tolerances are not exceeded during erection including fit-up of field welded joints.
 - .13 Inspection of field cutting.
 - .14 Shop paint, including surface preparation, and field touch-up.
 - .15 Galvanizing and field touch-up.
 - .16 Grouting under base plates and bearing plates.
- .7 Arrange for the inspector to be present during the welding of 25% of moment connections and 25% of butt welds in direct tension.
- .8 Sample testing: When required, test coupons will be taken and tested in accordance with CSA G40.20 to establish identification. Cut samples from member locations selected by Structural Engineer and provide to inspection and testing agency. Make good the locations if requested, at no extra cost, by adding new plates and welds acceptable to the Structural Engineer. The agency will have the samples tested for mechanical properties and for chemical composition and will classify the steel as to specification.
- .9 Arrange for the inspector to start field inspection as soon as each section of the Work is completed, plumbed, bolts tightened and field welding finished.

SECTION 05 10 00 – STRUCTURAL STEEL

- .10 The inspector will check high-strength bolts in a representative 10% of bolted connections by torque testing each bolt. He will torque test 10% of the remaining bolts at random, but not less than 2 bolts in each connection. He will remove nuts from 1% of all bearing bolts and check that thread is excluded from the shear planes.
- .11 The inspector will randomly select and pull test 5% of all types and sizes of drilled in anchors installed on a weekly basis, but not less than one anchor of each type and size. Pull test to twice the design tension capacity of the anchor given by the manufacturer. Submit reports to Consultant within one week of testing. Reports to indicate each anchor location, test load and mode of failure, if applicable. Notify Consultant immediately if any anchor fails the pull test.
- .12 The inspector will visually check all the adjustable connections at wall supporting members to ensure the connections have been finalized after the concrete is poured.

3.5 FIELD MEASUREMENTS

- .1 Make field measurements necessary to ensure the proper fit of members.
- .2 Identify on shop drawings dimensions, which have been obtained by field measurement.

3.6 ERECTION

- .1 Comply with the requirements of CAN/CSA S16.
- .2 Submit a description of proposed erection methods and sequence to the Consultant for his records if requested.
- .3 Make adequate provision for all loads acting on the structure during erection. Provide erection bracing to keep the structure stable, plumb and in true alignment until the completion of masonry Work and the completion of floor and roof decks which together provide the permanent bracing. Prepare erection bracing drawings signed and sealed by a professional engineer and keep these drawings on site until erection bracing is no longer required.
- .4 Set column base plates with levelling screws to the proper elevation ready for grouting. Lift base plates for inspection when so directed.
- .5 Column base plates and beam bearing plates shall be grouted as soon as steelwork is completed. Do not add load on steelwork until grouting is completed and grout strength has reached at least 20 MPa.
- .6 Do not make permanent connections until as much of the structure as will be stiffened thereby has been properly aligned.
- .7 Adjust and finalize connections at wall supporting elements affected by floor beam deflections after concrete is poured.
- .8 Report ill-fitting connections to the Consultant before taking corrective measures.

- .9 Do not weld in an ambient temperature below -17°C. Preheat material adjacent to welding areas when ambient temperature is between -17°C and +40°C.
- .10 Remove slag from all completed welds so that they may be visually inspected.

3.7 DRILLED ANCHORS

- .1 Conform to requirements of manufacturer. Use hammer drill to make holes. Turn off hammer when drilling masonry with voids. Hole diameters must never exceed those required by manufacturer. Tighten all expansion anchors using a torque wrench unless finger-tight is required by the Drawings to allow for movement. Unless otherwise noted on drawings, provide manufacturer's standard embedment length into solid concrete.
- .2 Do not cut reinforcement to accommodate anchors. Relocate anchors, at no extra cost to the Contract, when obstructions prevent drilling holes to required depth in locations specified. Obtain Consultant's approval of new location before drilling hole. Fill all abandoned holes with grout.
- .3 Arrange for manufacturer's technical representative to be present during installation of first few anchors of each size and type. Submit site reports by manufacturer to Consultant within one week of each visit. Reports to indicate anchor sizes and types installed, locations, and names of those present during installation.

3.8 SUSPENDED LOADS

- .1 Do not overstress members supporting suspended loads. Hanger loads shall not exceed one kN (220 pounds). Loads from mechanical and heavy electrical services suspended from the steelwork shall not exceed the load allowance provided for such services and shall be distributed uniformly. Prevent torsion from hangers connected to beams by alternating their positions on either side of members. Do not apply twisting loads to joists and make attachment using U-bolts with double hangers or other devices that will centre the hanger load on the joist. Loads shall only be suspended directly at the panel points of joists, unless the chords of the joists have been specifically designed to support the concentrated loads.
- .2 Steel Beams: Vertical loads must be applied so that they do not cause twisting of the beams or excessive bending of the flanges. Lateral loads are not to be applied to beams unless approved in writing by the Consultant's structural engineer.

3.9 REJECTED WORK

- .1 Do not deliver to the site materials, which are known not to meet the requirements of the Specifications. If rejected after delivery, remove immediately from site.
- .2 Where review reveals materials or workmanship which appear to have failed to meet the specified quality or tolerances, the Consultant shall have the authority to order tests made of materials; to order detailed field surveys and measurements; to order a structural analysis of the existing elements and to load test the structure. All such Work will be carried out in order to assist in determining whether the structure may, in the opinion of the Consultant, be accepted, with or without strengthening or modification.

SECTION 05 10 00 – STRUCTURAL STEEL

Testing shall meet the requirements of the Ontario Building Code. All expense incurred shall be chargeable to the Contractor regardless of the results.

END OF SECTION

PART 1 - GENERAL

1.1 WORK FURNISHED AND INSTALLED

- .1 Steel roof deck
- .2 Holes for other trades
- .3 Hole and edge reinforcing fastened to deck
- .4 Closures and cover plates
- .5 Other sheet metal items noted on the structural drawings to be provided by this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Structural Steel, Section 05 10 00.

1.3 REFERENCES

- .1 CSA S136, North American Specifications for the Design of Cold Formed Steel Structural Members.
- .2 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .3 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
- .4 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .5 ASTM A108, Standard Specification for Steel Bars, Carbon and Alloy, Cold Finished.
- .6 ASTM A653/A653M, Specification for Sheet Steel, Zinc-Coated (Galvanized) Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .7 ASTM A792/A792M, Standard Specification for Steel, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .8 CSSBI 10M, Standard for Steel Roof Deck.
- .9 CSSBI 12M, Standard for Composite Steel Deck
- .10 CSSBI B13, Design of Steel Deck Diaphragms
- .11 Factory Mutual Loss Prevention Data 1-28, Wind Loads to Roof Systems And Roof Deck Securement.

1.4 QUALITY ASSURANCE

- .1 Welding shall be performed by a firm certified by the Canadian Welding Bureau under the requirements of CSA W47.1. Welders shall be qualified for deck welding by the Canadian Welding Bureau.

SECTION 05 30 00 – STEEL DECK

- .2 Before the start of fabrication, supply the Consultant and the independent inspection agency with mill test reports properly correlated to the materials. The onus for proving the properties of the steel supplied rests with the Contractor.

1.5 **SHOP DRAWINGS**

- .1 Refer to Section 01 30 00 – Submittals. "Shop drawings" means erection diagrams. Shop drawings received after noon will be date-stamped as received the following working day.
- .2 Submit to the Consultant for review before the start of Work, 4 white prints of shop drawings. Leave room on drawings for the stamps of the Consultant and the Structural Engineer. Check and sign before submission. Only 2 copies will be returned to General Contractor.
- .3 Submit copies of manufacturer's data sheets for each deck type.
- .4 If required, CAD diskettes of the structural plans are available "as-is" for use in the preparation of shop drawings provided that the title blocks are removed and provided that the Owner and the Owner's Consultants are not held responsible for any errors or omissions on the drawings. CAD files of the structural sections, elevations and schedules will not be made available for the preparation of shop drawings.
- .5 Show on drawings: material specifications, sheet lengths, inverted deck locations, thicknesses, local reinforcement, field fastening.
- .6 All shop drawings shall be signed and sealed by a professional engineer registered in Ontario.
- .7 Review of shop drawings by the Consultant and the Structural Engineer is a precaution against oversight or error and solely to review conformance with general design intent. It is not a detailed check and must not be construed as relieving the Contractor of responsibility for making the Work accurate and in conformity with the Contract Documents. Design for which the Contractor is responsible under the Contract will not be reviewed. Work done prior to receipt of the reviewed drawings will be at the risk of the Contractor. Review comments are not authorization for changes to the Contract price.
- .8 Provide the office preparing shop drawings with a complete set of Contract Drawings and Specifications plus all Addenda and Change Orders.
- .9 Make corrections required by previous review before resubmitting drawings. Do not add new details to drawings which have been reviewed.
- .10 After review, drawings will be returned to the Contractor stamped to show one of the following:
- .1 Reviewed - Released for fabrication.

- .2 Noted - Released for fabrication after revisions noted are made. Submit final record print as soon as corrections are made.
- .3 Resubmit - Correct and resubmit for review prior to fabrication.

Conform to the requirements of each authority that has reviewed the drawings.

- .11 Allow a minimum of 10 working days for review of each submission of shop drawings in the Structural Engineer's office. Allow more time when large quantities of shop drawings are submitted. Submit in general conformity with the sequence of construction intended. Co-ordinate with the Consultant. Shop drawings received after noon will be date-stamped as received the following working day.
- .12 Keep on site at all times a set of shop drawings bearing the review stamps of the Consultant and the Structural Engineer and use only these drawings and the Structural Drawings to erect steel deck. Neatly mark on the Structural Drawings changes issued during the course of construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Deck: ASTM A653/A653M, Grade 230, Zinc-Iron Alloy Coating ZF75, or ASTM A792/A792M, Grade 230, Aluminum-Zinc Alloy Coating AZ150.
- .2 Powder-actuated fasteners: Hilti Decking Fastening System.
- .3 Zinc-rich paint - organic, ready mixed:
 - .1 Galvafruid by W. R. Meadows Ltd.
 - .2 Glid-Zinc 100 by Glidden Company (Canada) Ltd.
- .4 Galvanized Deck (see drawing for locations): ASTM A653/A653M, Grade 230 Zinc coating Z275, or ASTM A792/A792M, Grade 230, Aluminum-Zinc Alloy Coating AZ150.
- .5 Coated Fasteners for galvanized deck and prefinished deck; Buildex Division, Canada ITW Ltd. Climaseal coating, encapsulated EPDM washer, self-drilling screw. 12-24 x 7/8" Hex Washer Head Traxx/4 (total thickness 6mm). 12-24 x 1/4" Hex Washer Head Traxx/5(total thickness 12mm).

2.2 DESIGN

- .1 Conform to requirements on drawings and in specifications and to Factory Mutual FM Class 90 approval rating requirements.
- .2 Conform to CSSBI 10M and 12M where applicable unless otherwise required by drawings and specifications.

SECTION 05 30 00 – STEEL DECK

- .3 Design deck profiles for indicated loads in accordance with CSA S136. Section depths and minimum steel thicknesses are shown on the Drawings. Deck to have interlocking male and female side laps.
- .4 Design deck for indicated diaphragm action, including deck thickness, anchorage and side laps, in accordance with CSSBI "Design of Steel Deck Diaphragms" and Hilti Product Technical Guide (for Powder Actuated Fasteners). If no diaphragm shear is indicated on drawings, design deck for shear of 5.0 kN/m.
- .5 Roof deck: Rib spacing, centre to centre, shall be 150 mm for 38 mm roof deck and 150 mm or 200mm for 76mm roof deck, unless otherwise noted.
- .6 Deck profiles and welding shall, in addition to the requirements of this Section, satisfy the requirements of any Fire Rated Assembly Design specified for the Project.
- .7 Limit deflection of roof deck under total load to 1/240th of span. Also limit deflection to that required by Factory Mutual for a person walking on the roof.
- .8 Make sections continuous over 3 spans or increase thickness of material to give the equivalent stiffness and strength of a 3-span deck.
- .9 Design anchorage of roof deck to supports to resist net factored uplift forces of 3 kPa on cantilevers and at all roof corners (6m x 6m areas) and 2 kPa elsewhere on 3m wide strip around perimeter of all roof areas, but not less than that shown on the drawings or required by Factory Mutual. Increase minimum welding specified under Erection if necessary.
- .10 Provide side lap connections, which distribute vertical loads between panels and also horizontal loads when acting as a diaphragm.

2.3 FABRICATION

- .1 Conform to CSA S136 and CSA W59.
- .2 Fabricate sections from steel sheets by rolling. Form integral ribs which will bear on supports and form interlocking male and female side laps.
- .3 Cellular units: Spot weld together upper and lower elements assembled into a cellular unit so as to develop the full horizontal shear along the length of the interface.

2.4 ACCESSORIES

- .1 Provide all required edge stiffeners, closures, reinforcing sheet steel plates and flashing.
- .2 Reinforce edge of free spanning deck with channel shaped closure fitted to edge and fastened to deck.
- .3 Provide flashing at columns and points of discontinuity to prevent leakage of mortar when concrete is placed over deck.

2.5 CLOSURES

- .1 Provide fitted steel closures to fill hollow spaces between webs immediately above beams, partitions and walls transverse to deck when a ceiling is not specified. Where deck is continuous over support provide closures on each side and pack between closures with glass fibre insulation. Where deck span is parallel to walls and partitions, install steel flashings to provide a neat juncture.
- .2 Provide both interior and exterior fitted steel closures where deck cantilevers over exterior walls. Pack between closures with glass fibre insulation.
- .3 Provide fitted steel closures to fill hollow spaces between webs below all roof top sleepers or mechanical unit or skylight supports.

2.6 OPENINGS

- .1 Structural Drawings do not show all openings required. Refer also to Architectural, Mechanical, and Electrical Drawings.
- .2 Cut all required openings in steel deck and reinforce openings larger than 150mm.
- .3 Openings up to 150 mm wide across the flutes require no reinforcing. Minimum clear distance between unreinforced openings shall be 600 mm.
- .4 Reinforce roof openings 150 to 300 mm wide across the flutes. Use 55 x 55 x 6 mm angle under the flutes at each end of the opening. Extend across at least three flutes on each side. For openings over 300 to 400 mm across the flutes, provide suitable reinforcement based on a structural analysis of the loads involved. Roof openings larger than 400 mm wide across the flutes will be framed by the Structural Steel Trade.

PART 3 - EXECUTION

3.1 CONSTRUCTION REVIEW

- .1 General Review During Construction by the Consultant and Structural Engineer are undertaken so that the Owner may be informed as to the quality of the Contractor's performance and for the protection of the Owner. It will be carried out by examination of representative samples of the Work.
- .2 The Contractor will receive copies of the construction review reports. He will thereby be informed of any defects or deficiencies found. The provision of this information does not relieve the Contractor of his responsibility for the performance of the Contract and he shall implement his own supervisory and quality control procedures.
- .3 Bring to the attention of the Consultant and Structural Engineer any defects or deficiencies in the Work, which may occur during construction together with a proposal for remedy. The Structural Engineer will decide what corrective action may be taken. The Consultant will issue the necessary instructions.

SECTION 05 30 00 – STEEL DECK

3.2 COOPERATION

- .1 Cooperate with all engaged on the Project. Exchange with related trades shop drawings and other data required to coordinate and schedule the Work.
- .2 Cut and reinforce openings required by other trades.
- .3 Do not hang concentrated loads from the steel deck. Attach hangers, which support services to the steelwork.

3.3 EXAMINATION OF WORK

- .1 Do not begin operations before making a thorough examination of existing conditions and the Work of related trades. Report inconsistencies before proceeding.

3.4 INSPECTION AND TESTING

- .1 The Consultant will appoint an independent inspection and testing agency. Notify the Consultant two weeks in advance of the date when the first Work will be ready for inspection. Assist the agency in its Work.
- .2 Pay for cost of inspection from the Cash Allowance.
- .3 Work will be inspected when erected.
- .4 The agency will submit reports to the Consultant, Structural Engineer, and Contractor covering the Work inspected and provide details of defects or deficiencies observed.
- .5 Inspection will include:
 - .1 Checking that mill test reports are properly correlated to materials
 - .2 Checking welders' CWB certification
 - .3 Checking deck types and gauge thicknesses
 - .4 Checking all welding, fastening and button punching
 - .5 Checking of all reinforcement required at holes cut in deck
 - .6 Checking installation of sheet metal strips and edge reinforcing

3.5 FIELD MEASUREMENTS

- .1 Make field measurements necessary to ensure the proper fit of members.
- .2 Identify on shop drawings dimensions, which have been obtained by field measurement.

3.6 ERECTION

- .1 Carry out erection using only the forces of the steel deck fabricator unless written permission is obtained from the Consultant prior to the close of Bids to sublet the erection.
- .2 Align deck end to end for accurate fit with corresponding sections. Ensure that sections are parallel, even and straight.
- .3 Protect members supporting deck from damage when deck is being welded in place. Report damage to the trade that has provided the member and establish with that trade a

procedure for repair or replacement. Obtain the acceptance of the Consultant before starting remedial measures.

- .4 Weld deck to supports to resist uplift and lateral forces but not less than using at all bearing points with 20 mm diameter fusion welds in alternate flutes, unless otherwise noted on drawings. Stagger welds along flanges of supporting members to the maximum obtainable by the width of the flange. Place one weld each side of side lap, in each flute where side lap is made. Increase weld size and spacing as required.
- .5 Provide min. 45mm bearing on all supporting members
- .6 Locate a rib of deck directly over steel beams and perimeter angles spanning parallel to deck and at same elevation as deck support. Weld deck to beam or angle at 450 mm centres.
- .7 Make end laps over supports lapping not less than 50 mm and not more than 100mm.
- .8 Provide adequate connection to withstand all forces, including uplift, acting on the deck during erection.
- .9 Field welding to conform to requirements of CSA - W59.
- .10 For exposed deck end laps, ensure that lower deck sheets do not extend past the face of the supports.
- .11 Connect male and female side laps by welding or mechanically interlocking with a button punch at 600 mm on centre maximum including at supports. Reduce spacing as required for diaphragm action or if the ULC Fire Rated Assembly design specified requires a closer spacing..
- .12 Increase deck welding specified elsewhere if necessary to satisfy the requirements of any Fire Rated Assembly Design specified for the Project.
- .13 Inspect all surfaces of deck after erection and touch-up with zinc-rich paint where protective coating has been scratched or damaged. Minimum thickness 0.06 mm (2.5 mils).

3.7 REJECTED WORK

- .1 Do not deliver to the site materials which are known not to meet the requirements of the Specifications. If rejected after delivery, remove immediately from site.
- .2 Where review reveals materials or workmanship which appear to have failed to meet the specified quality or tolerances, the Consultant shall have the authority to order tests made of materials; to order detailed field surveys and measurements; to order a structural analysis of the existing elements and to load test the structure. All such Work will be carried out in order to assist in determining whether the structure may, in the opinion of the Consultant, be accepted, with or without strengthening or modification. Testing shall meet the requirements of the Ontario Building Code. All expense incurred shall be chargeable to the Contractor regardless of the results.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Supply and installation of miscellaneous steel supports and other steel fabrications.

1.2 RELATED WORK

- | | | |
|----|-----------------------------|------------------------------|
| .1 | Structural Steel | Section 05 10 00 |
| .2 | Finish Carpentry | Section 06 20 00 |
| .3 | Architectural Casework | Section 06 41 16 |
| .4 | Built-up Bituminous Roofing | Section 07 51 00 |
| .5 | Painting | Section 09 92 00 |
| .6 | Mechanical | Divisions 20, 21, 22, 23, 25 |
| .7 | Electrical | Divisions 26, 27, 28 |

1.3 REFERENCE STANDARDS

- .1 Conform to CSA-W59, Welded Steel Construction (Metal Arc Welding)
- .2 Use fabricator fully approved by Canadian Welding Bureau, in conformance with the requirements of CSA-W47.1
- .3 Conform to CAN/CSA-S16, Limit States Design of Steel Structures (Consolidation)

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 01 33 23. Show and describe detail work of this Section.
- .2 Include large scale details of members and materials, connections, joining details, and of anchorage devices, dimensions, gauges, thicknesses, description of materials, metal finishing specifications, as well as all other pertinent data and information.
- .3 Indicate field dimensions on shop drawings.
- .4 Include Engineering calculations substantiating that the design loading of railings and ladders conform to the requirements of the Ontario Building Code.
- .5 Shop drawings for shall be stamped by a professional structural engineer, registered in the Province of Ontario, retained by the Contractor, who shall be responsible for the structural design of metal fabrications.

1.5 FABRICATION

- .1 Design, fabricate and erect structural steel members in accordance with CAN/CSA-S16.1.

SECTION 05 52 00 - METAL FABRICATIONS**1.6 INSPECTION AND TESTING**

- .1 The Owner will appoint a Testing and Inspection Company who shall ensure that the deflection and lateral support angles for non-loadbearing masonry walls have been securely anchored to wall and to structure above.
- .2 The cost of this testing and inspection shall be paid through the Cash Allowance included in the Contract; refer to Section 01 10 00.
- .3 Contractor shall cooperate with inspectors and provide full access to all places where the work is being performed.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Structural Steel: to CAN/CSA - S161.1; CAN/CSA-G40.20/G40.21.
- .2 Mild Steel Shapes: CAN/CSA A3-G40.20/G40.21, grade 350W.
- .3 Welding Materials: to CSA W59, CSA W55.3 for stainless steel, ASTM A371; for aluminum, ASTM B 285 and CSA-S244.
- .4 Sheet Steel: wiped coated, ASTM A 446; structural quality Grade A or B, maximum permissible working stress, Grade A 137,895 kPa, Grade B 154,442 kPa.
- .5 Prime Paint: CGSB 1-GP-40 M.
- .6 Bituminous Paint: CGSB-1-GP-108 M.
- .7 Zinc-Rich Coating: organic zinc rich coating, "ZRC 221 Cold Galvanizing Compound" by ZRC Worldwide.
- .8 Steel pipes: to CAN/CSA-G40.20 type 300W; heavy duty, Schedule 40 or better.
- .9 Galvanizing: to CAN/CSA G164, G90.
- .10 Sheet Aluminum: 2mm thick, clear anodized, satin finish.
- .11 Stainless Steel: Type 304 for interior work, Type 317 for exterior applications, No. 4 brushed finish
- .12 Reflective Tape: 3M Diamond Grade Fluorescent Yellow Conspicuity Markings; 50mm wide fluorescent, retroreflective tape for exterior applications.
- .13 EPDM Gasket: Continuous gasket fabricated of 19mm thick, by minimum 19mm wide, 40 durometer EPDM flat cord, as manufactured by Budlar Flexible Products Inc., or approved equivalent.

- .14 Bolts and anchors bolts: to ASTM A307-82A.
 - .1 Supply angles, bolts, anchors, sleeves and any other attachments to structure necessary for the installation of work under this Section.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Execute work according to details and reviewed shop drawings.
- .2 Take all measurements at the building before proceeding with fabrications.
- .3 Report discrepancies in dimensions to the Consultant who shall determine the adjustments to be made.
- .4 Where drawings indicate modifications to existing metal fabrications, the work shall be done by the subcontractor responsible for the work of this Section.

3.2 WORKMANSHIP

- .1 Use only workmen skilled in the Work of this Section. Do work to best standard practice and in accordance with applicable laws, by-laws and regulations. Conform to the requirements of Authorities Having Jurisdiction.
- .2 Fit and assemble work in shop where possible. Execute work according to details and reviewed shop drawings. Where shop fabrication is not possible, make trial assembly in shop.
- .3 Make joints in built-up sections with hairline joints in the least conspicuous locations and manner.
- .4 Welding:
 - .1 to CSA W59.
 - .2 Weld all connections, unless otherwise noted.
 - .3 File or grind exposed welds smooth and flush, so as to be invisible after painting.
- .5 Counter sink screws, unless otherwise noted.
- .6 Make workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work. Fit joints and intersecting members accurately. Make work in true plumb, true, square, straight, level and accurate to sizes and shapes detailed, free from distortion or defects detrimental to appearance or performance.
- .7 Insulate metals where necessary to prevent corrosion due to contact between dissimilar metals and between metals and masonry, concrete or plaster. Use bituminous paint, butyl tape, building paper or other approved means.

SECTION 05 52 00 - METAL FABRICATIONS

- .8 Supply all fastenings, anchors and accessories required for fabrication and erection of the work. Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.
- .9 Draw mechanical joints to hairline tightness and seal countersunk screws and access holes for locking screws with metal filler where these occur on exposed surface.
- .10 Thoroughly clean all ferrous metals, by methods suitable to remove burrs, weld spatter, rust, loose mill scale, oil, grease, dirt and other foreign matter. Apply one coat of prime paint to all surfaces except those requiring field welding. Brush on thoroughly and work well into all crevices.
- .11 After erection and installation, thoroughly clean the work and apply field touch up of same formula as shop coat to all damaged or unpainted surfaces. Work all paint well into all joints, crevices and open spaces.
- .12 Galvanize all exterior work and all steel which will be embedded in concrete or masonry. Partially embedded items shall be galvanized beyond the point of embedment, to protect steel at junction point. Do galvanizing after welding.
- .13 After installation, remove any rust and touch up all galvanized work with two coats zinc rich coating.
- .14 Finish painting is specified in Section 09 92 00.

3.3 SUPPORT STEEL

- .1 Provide and install miscellaneous structural steel supports and any other steel fabrications required for entrances and screens.
- .2 Provide galvanized steel lintels for new or enlarged openings.
- .3 Provide steel supports and angles for new and / or enlarged door openings.
- .4 Provide steel supports at new roof openings.
- .5 Provide steel supports at new mechanical openings in Corridor walls.

3.4 LATERAL SUPPORT FOR MASONRY

- .1 Provide deflection and lateral support angles for non-loadbearing masonry walls in accordance with Section 04 22 00. Install on both sides of wall.
- .2 Lateral support noted below is a minimum requirement; provide lateral support as indicated on structural drawings where it exceeds these requirements.

- .3 For interior walls with concealed tops parallel with joists provide steel angles 90mm x 90mm x 6mm x 800mm long on both sides of wall, at maximum 1800mm o.c. Anchor angle to underside of structure with suitable inserts and bolts.
- .4 Where wall is directly below joist, provide steel angles 90mm x 90mm x 6mm x 800mm long at 1800 o.c. welded to bottom cord of joist on each side of wall. Coordinate with forces providing drywall enclosure at joist above wall.
- .5 For interior walls with concealed tops perpendicular to joists, provide 75mm x 50mm x 6mm L x 100mm long, welded to bottom chord of each joist.
- .6 For interior walls with exposed tops provide 75mm x 75mm x 6mm continuous steel angles. Anchor angles in an approved manner.
- .7 Coordinate with forces installing acoustic insulation in gaps at top of partitions, to ensure insulation is installed before lateral support angles.

3.5 CORNER GUARDS

- .1 Supply and install 1400 high stainless steel corner guards over gypsum board finishes where indicated on drawings.
- .2 Guards shall be 100 x 100 x 1.5 and secured to corners with stainless steel round headed fasteners to secure guard tight to corner with no gaps.
- .3 Grind all exposed edges to round smooth finish.

3.6 BOLLARD

- .1 Supply and install 200 x 200 x 9.5mm thick x 31mm long galvanized steel bollard at B/F push button location at new entrance.
- .2 Install 1600mm into concrete foundation and extend 1500mm above grade. Co-ordinate openings for conduit feed for power to push button with Electrical Contractor. Recess electrical box into bollard.
- .3 Fill bollard with 25 mPa concrete and provide 9.5mm thick welded top cover.
- .4 Prepare galvanized steel for prime paint.

3.7 STAGE STAIR HANDRAILS

- .1 Supply & install 38mm Ø stainless steel handrails with 600mm long extensions at top and bottom of stairs (total two required).
- .2 Mount handrails on 16mm diameter stainless steel bent bars with 90mm x 6mm thick round wall plates with 13mm diameter holes to accommodate fasteners.

SECTION 05 52 00 - METAL FABRICATIONS

3.8 MISCELLANEOUS ITEMS

- .1 Examine the drawings and provide all metal brackets and supports detailed or indicated, with the exception of items included in custom cabinetry.
- .2 Anchor Bolts, Lag Screws, etc.: Supply anchor bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeves, brackets, etc. where required or called for on Drawings for work of this Section. Such items occurring on or in exterior wall or slab shall be hot dipped galvanized. Thread dimensions shall be such that nuts and bolts fit without re-threading or chasing threads.
- .3 Miscellaneous Sections:
 - .1 Provide all miscellaneous steel angles, channels, tubes, plates, etc. of shapes and sized noted or required which are not included on Structural Drawings or called for in other Sections of the Specifications.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Concrete Formwork	Section 03 10 00
.2	Structural Steel	Section 05 10 00
.3	Finish Carpentry	Section 06 20 00
.4	Custom Cabinets	Section 06 41 13
.5	Plastic Laminate Work	Section 06 41 19
.6	Built-Up Bituminous Roofing	Section 07 51 00
.7	Hollow Metal Doors and Frames	Section 08 11 13
.8	Door Hardware	Section 08 71 00
.9	Painting	Section 09 90 00
.10	Electrical	Division 26, 27, 28

1.2 REFERENCES

.1	CAN/CSA O80-Series	Standards for Wood Preservation
.2	CSA O121	Douglas Fir Plywood
.3	CSA O141	Softwood Lumber
.4	CSA O151	Canadian Softwood Plywood
.5	CSA B111	Wire Nails, Spikes and Staples.
.6	National Lumber Grading Authority (NGLA), Standard Grading Rules for Canadian Lumber	

1.3 DELIVERY AND STORAGE

- .1 Do not deliver materials until they are required for incorporation into the work.
- .2 Protect materials, under weatherproof cover, both in transit and on site.
- .3 All exterior and interior finish materials shall, upon delivery, be neatly stored in a dry place and shall be protected from damage due to weather, water, or any other cause.

1.4 PROTECTION

- .1 Protect fire-retardant materials against high humidity and moisture.
- .2 Protect countertops and cabinets with 6 mm plywood or other suitable sheet material.
- .3 Protect installed hardware from damage and blemishes.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Wood materials: straight, sawn square, true, dressed four sides, properly sized and shaped to correct dimensions from nominal sizes indicated or specified.

SECTION 06 10 00 - ROUGH CARPENTRY

- .2 Lumber grade and moisture content:
 - .1 comply with the official grading rules of NLGA for the particular lumber and grade, and structurally complying with the latest requirements of the Ontario Building Code.
 - .2 Comply with CSA Standard O141 Softwood Lumber. Use only grade marked lumber.
- .3 All wood materials:
 - .1 well seasoned NLGA, free from defects which impair strength and durability.
 - .2 Moisture content limit:
 - .1 S-GRN: Unseasoned
 - .2 S-DRY: Maximum 19% moisture content
 - .3 KD: Maximum 15% moisture content
- .4 Pressure Treated Lumber to CSA O80.
- .5 Blocking, cant strips, grounds, nailing strips:
 - .1 NLGA No. 2 Ontario White Pine, No. 2 Red Pine, all complying with the grading rules of the NLGA for Construction,
 - .2 Douglas Fir dense complying with COFI standard grading and dressing rules.
- .6 Douglas Fir plywood:
 - .1 all veneer play; comply with CSA Standard O121, COFI Exterior.
 - .2 Western softwood plywood - comply with CSA Standard O151, COFI Waterproof glue WSP. Exposed two sides shall be grade G2S, and exposed one side shall be grade G1S.
 - .3 Plywood over steel deck at canopies shall be 19mm thickness, waterproof, tongue and grooved ply.
- .7 Wood preservative
 - .1 Pentox Green preservative and Osmose Cut End preservative, as manufactured by Osmose Pentox Inc.; Pentox Conservator Clear for painted wood.
 - .2 For painted surfaces use clear type and for concealed surfaces use green tinted type.
- .8 Fire Retardant Treatment: To ULC S102; flame spread rating 25 or less.
- .9 Rough hardware:
 - .1 nails, screws, bolts, lag screws anchors, special fastening devices and supports as required for the erection of all carpentry items.
 - .2 For preservative treated wood, use only stainless steel hardware, with the following exception:
 - .1 where galvanized steel items, such as gates, flashings, etc., are being attached to wood, galvanized steel fasteners shall be used.
 - .3 Do not mix stainless steel with galvanized steel; contact of these dissimilar metals can cause galvanic corrosion.
 - .4 Stainless steel hardware to be type 317.
 - .5 Galvanized hardware must be hot-dipped galvanized as follows:
 - .1 fasteners meeting CAN/CSA-G164 minimum zinc coating of 600 g/m² (ASTMA153 Class A or B1 G185)
 - .2 connectors meeting CAN/CSA-G164 minimum zinc coating of 600 g/m² (ASTM A653 Class G-185 sheet) or better.
 - .3 Electroplated galvanized hardware is not permitted.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Examine surfaces to receive the work of this Section and proceed only when conditions are satisfactory for a proper installation.
- .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

3.2 INSTALLATION - GENERAL

- .1 Provide running members of the longest lengths obtainable.
- .2 Slowly feed machine-dressed members using sharp cutters. Provide finished members free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding.
- .3 Machine sand surfaces exposed in the finished work and hand sand to an even smooth surface free of scratches.
- .4 Properly frame material with tight joints and rigidly secure in place. Use glue-blocks where necessary.
- .5 Design construction methods for expansion and contraction of the materials.
- .6 Conceal joints and connections wherever possible. Locate prominent joints only where directed.
- .7 Match joints made on the site with joints made in the shop.
- .8 Unless otherwise specified glue and blind screw or nail all work. Set and fill and plug surface screws using matching wood plugs.
- .9 Accurately scribe, cope and mitre members where required to produce hairline joints.
- .10 Erect work plumb, level, square and to the required lines.
- .11 Do not regard blocking, strapping and other rough carpentry indicated as complete or exact. Provide rough carpentry items required for the installation of the Work of other Sections.
- .12 The use of pressure treated wood is required for the following:
 - .1 Wood in direct contact with the ground or framed into concrete below ground level.
 - .2 Structural wood elements within 150mm of ground.
 - .3 In termite areas, for all structural wood elements within 450mm of ground.
 - .4 Wood framing members without a dampproof membrane separating the wood framing member from concrete in contact with the ground.
 - .5 Building components where moisture may accumulate.
 - .6 Retaining walls.

SECTION 06 10 00 - ROUGH CARPENTRY

- .13 Aluminum must not be in direct contact with pressure treated wood. Provide minimum 6mm spacing between aluminum products and treated wood, with 10mil polyethylene barrier and polyethylene or nylon spacers.

3.3 INSTALLATION - ROUGH CARPENTRY

- .1 Blocking and Grounds: Fasten wood nailers, blocking, bucks, grounds curbs, copings and strapping solidly to supporting materials in true planes so that they will remain straight and not be loosened by work of other Trades.

Provide wood blocking and / or plywood for fastening millwork, whiteboards, miscellaneous Science Room equipment, corner guards radiation and radiation cover support brackets and other wall mounted equipment.
- .2 Framing: Do all wood framing in accordance with the Ontario Building Code - latest version, and to CAN 3 086 as applicable.
- .3 Wood Cants, Copings, Curbs:
 - .1 Fasten wood cant blocking to structure with 19 mm. dia. bolts 760mm o.c.
 - .2 Provide wood curbs at new roof penetrations as indicated.
 - .3 Wood cants, curbs and copings to be preservative treated. Plywood to be exterior grade.
- .4 Preservative:
 - .1 Apply preservative to concealed wood members in contact with exterior walls and roof before fixing in place.
 - .2 Apply preservative to all cut ends of pressure treated wood.
 - .3 Preserve all other wood indicated to be preserved. Use clear preservative for items to be painted.
 - .4 Preserve wood by immersing in preservative for at least one hour.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 All finished wood items and trim, other than custom cabinetry, shown on drawings.
- .2 Factory finishing of all wood for clear finish, to specifications for casework.
- .3 Factory application of clear fire retardant coating for all wood installed in corridors.

1.2 RELATED WORK

- | | | |
|----|------------------------|------------------|
| .1 | Metal Fabrications | Section 05 52 00 |
| .2 | Rough Carpentry | Section 06 10 00 |
| .3 | Architectural Casework | Section 06 41 13 |
| .4 | Plastic Laminate Work | Section 06 41 19 |
| .5 | Acoustic Wall Units | Section 09 84 33 |
| .6 | Painting | Section 09 92 00 |

1.3 DELIVERY AND STORAGE

- .1 Protect materials against high humidity and moisture at all times.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Wood materials - straight, sawn square, true, dressed four sides, properly sized and shaped to correct dimensions from nominal sizes indicated or specified.
- .2 Lumber grade and moisture content - comply with the official grading rules of NLGA for the particular lumber and grade, and structurally complying with the latest requirements of the Ontario Building Code. Comply with CSA Standard 0141 Softwood Lumber. Use only grade marked lumber.
- .3 All wood materials: well seasoned NLGA, free from defects which impair strength and durability. Moisture content limit: S-GRN: Unseasoned; S-DRY: Maximum 19% moisture content: KD: Maximum 15% moisture content.
- .4 Hardwood Lumber: Select white birch, suitable for clear finish except as noted.
Clear maple, suitable for clear finish
Clear oak, suitable for clear finish
- .5 Douglas Fir plywood: all veneer ply; comply with CSA Standard 0121, COFI Exterior. Exposed two sides shall be grade G2S, and exposed one side shall be grade G1S

SECTION 06 20 00 - FINISH CARPENTRY

- .6 Canadian Softwood Plywood: all veneer ply; comply with CSA Standard 0151, COFI Waterproof glue WSP. Exposed two sides shall be grade S2S, and exposed one side shall be grade S1S.
- .7 Hardwood plywood : all veneer ply conforming to CSA 0115 and AWMAC. Birch or maple ply for stain finish, where noted on drawings.
- .8 Fasteners:
 - .1 Wood screws: electroplated, to CSA-B35.4
 - .2 Nails and Staples: to CSA-B111
- .9 Finish:
 - .1 As specified in Section 06 42 13
 - .2 Stain to be top quality, compatible with finishing system, in colours to be selected by the Consultant.
- .10 Clear Fire Retardant Coating:
 - .1 Interior clear, two-component coating for wood; satin finish
 - .2 Flame Spread Rating (Class A) tested to CAN/ULC S-102 and Class 1 tested to ASTM E-84-09 on Douglas Fir.
 - .3 SafeCoat Clear by Quantum Technical Services Ltd.
- .11 All steel furring and framing shall conform to the specifications of Section 09 29 00.

PART 3 - EXECUTION**3.1 PREPARATION**

- .1 Examine surfaces to receive the work of this Section and proceed only when conditions are satisfactory for a proper installation.

3.2 INSTALLATION - GENERAL

- .1 Provide running members of the longest lengths obtainable.
- .2 Slowly feed machine-dressed members using sharp cutters. Provide finished members free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding.
- .3 Machine sand surfaces exposed in the finished work and hand sand to an even smooth surface free of scratches.
- .4 Properly frame material with tight joints and rigidly secure in place. Use glue-blocks where necessary.
- .5 Design construction methods for expansion and contraction of the materials.
- .6 Conceal joints and connections wherever possible. Locate prominent joints only where directed.
- .7 Match joints made on the site with joints made in the shop.

- .8 Unless otherwise specified glue and blind screw or nail all work. Set and fill and plug surface screws using matching wood plugs.
- .9 Accurately scribe, cope and mitre members where required to produce hairline joints.
- .10 Erect work plumb, level, square and to the required lines.

3.3 WINDOW STOOLS / SILLS

- .1 Provide continuous plastic laminate finish window stools / sills, where indicated on drawings. Stools / sills shall be site measured.

3.4 WOOD TRIM

- .1 Supply and install all wood trim, for clear finish, where shown on drawings and details including, but not limited to, the following:
 - .1 Solid maple trim at control panels.
 - .2 Solid maple trim at panelling and where noted on drawings.
 - .3 Provide steel angles and brackets for concealed fastening of trim. Co-ordinate installation with acoustic panels.

3.5 FINISHING

- .1 Finish wood generally in accordance with the specifications for casework in Section 06 41 13.
- .2 Wood to be for clear finish, except where stain finish is indicated on drawings and schedules.
- .3 Fire Retardant Coating:
 - .1 Finish wood trim and other wood fabrications in corridors with a clear, fire retardant coating, to achieve as maximum flame spread rating of 25. Conform to manufacturer's printed instructions.
 - .2 Mix two component coating system in accordance with manufacturer's directions.
 - .3 Surface preparation:
 - .1 Surface must be clean, dry, and in sound condition, free of all oil, dust, grease, loose particles and rust.
 - .2 Stain wood in colour selected by the Consultant, where applicable.
 - .3 Apply a sanding sealer coat on wood to reduce absorption of the fire retardant coating.
 - .4 Ensure that sealer and stain are fully cured to avoid off-gassing and subsequent blistering of the fire retardant coating.
 - .5 Do not sand after application of the coating.
 - .4 Install wood prior to application of the fire retardant coating.

SECTION 06 20 00 - FINISH CARPENTRY

- .5 Apply fire retardant coating by spraying or brushing, in accordance with manufacturer's printed instructions.
 - .1 Ensure all containers are kept tightly closed when not being poured into mix containers. Do not leave containers standing open.
 - .2 If spraying, use and flush airless spray equipment in strict accordance with manufacturer's instructions.
 - .3 Avoid touching or handling the substrate once the coating has been applied as areas will mar easily.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Rough Carpentry	Section 06 10 00
.2	Finish Carpentry	Section 06 20 00
.3	Door Hardware	Section 08 71 00
.4	Glazing	Section 08 81 00
.5	Resilient Base	Section 09 65 00
.6	Painting and repainting	Section 09 92 00
.7	Laboratory Equipment	Section 11 53 00
.8	Laboratory Work Surfaces	Section 12 36 53
.9	Mechanical Work	Division 15
.10	Electrical Work	Division 16

1.2 QUALIFICATIONS

- .1 The Work of this Section shall be provided by a specialist millwork firm established in Ontario for a minimum of five years and able to produce evidence of satisfactory completion of quality casework comparable with Work specified under this Section.
- .2 All Work to conform to minimum standard for premium Grade Work as specified in Quality Standards for Architectural Woodwork prepared by Architectural Woodwork Manufacturers Association of Canada.

1.3 INTENT

- .1 The intent of this Section is that the casework shall be manufactured and finished at the plant, delivered to the Site and immediately installed by this Section including provision of necessary strapping, backings, bearers, rough hardware and finish hardware. Touch up finish immediately prior to completion of the Work and leave in perfect condition.
- .2 It is also the intent of this Section that all casework be manufactured with low or no VOC products, to minimize VOC emissions in the finished products.

1.4 SUBMITTALS

- .1 Submit Shop Drawings of all finish carpentry, in accordance with Section 01 33 00.
 - .1 Draw Shop Drawings in related and/or dimensional positions with sections. Scale minimum 1:10.
 - .2 Shop Drawings shall show fabrication details, materials, jointing, description of anchorage and hardware. Dimensions shall be based on actual measurements taken at the Site. Provide details and dimensions for all fittings and the like for mechanical and electrical connections to this work.
- .2 Submit samples of materials, construction method and wood stain finish for Consultant's approval.

06 41 16 - ARCHITECTURAL CASEWORK

- .3 Submit samples of all hardware and perforated metal sheet.
- .4 Submit one full size sample of proposed units, of type selected by Consultant, prior to proceeding with the remainder of cabinet work.
- .5 Maintenance Data and Materials:
 - .1 Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project closeout documents.
 - .2 Provide maintenance kit for finishes.

1.5 CO-OPERATION

- .1 Epoxy resin counters and sinks must be ordered immediately after award of the construction Contract. Coordinate with forces providing epoxy counters. Millwork subcontractor to review shop drawings for counters before they are ordered, to ensure coordination with casework.
- .2 Casework fabrication shall be coordinated with epoxy resin counters, per reviewed shop drawings.
- .3 Co-operate with other Sections and do all cutting, fitting and making good of own work for all Sections as may be necessary to carry out the true intent of the Drawings and Specifications. Examine the work and materials installed by others insofar as it affects this Work, and report to Consultant any such work not done properly.

1.6 OWNER'S APPLIANCES

- .1 Confirm the following standard appliance dimensions with the OWNER prior to fabrication:
 - .1 Dishwashers 610mm wide

1.7 MEASUREMENTS

- .1 Take necessary measurements at the Building of spaces and conditions to which work must conform or through which access is required. Take such measurements prior to fabrication of the Work of this Section and in ample time to avoid delays in the Work.

1.8 DELIVERY AND STORAGE

- .1 Do not deliver finished material during rain or damp weather or until "Wet Trades" have completed their work and windows are glazed or covered. Carefully protect from damage of any kind.

1.9 WARRANTY

- .1 Provide an extended Warranty to **two (2) years** from date of Substantial Performance of the Contract.

- .2 The warranty shall cover replacing, reworking and/or refinishing to make good defects in architectural woodwork due to faulty workmanship or defective materials, which appear during this two (2) year period.
- .3 Work showing defects during this period shall be replaced or made good without delay and at no cost to Owner.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 All wood must be straight and true, dressed 4 sides and conform to details. It must conform to official grading rules of Canadian Lumberman's Association for quality and moisture content. It must conform to NBC Structural requirements and be grade stamped according to CSA Standards 0140 or 0151. Stained woods and plywoods must be selected for colour and grain uniformity.
- .2 Softwood Lumber: Conform to CAN/CSA 0141 and National Lumber Grades Authority requirements.
- .3 Hardwood Lumber: Conform to National Hardwood Lumber Association (NHLA) requirements. Maple for stain finish to AWMAC Premium Grade.
- .4 Hardwood Plywood: Conform to CSA 0115 and AWMAC. Maple veneer plywood for natural finish. Exposed faces to be natural grade per AWMAC. Interior of doors to be classified as exposed face.
- .5 Canadian Softwood Plywood: Veneer plywood conforming to CSA 0151.
- .6 Douglas Fir Plywood: Veneer plywood conforming to CSA 0121.
- .7 Poplar Plywood: Veneer plywood conforming to CSA 0153.
- .8 Wood Particleboard:
 - .1 fabricated from 100% recycled or recovered wood fibre, containing no added urea formaldehyde, and certified by the Forest Stewardship Council (FSC). Conform to ANSI A208.1/Grade M-2, with formaldehyde emissions of 0.09 ppm or less; .
 - .2 No Added Urea Formaldehyde (NAUF) products; NuGreen 2 Particleboard as manufactured by Uniboard, ZCore as manufactured by Panolam Industries, TafiLam-Eco as manufactured by Tafisa Canada, or Vesta particleboard as manufactured by Flakeboard.
- .9 Hardboard: Conform to CGSB 11-GP-3M.

06 41 16 - ARCHITECTURAL CASEWORK

- .10 Plastic Laminate:
 - .1 Arborite, Formica, Nevamar, Wilsonart, Lamitech, or Pionite, conforming to CAN3-A172.
 - .2 1.6mm thick, general purpose grade for flatwork and 1.25mm thick standard postforming grade for shaped profiles and bends.
 - .3 Finishes to be matt finish, Maple wood grain colours as later selected by the Consultant from the manufacturers standard range.
 - .4 Finish at casework in Library Office only, will be bright white gloss.
 - .5 Balancing sheet shall be the same thickness as surface sheet and shall be supplied by the same manufacturer.
 - .6 Plastic laminate work shall be in accordance with Section 06 41 19.
- .11 Melamine panels:
 - .1 Thermofused melamine panels; by Uniboard Canada Inc., Panolam Industries, Flakeboard, or by Tafisa.
 - .2 Core shall be No Added Urea Formaldehyde (NAUF) particleboard, as specified above.
 - .3 Materials shall conform to ANSI A208.1 Nema Standards and ALA 1992. Colour to be selected by Consultant. Provide samples to Consultant for approval.
 - .4 Melamine sheets to be thermally fused with phenolic resin to particle board core.
 - .5 Melamine may be used in vertical applications only, and only where it will not be exposed to exterior of cabinets; such as in backs of wall mounted cabinets, and intermediate gables inside cabinets. Colours shall match plastic laminate finishes.
- .12 Edging: 3mm polyvinyl chloride (P.V.C.) in colour to match plastic laminate face
- .13 Nails and Staples: Conform to CSA B111.
- .14 Wood Screws: Steel, of types and sizes to suit applications
- .15 Draw bolts: mechanical devices of approved manufacture which can be recessed into the core of decorative laminated panels and used to draw two parts together for permanently tight joints.
- .16 Fixing clips: 1.6mm. (16 ga.) steel, galvanized (or prime painted), as detailed.
- .17 Glue: Adhesives to be urea formaldehyde free, low or no VOC . All adhesives to conform to CSA 0112 Series.
- .18 Adhesives for Plastic Laminate:
 - .1 Formulated for use in decorative laminate fabrication and to suit the conditions of application without failure.
 - .2 Adhesive conforming to CSA 0112 Series, no added urea formaldehyde; Greenguard Children & Schools certified low emitting products.
 - .3 Adhesive shall be acceptable to the laminate manufacturer.
 - .4 Plastic Laminate adhesives applied onsite must have a VOC content equal to or less than 20 g/L.

- .19 Glass and glazing: Refer to Section 08 81 00. Note that glazing stops shall be continuous wood stops; no clips will be permitted.
- .20 Wood Doors:
- .1 All tall cabinet doors shall be 38mm, solid core, flush slab doors, plastic laminate clad.
 - .2 Doors shall be made of materials that are low VOC emitting, FSC approved, and with no added urea formaldehyde.
 - .3 Doors to have 16mm minimum solid hardwood edges, to match face of door
 - .4 Solid Core Doors to have urea formaldehyde-free, solid mat formed particle board core, density 449kg/m³, conforming to CSA-O188.
 - .5 Doors to be as manufactured by Baillargeon Door Inc., Masonite, Lambton Doors, JWS Manufacturing Inc., or VT Industries.
- .21 Wood Finish:
- .1 Stain, sealer and varnish system
 - .2 The individual components of the system used must be chemically compatible to assure perfect adhesion and a top quality, durable final finish.
 - .3 Finish to match plastic laminate colour.
- .22 Perforated metal sheets at Art drying racks:
- .1 5mm perforated metal 5mm staggered centers, 20 gauge, 63% open area pre-galvanized G90 sheets.

2.2 CABINET HARDWARE

- .1 The hardware specified herein is to be provided as listed. Any proposed substitutions must be submitted to the Consultant for approval prior to shop drawing submission. Proposed substitutions must be equal or better quality than the specified items and will be considered at the Consultant's discretion. Hinges must be as specified.
- .2 Furnish and install all hardware to custom cabinetry as follows:

<u>Hardware for 19mm thick cupboard doors</u>			<u>Finish</u>
Hinges	Hettich	Selekta Pro 2000	C15
Catches	Richelieu	807V	C2G
Pulls	Richelieu	30135-170, 153 x 28mm	170
Flush Pulls (Science & Prep. Room)	Knape & Vogt	819x	ANO
Pulls at Barrier-Free Work Stations in Science Rooms	Richelieu	0141128170 (ADA compliant)	170
Cupboard lock	Hafele	235.08.358 complete with lock cores 210.04.606 and cylinder rosettes 210.04.062	polished nickel
Strike Plates	Hafele	gable catch: 329.61.319 bottom slot: 239.08.705	black

06 41 16 - ARCHITECTURAL CASEWORK

<u>Hardware for 19mm thick cupboard doors</u>			<u>Finish</u>
Elbow Latch & Strike	Richelieu	55401.8	Nickel
<u>Hardware for drawers</u>			
Slides	Knape & Vogt	6505 (length to suit)	Zinc
Pulls	Richelieu	30135-170, 153 x 28mm	170
Flush Pulls (Science & Prep. Rooms)	Knape & Vogt	819x	ANO
Pulls at Barrier-Free Work Stations in Science Rooms	Richelieu	0141128170 (ADA compliant)	170
Drawer locks	Hafele	235.08.303 complete with lock cores 210.04.606 and cylinder rosettes 210.04.062	polished nickel
Strike Plate	Hafele	239.08.705	black
<u>Hardware for Adjustable Wood Shelves</u>			
Pilaster Strips	Knape & Vogt	255 ZC Steel	Zinc
Shelf Clips	Knape & Vogt	256 ZC Steel	Zinc
<u>Hardware for 38mm thick cupboard doors</u>			<u>Finish</u>
Hinge	Stanley	F179 114x102	619
Locksets	Lockset Complete with Interchangeable Cylinder Supplied by Finishing Hardware Supplier		
Closet rods & flanges	Knape & Vogt	660 SS 30mm OD rod	629
		730 end caps	ANO
		734 & 735 end supports	CHR
		760 intermediate support	ANO
Roller Catches	Richelieu	504XV	625
Surface Bolts	Richelieu	392	646
Door Stop/Holder	Rixson	"Checkmate" 10 Series Adjust. Standard Duty Surface Mounted	630
Coat Hooks	Ives	571, cast brass, Coat & Hat Hook	626
<u>Specialty Hardware</u>			
Grommets for Wiring	Richelieu	60091060	brown

- .3 Supply and install additional hardware as follows:
 - .1 Safety Coat Hooks: Frost Model 1150, stainless steel, in colours to be selected by the Consultant from manufacturer's standard range.
 - .2 Door Grilles:
 - .1 Nailor Industries Door/Transfer Grille, model No. 51DGD, double flange, sight-proof design, clear anodized heavy duty aluminum; 400mm wide x 200mm high unless indicated otherwise on drawings. Provide where indicated on drawings.
 - .3 Adjustable Height Countertop Hardware:
 - .1 AjuTable System by Hafele Canada Inc., panel attachment type, black colour.
 - .2 System shall be complete with the following components:
 - .1 Adjustable side bases 630.00.361
 - .2 Top supports 560mm 630.00.352
 - .3 Attachment brackets 630.05.300
 - .4 C-beam/drive shaft , 630.11.311; sized for counter width.
 - .5 Bolt pack 630.00.359
 - .6 Centre support 630.03.310
 - .7 Front crank kit 630.00.391
- .4 Keying:
 - .1 All locks in a room to be keyed alike.
 - .2 Provide locks on all casework.
 - .3 Provide 6 extractor keys.

2.3 FABRICATION - GENERAL

- .1 Check job dimensions and conditions and notify the Consultant in writing of unacceptable conditions. Do not proceed until remedial instructions are received.
- .2 As far as practical, assemble work at the shop and deliver to the job ready for installation. Leave ample allowance for fitting and scribing on the job.
- .3 Fabricate work square and to the required lines. Recess and conceal fasteners and anchor heads. Fill with matching wood plugs. All fixed elements must be glued and screwed or dowelled to ensure rigid construction.
- .4 Comply with glue manufacturer's recommendations for lumber moisture content, glue life, pot life, working life, mixing spreading, assembly time, time under pressure and ambient temperature.
- .5 Make all necessary cut-outs in the furniture for sinks and electrical switch and outlet boxes and pre-drill all mounting holes for faucets, fittings and outlet boxes. Refer to electrical and mechanical Drawings and specifications.
- .6 Provide and install pipe covers, scribing pieces, top, bottom and/or and closures and filler panels where necessary, including wherever units require furring out or blocking to existing conduits, pipes, etc.

06 41 16 - ARCHITECTURAL CASEWORK

- .7 Service cover panels to be provided at all kneehole drawer units, kneehole front rails and knee drawer table assemblies. End closing panels to be provided at all exposed ends of service strips and island/peninsula assemblies. Front filler panels to be provided where called for on Drawings and as required by field conditions.
- .8 Provide trim at dishwashers and other under-counter appliances, after installation of appliances.
- .9 Resilient base around all toe spaces is specified in Section 09 65 00.
- .10 Avoid sharp corners and edges at exposed surfaces; smooth or round surfaces as appropriate.

2.4 PLASTIC LAMINATE WORK

- .1 All units shall be shop fabricated. Plastic laminate shall be applied to an approved underlayment with a thermosetting adhesive.
- .2 Build work plumb, true and square. Arrange adjacent parts of continuous laminate work to match in colour and pattern.
- .3 Obtain the governing dimensions before fabricating items which are to accommodate or abut appliances or equipment.
- .4 Veneering of plastic laminate to core material shall be done according to the laminate manufacturer's directions. All veneered work shall be backed with a balancing sheet except where exposed in the finished work, then face veneer to be applied to all exposed surfaces.
- .5 Where any fabrication is done at the site, laminate and core materials shall be stored in the work area for not less than 48 hours for preconditioning before bonding together.
- .6 Self Edging.
 - .1 Straight self edging shall be decorative laminate 1.6mm thick.
 - .2 Curved self edging shall be postformed material or bending grade.
 - .3 Chamfer exposed edges of laminate uniformly, at approximately 1.5mm.
 - .4 Do not mitre the decorative laminate sheet at edges.
- .7 Joints
 - .1 Locate joints where indicated, where not indicated at approximately 2440 or 3660mm centres also include joints at corners, and changes in superficial area.
 - .2 Accurately fit decorative laminate together to provide tight, flush, butt joints. Joints in cored. panels shall be made with 6mm blind splines and draw bolts, one draw bolt for widths up to 150mm, two or more draw bolts at maximum 450mm o.c. for widths exceeding 150mm.
 - .3 Seal the core at joints with sealer.

2.5 CABINET CONSTRUCTION

- .1 All cabinet work shall be factory assembled in modular, unitized construction. Carefully machine with dovetailed mortised and tenoned or blind dado joints. Each unit shall be self supporting and designed to be bolted together with fasteners inside units with plastic plugs over fasteners. All joints to be securely glued. Fabricate units as per Drawings and as specified.

- .2 Finish all sides of each cabinet module, including concealed sides, to permit future relocation of units.
- .3 All casework shall be plastic laminate clad.
- .4 Edging is to be applied after plastic laminate finish, so that edges of laminate are concealed.
- .5 *Plastic laminate faced panels and melamine panels are not to come into contact with the floor.* Provide 100mm high base of 19mm water resistant plywood. Coordinate height of plywood base with height of resilient base supplied. Set plywood base back from front face of cabinets minimum 75mm to provide toe space. Provide one coat of sealer to plywood base; ensure compatibility with resilient base adhesive.
- .6 Plywood base must be concealed by resilient base. Coordinate with forces installing rubber base. Where any part of the plywood base will be exposed above the rubber base, after levelling on site, cover with plastic laminate to match millwork.
- .7 Resilient base around all toe spaces is specified in Section 09 65 00.
- .8 Plastic laminate panels shall be finished both sides with the same pattern where they will be exposed to view. This includes items the inside of cabinets with doors, all shelving, and gables exposed under counters. Only faces permanently concealed may be white; laminate must be of same weight on both sides regardless of colour.
- .9 Gables to be 19mm thick plastic laminate clad panels, with matching laminate edging on all exposed edges.
- .10 Provide top front, top back rails and posts of solid hardwood 19mm x 50mm framing members, tongue and grooved together and dadoed to gables.
- .11 Bottoms to be 19mm thick plastic laminate clad panels, with PVC edging.
- .12 Doors generally to be flush overlay 19mm plastic laminate clad panels with laminate edges all four edges, of colour to match door face. Interior face of door to be considered a finished face.
- .13 Glazed doors are to be fabricated from 19mm solid wood frames with plastic laminate finish and matching laminate edges. Provide continuous hardwood glazing stops. Coordinate installation of glazing with Section 08 81 00.
- .14 Exposed back panels shall be minimum 19mm thick plastic laminate clad panels, removable within unit where access is required behind. Removable panels to have PVC edge trim, four sides.
- .15 Unexposed backs of wall mounted cabinets only may be 13mm thick melamine panels. Intermediate gables, which will not be exposed to view when cabinets are closed, may be 19mm thick melamine panels. Finish inside cabinets shall match pattern of plastic laminate exactly. Where cabinet backs and gables are exposed, even partially, they must be plastic laminate finished on both sides.

06 41 16 - ARCHITECTURAL CASEWORK

.16 Drawer Construction

- .1 Fronts: 19mm plastic laminate clad panels with applied edges on all four sides, secured to front of drawer box with minimum 5 screw nails.
 - .2 Drawer boxes: 13mm solid maple all glued and dovetailed together. Back and front to be tenoned to sides.
 - .3 Drawer bottom: 6mm tempered hardboard grooved into sides, back and front members.
 - .4 Provide all drawers with spring hinged stops to prevent accidental removal of drawer. Provide guides and slides for all drawers as specified above, sized for depth of drawer. Top hung drawer slides or grooved drawer sides for runners are not acceptable.
- .17 Shelves to be plastic laminate on 19mm particle board, finished both sides, with PVC edging on all four edges.
- .18 Sit all adjustable shelves on pilaster clips. Pilasters to be recessed into gables and fastened with screws. At all adjustable shelves in top half of tall shelving units (above fixed middle shelf), pilaster clips are to be type with cross support; screw to shelves.
- .19 Shelving in upper cabinets to be generally 300mm deep unless specifically noted. Provide centre pilaster to all shelves 1200mm long or over.
- .20 Provide centre gable to units 1200mm long where glass doors installed and also provide stiffener under bottom at front 25mm x 57mm on all cabinets to prevent deflection.
- .21 Provide extended top, bottom and exposed gables where furring out of upper cupboards is required due to pipes, conduits, exhaust ducts, and the like behind to provide a flush face at walls. Extend enclosure to ceiling where necessary to conceal ducts and the like.

2.6 COUNTERTOPS

- .1 Refer to Section 12 36 00 for epoxy resin countertops in Science Rooms and Prep Room.

2.7 WOOD FINISHING

- .1 Carefully prepare all work to receive finish. Thoroughly sand all wood surfaces to remove machine marks and make dust-free before finishing.
- .2 Finish exposed surfaces with one coat of selected satin, one coat of sealer, sanded smooth, and two coats of finish as specified. Apply finish in accordance with best practice and the resultant finish must be of highest quality for furniture use.
- .3 Finish unexposed surfaces with two coats of tinted sealer including backs of all base and wall cabinets, enclosures, etc.
- .4 The colour of stain shall match the plastic laminate colour. Before proceeding submit prepared 300mm x 300mm finished samples of materials for approval.

2.8 TRIM

- .1 Decorative laminate trim shall be as detailed. Joins shall be kept to the minimum, with none occurring in lengths under 3000mm. Slightly bevel the laminate edges of joints. Secure trim with adhesive.

PART 3 - EXECUTION

3.1 FABRICATION

- .1 Provide running members of the longest lengths obtainable.
- .2 Slowly feed machine-dressed members using sharp cutters. Provide finished members free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding.
- .3 Machine sand surfaces exposed in the finished work and hand sand to an even smooth surface free of scratches.
- .4 Properly frame material with tight joints and rigidly secure in place; use glue-blocks where necessary.
- .5 Design construction methods for expansion and contraction of the materials.
- .6 Conceal joints and connections wherever possible. Locate prominent joints only where directed.
- .7 Match joints made on the site with joints made in the shop.
- .8 Unless otherwise specified glue and blind screw or nail all work. Set and fill and plug surface screws using matching wood plugs.
- .9 Accurately scribe, cope and mitre members where required to produce hairline joints.
- .10 Erect work plumb, level, square and to the required lines.

3.2 PREPARATION

- .1 Examine surfaces to receive the work of this Section and proceed only when conditions are satisfactory for a proper installation.

3.3 INSTALLATION

- .1 Set and place all materials and components in place, rigid, plumb and secure.
- .2 Provide heavy duty fixture attachments for wall mounted cabinets.
- .3 Install all shelving, counter tops and sliding doors.
- .4 At junction of counters, back splash and adjacent wall finish, apply small bead of sealant.

06 41 16 - ARCHITECTURAL CASEWORK

- .5 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .6 After installation, fit and adjust operating hardware for wood cabinet doors, drawers, shelves, and height adjustable counters.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Provide all plastic laminate countertops as indicated on drawings, except Science and Preparation Rooms which shall be epoxy.
- .2 All plastic laminate work for the project shall conform to the specifications of this section.

1.2 RELATED WORK

- | | | |
|----|---------------------|------------------|
| .1 | Framing and Grounds | Section 06 10 00 |
| .2 | Finish Carpentry | Section 06 20 00 |
| .3 | Custom Cabinets | Section 06 41 13 |
| .4 | Door Hardware | Section 08 71 00 |
| .5 | Plumbing Fixtures | Division 22 |
| .6 | Electrical | Division 26 |

1.3 SUBMITTALS

- .1 Refer to Section 01 33 23.
- .2 Submit two 300 x 300mm samples of all materials to the Consultant for approval. The samples shall be identified by the project number, date and the name of the contractor the samples shall show colours and details of edging, forming and construction. The materials used in the building shall correspond to the approved samples.
- .3 Shop Drawings:
 - .1 Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - .2 Show full-size details, edge details, attachments, etc.
 - .3 Show locations and sizes of furring, blocking, including concealed blocking and reinforcement required.
 - .4 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers and other items installed in countertops.
- .4 Submit data sheets for fire-rated plastic laminate, particle board, plywood, adhesives, joint sealants, and sealers.
- .5 Submit ULC or cUL certifications for fire-rated products.
- .6 Maintenance Data and Materials:
 - .1 Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project closeout documents.
 - .2 Provide maintenance kit for finishes.

1.4 PROTECTION

- .1 Refer to General Instructions Section 01 10 00.
- .2 Handle and store countertops in accordance with manufacturers recommendations.

SECTION 06 41 19 - PLASTIC LAMINATE WORK

- .3 Countertop surfaces shall be covered with heavy kraft paper, or tops shall be put in cartons for protection during shipment.
- .4 If protective film is provided, do not remove until counters have been installed.
- .5 Remove any stickers immediately after installation
- .6 Protect installed countertop surfaces with heavy kraft paper secured in position with masking tape. Do not remove until final inspection.
- .7 Comply with the printed directions, issued by the material manufacturers.

1.5 WARRANTY

- .1 Plastic laminate work shall be warranted against warping or delamination for a period of two (2) years from the date of Substantial Performance of the Contract.
- .2 Work showing defects during the warranty periods shall be replaced or made good without delay and at no expense to the Owner.

PART 2 - MATERIALS**2.1 MATERIALS**

- .1 Plastic laminate:
 - .1 Arborite, Formica, Nevamar, Wilsonart, Lamitech, or Pionite, conforming to CAN3-A172.
 - .2 1.6mm (.062") thick, general purpose grade for flatwork and 1.25mm (.050") thick standard postforming grade for shaped profiles and bends; finishes to be sued, solid and wood grain colours as later selected by the Consultant from the manufacturers standard range of colours. Balancing sheet shall be the same thickness as surface sheet and shall be supplied by the same manufacturer.
 - .3 Provide black, acid resistant plastic laminate for countertops in science and prep rooms, unless specified otherwise.
 - .4 Provide fire rated plastic laminate for wall panelling. Fire rated laminate must be ULC or cUL labelled, or equivalent label acceptable to Authorities Having Jurisdiction.
- .2 Cores
 - .1 Wood products shall be FSC certified, manufactured with no added urea formaldehyde. Use fire rated versions of these products where fire rating is required, including core at all wall panelling.

- .2 Particle board shall be NuGreen 2 ULEF particle board, as manufactured by Uniboard, or equal by Panolam Industries, Tafipan-Evolvo ULEF by Tafisa Canada, or Duraflake Vesta ULEF by Arauco, meeting the requirements of ANSI A208.1 Grade M-2. Surface shall be smooth, dense, and free from loose particles, or defects which will telegraph through the laminate.
- .3 Fire rated particle board core shall be Duraflake Vesta FR by Arauco. Flame spread shall not exceed 25. Smoke Developed shall not exceed 25.
- .4 Plywood core - fir core, poplar faced, 3, 5, or 7 ply, exterior grade veneer plywood, urea-formaldehyde free or fir plywood conforming to CSA 0121, graded solid faces, 3, 5, or 7 ply. Faces and second ply shall be without voids,.
- .5 Provide waterproof cores in countertops with sinks, in washrooms, and in all other areas where moisture is possible.
- .3 Adhesives:
 - .1 Formulated for use in decorative laminate fabrication and to suit the conditions of application without failure.
 - .2 Adhesive conforming to CSA 0112 Series, no added urea formaldehyde; Greenguard Children & Schools certified low emitting products.
 - .3 Adhesive for countertops where sinks will be installed is to be water resistant.
 - .4 Adhesive shall be acceptable to the laminate manufacturer.
 - .5 Plastic Laminate adhesives applied onsite and used within the weatherproofing system must have a VOC content equal to or less than 20 g/L.
- .4 Sealer: approved water-resistant sealer or glue, low VOC.
- .5 Draw bolts: mechanical devices of approved manufacture which can be recessed into the core of decorative laminated panels and used to draw two parts together for permanently tight joints.
- .6 Fixing clips: 1.6mm. (16 ga.) steel, galvanized (or prime painted), as detailed.
- .7 Linear Grilles: Refer to Section 06 41 16

2.2 FABRICATION

- .1 Fabricate wall panelling of fire rated materials.
- .2 All countertops to be laminate finish, unless otherwise indicated on drawings.
- .3 All units shall be shop fabricated. Plastic laminate shall be applied to an approved core with a thermosetting adhesive.

SECTION 06 41 19 - PLASTIC LAMINATE WORK

- .4 Build work plumb, true and square. Arrange adjacent parts of continuous laminate work to match in colour and pattern.
- .5 Obtain the governing dimensions before fabricating items which are to accommodate or abut appliances or equipment.
- .6 Veneering of plastic laminate to core material shall be done according to the laminate manufacturer's directions. All veneered work shall be backed with a balancing sheet except where exposed in the finished work, then face veneer to be applied to all exposed surfaces.
- .7 Where fabrication is done at the site, laminate and core materials shall be stored in the work area for not less than 48 hours for preconditioning before bonding together.
- .8 Form shaped profiles and bends as detailed. For countertops, use postforming or bending grade according to manufacturer's recommendations. Core and laminate profiles shall coincide to provide continuous support and bond over the entire surface.
- .9 Self Edging.
 - .1 Straight self edging shall be decorative laminate 1.6mm thick.
 - .2 Curved self edging shall be postformed material or bending grade.
 - .3 Chamfer exposed edges of laminate uniformly, at approximately 15mm.
 - .4 Do not mitre the decorative laminate sheet at edges.
- .10 Joints
 - .1 Locate joints where indicated, where not indicated at approximately 2440 or 3660mm centres also include joints at corners, and changes in superficial area.
 - .2 Accurately fit decorative laminate together to provide tight, flush, butt joints. Joints in cored panels shall be made with 6mm blind splines and draw bolts, one draw bolt for widths up to 150mm, two or more draw bolts at maximum 450mm o.c. for widths exceeding 150mm.
 - .3 Seal the core at joints with sealer.

2.3 CUTOUTS

- .1 Provide cutouts as required for inserts, grilles, appliances, outlet boxes, sinks, and other fixtures. Radius the internal corners, chamfer the edges, and seal the core.
- .2 Provide face finish, to match countertop material at cutouts for under counter sinks and elsewhere where edges will be exposed.
- .3 Install bases for retort stands, supplied in Section 11 53 00.

2.4 EXAMINATION OF SURFACES AND CONDITIONS

- .1 Refer to General Instructions 01 10 00.
- .2 Surface and ambient temperatures shall be minimum of 20°C at a relative humidity between 20 to 80%.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- .1 Install all work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around periphery and where fixed objects pass through or project into countertops or panelling, to permit normal movement without restriction.
- .3 Secure work by concealed means in an approved manner (or as detailed). Fasteners shall not be more than 600mm o.c. and 150mm from edges and ends. Where concealed fastening is not possible use stainless steel trim threaded screws with matching cup washers or other approved means.
- .4 Sand or chamfer site cut edges of the laminate free from chips. Radius any internal angle cuts. Seal core edges.
- .5 Isolate decorative laminate panels from direct contact with exterior metal frames.
- .6 Upon completion of installation remove identification marks and clean surfaces. Protect as specified above.
- .7 At junction of counter back splash and adjacent wall finishes, apply small bead of sealant. Walls shall be cleaned of chalk lines, dirt, grease, etc., before sealant is applied.
- .8 Wall panels are to be installed as specified in Section 06 20 00.
- .9 Install continuous grilles in countertops above radiant heating units, where indicated on drawings.

3.2 TRIM

- .1 Decorative laminate trim shall be as detailed. Joints shall be kept to the minimum, with none occurring in lengths under 3000mm. Slightly bevel the laminate edges of joints. Secure trim with adhesive.
- .2 Coordinate with forces installing wood trim at laminate panels.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 All thermal insulation in walls and soffits.
- .2 Includes all insulation indicated on drawings but not specified elsewhere.

1.2 RELATED WORK

- | | | |
|----|--------------------------------------|------------------|
| .1 | Concrete Unit Masonry | Section 04 22 00 |
| .2 | Lateral supports at block partitions | Section 05 52 00 |
| .3 | Rough Carpentry | Section 06 10 00 |
| .4 | Vapour Barriers | Section 07 26 00 |
| .5 | Under-Slab Vapour Barrier | Section 07 26 16 |
| .6 | Roof insulation | Section 07 51 00 |
| .7 | Firestopping | Section 07 84 00 |
| .8 | Gypsum Board | Section 09 29 00 |

1.3 REQUIREMENTS OF REGULATING AGENCIES

- .1 Where combustible insulation or vapour barrier materials are specified herein, comply with applicable code requirements including supply and installation of approved non-combustible backing and independently supported, non-combustible insulation covering, except where noted specifically as Work of other Sections.

1.4 DELIVERY AND STORAGE

- .1 Store packaged materials in their original wrappings or containers with manufacturer's labels and seals intact. Store flammable materials outside the building and protect from all weather hazards and open flame. Abide by all fire protection regulations imposed by the authorities having jurisdiction, and take precautionary measures to avoid fire.
- .2 Do not store insulation in direct contact with the earth, road surface or floors. Place suitable forms or skids under the insulation upon delivery to protect the insulation from absorbing dampness from the surrounding terrain or floor. Cover material with approved tarpaulins and secure.
- .3 In cold weather, provide warm storage for adhesives such that their consistency is suitable for ease of application

1.5 PROTECTION

- .1 Protect surfaces, and in particular the building cladding finish, from being marred or contaminated by the materials.

SECTION 07 21 00 - INSULATION**PART 2 - MATERIALS****2.1 MATERIALS**

- .1 Vapour barrier in exterior walls shall be as specified in Section 07 26 00 for cavity walls. Vapour Barrier over insulation in steel or wood framed areas, where specified vapour barrier is unsuitable, shall be 10 mil polyethylene sheet, conforming to CAN/CGSB-51.34. Vapour Barrier at slab-on-grade is specified in Section 07 26 16.
- .2 Cavity Wall Insulation:
 - .1 Mineral wool fibre insulation board, semi-rigid manufactured by Roxul, conforming to CAN/CGSB 51.10 and must be manufactured to metric dimensions, sized to suit masonry coursing;
 - .2 Roxul CavityRock, with a flame spread rating of less than 25, RSI value of 0.76m²K/W per 25.4mm (R-4.3/inch).
- .3 Batt insulation: Roxul "Comfort Batt" friction fit mineral wool batts
- .4 Insulation fasteners: "Wedge-Lok" by Block-Lok
- .5 Compressible Filler: Emseal "Backerseal"
- .6 Sound Attenuation Insulation: AFB acoustic fire batt by Roxul or Thermafiber SAFB Sound Attenuation Fire Blankets (unfaced) from Owens Corning, to thickness shown on drawings, and as required to obtain required S.T.C. rating.
- .7 Fibrous Board Insulation: Comply with CGSB 51-GP-11, Thermal Insulation, Mineral Fiber, Blanket, for Piping, Ducting, Machinery and Boilers
- .8 Compressible Filler: Emseal "Backerseal"
- .9 Adhesives:
 - .1 Type recommended by insulation manufacturer for the specific application.
 - .2 To have adequate early and permanent bond and tensile strength for application, and have a service temperature between high and low temperatures to which they will be subjected.
 - .3 LePage PL 300 Foamboard Adhesive, or equivalent, for polystyrene board insulation, subject to insulation manufacturer's approval.

PART 3 - EXECUTION**3.1 PREPARATION**

- .1 Ensure that surfaces to receive adhesive or insulation are dry, firm, straight, slightly textured for bond, and free from loose material, projections, ice, frost, slick, grease, oil or other matter detrimental to bond of the adhesive or uniform bedding of the insulation.
- .2 Maintain surface and ambient temperatures constantly between 38°C and 10°C during application and curing of adhesive except as permitted otherwise by the Consultant in writing.

- .3 Report surfaces left unacceptable by other trades to the Consultant.

3.2 **INSTALLATION - GENERAL**

- .1 Install insulation to thicknesses shown on the Drawings.
- .2 Install all materials in accordance with manufacturer's printed instructions unless otherwise specified herein.
- .3 In construction separating interior from exterior, locate vapour barrier on the warm-in-winter side of the insulation.
- .4 Ensure a uniform, continuous thermal and vapour barrier effect. Where insulation and vapour barriers are to be provided under other Sections, co-ordinate the work such that thermal and vapor barrier continuity is achieved.
- .5 Where hangers for suspended ceilings and where supports for heating units pass through insulation and vapour barrier construction, butter apertures liberally with vapour barrier adhesive and ensure continuity of thermal and vapour barrier provisions.

3.3 **INSTALLATION OF INSULATION**

- .1 Apply insulation over vapour barrier.
- .2 Apply adhesive to the entire surface of the substrate using notched trowels of the type recommended by the adhesive manufacturer.
- .3 Pack all crevices and voids, with friction fit batt insulation.

3.4 **CAVITY WALL INSULATION**

- .1 Inspect vapor barrier membrane before covering with insulation. Do not proceed unless vapour barrier work is complete, including repairs as specified in Section 07 26 00.
- .2 Apply cavity wall insulation to thickness as shown on Drawings to the outer face of the interior masonry or drywall wythe. Insulation shall fit tightly between spacing wall ties. All butt joints shall be brought into moderately tight contact. Any cutting or fabricating shall be made of the largest module possible of insulation, to reduce the number of joints.
- .3 After installation of insulation ensure all ties are provided with wedges to hold insulation tight to air/vapour membrane prior to installation of exterior wythe.
- .4 After completion of cavity wall insulation and exterior insulation, fill corners between insulation and exterior masonry with compressible filler, Emseal "Backerseal".

3.5 **ACOUSTIC INSULATION AT NON-BEARING MASONRY WALLS**

- .1 Insert sound attenuation fire batt (SAFB) insulation between tops of non-bearing, non-rated masonry walls and structure above.

SECTION 07 21 00 - INSULATION

- .2 Coordinate with forces installing lateral support angles to ensure insulation is installed at tops of walls before lateral support angles have been installed both sides.
- .3 Insert SAFB batt insulation around OWSJ or structural steel where they occur directly over non-bearing masonry walls. Provide gypsum board enclosure to form acoustic barrier; refer to Section 09 29 00.
- .4 Firestopping between tops of fire rated walls and structure above, is specified in Section 07 84 00.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Provide air/vapour barrier to exterior face of interior wythe of masonry where cavity wall noted, to exterior face of exterior sheathing at veneer walls, at soffits, and elsewhere as indicated on drawings or otherwise required to maintain continuity of vapour barrier.
- .2 Sealing of windows, doors and other locations as indicated on drawings, by membrane air barrier.
- .3 Cleaning and priming of substrate, installation of vapour barrier and insulation attachment. Coordinate with other Sections to provide a complete air/vapour barrier system where in contact with components specified elsewhere.
- .4 Coordinate with forces installing vapour barriers below interior slabs-on-grade and at roof. Vapour Barrier system is required to be continuous for the entire building.

1.2 RELATED WORK

- | | | |
|----|-------------------------------|------------------|
| .1 | Concrete | Section 03 30 00 |
| .2 | Clay Unit Masonry | Section 04 21 00 |
| .3 | Concrete Unit Masonry | Section 04 22 00 |
| .4 | Thermal Insulation | Section 07 21 00 |
| .5 | Under-Slab Vapour Barrier | Section 07 26 16 |
| .6 | Joint Sealants | Section 07 92 00 |
| .7 | Hollow Metal Doors and Frames | Section 08 11 13 |
| .8 | Aluminum Windows | Section 08 51 13 |

1.3 INSPECTION

- .1 Manufacturer of the membrane material shall inspect surfaces to which material is to be applied, to ensure that the surfaces are suitable, provide periodic inspection during the application of the membranes, and inspect completed work immediately prior to covering with other materials to ensure that membranes are in an undamaged condition and installed to provide an air/vapour barrier system.

1.4 DELIVERY AND STORAGE

- .1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

1.5 SPECIAL PROTECTION

- .1 Provide adequate protection of materials and work of this Section from damage by weather and other causes.
- .2 Protect the work of other Subcontractors from damage resulting from work of this Section. Make good such damage to the satisfaction of the Consultant.

SECTION 07 26 00 - VAPOUR BARRIER**1.6 SITE CONDITIONS**

- .1 Maintain surfaces and ambient air temperature 5 deg C minimum, for a minimum period of 72 hours prior to, during, and after waterproofing application.

1.7 QUALITY CONTROL

- .1 The membrane manufacturer's factory-trained agent shall be on site at the beginning of the installation to provide training and supervision of the Contractor's personnel in the installation of the membrane. He shall also provide frequent inspection visits thereafter to assure the quality and competence of the membrane installation.

PART 2 - PRODUCTS**2.1 MATERIALS****.1 Vapour Barrier at Cavity Walls**

- .1 Materials shall be as manufactured by Grace Construction Products, Henry Company, Tremco, W.R. Meadows, IKO, or Soprema. All materials used are to be by same manufacturer.

.2 Vapour barrier membrane:

- .1 Perm-A-Barrier by Grace, Blueskin SA by Henry Co., ExoAir 110 by Tremco, Air Shield by W.R. Meadows, AquaBarrier AVB by IKO, or Sopraseal Stick 1100T by Soprema Canada

- .2 When ambient or surface temperatures are below 5°C, use low temperature versions of these products.

.3 Primer:

- .1 Perm-A-Barrier WB Primer by Grace, Blueskin Primer by Henry, ExoAir 10 Primer by Tremco, Mel-Prime by W. R. Meadows, S.A.M. Adhesive by IKO, or Elastocol Stick by Soprema.
- .2 For low temperature applications use low temperature primers as recommended by the membrane manufacturer; Mel-Prime Solvent Base Primer by W.R. Meadows, or equivalent.
- .3 For applications over green concrete or damp substrate, use primers recommended by the membrane manufacturer for this purpose; Bituthene Primer B2 by Grace or equivalent.

- .4 Mastic: for sealing joints and edges of membrane use Bituthene Mastic Trowel Grade Grace, Air-Bloc 21 by Henry, ExoAir Termination Mastic by Tremco, Pointing Mastic by W.R. Meadows, AquaBarrier Mastic by IKO, or Sopramastic by Soprema.

.5 Liquid membrane:

- .1 Bituthene Liquid Membrane by Grace Construction Products, Air-Bloc 21 by Henry, ExoAir 120 by Tremco, Air Shield LM by W.R. Meadows, AquaBarrier Mastic by IKO, or Sopraseal LM 200 by Soprema.

- .2 Use for all protrusions or any difficult detail areas which do not allow for easy installation of the membrane.
- .3 Can be placed over or under membrane with at least 64 mm overlap.
- .2 Through-wall flashing: Perm-A-Barrier Wall Flashing by Grace, Blueskin TWF by Henry Co., ExoAir TWF by Tremco, Air Shield TWF by W.R. Meadows, AquaBarrier TWF by IKO, or Sopraseal WFM by Soprema.
- .3 Vapour Barrier at Slab-on-Grade
 - .1 Vapour barrier under slabs-on-grade: 15 mil polyolefin membrane, as specified in Section 07 26 16.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- .1 Examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.
- .2 Ensure concrete surfaces are clean, dry, smooth and free of fines, voids, honeycomb, spalled areas, sharp protrusions, etc.
- .3 Surfaces shall be free from loose particles, grease, oil, wax and other foreign matter.
- .4 Exposed metal surfaces shall be made clean of paint, oil, rust, or other contaminants, wiped clean with coal-tar solvent, and primed with primer.
- .5 Fill voids, holes and cracks, especially in mortar joints, with lean mortar mix, non-shrinking grout, or patch coat, to ensure continuity of flat surface.
- .6 All concrete surfaces shall be surface dry and have negative alkalinity when surface tested.
- .7 Protect adjacent surfaces not designated to receive vapour barrier.

3.2 APPLICATION / WORKMANSHIP

- .1 Ambient, surface and material temperature shall be minimum 5°C for standard products, or minimum -4°C for low temperature products. Confirm temperature requirements with the manufacturer.
- .2 Apply primer as recommended by manufacturer depending on porosity of surface. Prime only the area to be covered in a working day.
- .3 Allow primer to dry to a tacky surface, approximately 30 minutes, depending on environmental conditions.
- .4 Reapply primer if time lapsed between first application and installation of membrane exceeds 24 hours.
- .5 Apply sheet membrane so that laps shed water, i.e. start from low point.

SECTION 07 26 00 - VAPOUR BARRIER

- .6 Apply membrane in continuous strips, to as long length as possible to minimize joints. Apply membrane at edge of existing air barrier and openings in minimum 200mm strips, overhanging opening 100mm to allow junction with door or window frame and with air barrier.
- .7 Roll lap seam with an extension handled countertop roller. Roll across the seam first, then with the seam to eliminate any "fishmouths".
- .8 Lap all ends 75mm minimum. Seal all seams with mastic, applied in accordance with manufacturer's written instructions.
- .9 Construction and control joints: double ply covered with initial strip of 150mm width and second strip of 457mm width, after application of dampproofing.
- .10 Cutoff at end of day operations shall be sealed with mastic.
- .11 Seal holes around pipes, vents and other services passing through membrane by using mastic applied in accordance with manufacturer's directions. Liberally coat areas with mastic for radius of 150mm around drain hub, piping, vents, etc. before and after application of membrane.
- .12 Refer to manufacturer's written instructions and details for required procedures of installation.
- .13 Lap membrane onto frames at windows, doors and the like to ensure continuity of the air/vapour barrier seal. If membrane is installed in advance of windows or door frames, extend membrane, leaving backing intact, to allow for lapping onto frames at a later time. Protect membrane left unattached in this manner.
- .14 At all locations where membrane will be covered with insulation, temporarily protect membrane from puncture or install membrane immediately prior to application of insulation.
- .15 At all detailed areas, take extra care to ensure continuity of the air/vapour barrier.
- .16 All inside and outside corners shall be double covered with initial strip of membrane 305mm wide, centred.
- .17 Inspect membrane before covering and repair as necessary. Cover tears and inadequate overlaps with membrane. Seal edges of patches with pointing mastic.

3.3 PROTECTION AND CLEANING

- .1 Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures recommended by manufacturer.
- .2 Install insulation as soon as possible after installation of air/vapour barrier. Insulation to be tight to vapour barrier, anchored in place with plastic wedges to insure rigid location of insulation; refer to Section 07 21 00.
- .3 If the vapour barrier membrane system cannot be covered within 30 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Provide a membrane vapour barrier below new sections of interior slab-on-grade.

1.2 RELATED WORK

- .1 Concrete Section 03 30 00
- .2 Vapour barrier at cavity wall Section 07 26 00
- .3 Vapour barrier at roof Section 07 51 00

1.3 REFERENCE STANDARDS

- .1 ASTM International:
 - .1 ASTM E1643 Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
 - .2 ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
 - .3 ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
 - .4 ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slab
 - .5 ASTM D1709 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
 - .6 ASTM C920 Standard Specification for Elastomeric Joint Sealants

1.4 QUALITY CONTROL

- .1 Arrange and pay for a site visit by a technical representative of the manufacturer of the vapour barrier membrane at the commencement of the under-slab vapour barrier installation. Review with manufacturer all recommended procedures and techniques for installing vapour barrier and accessories. Review methods of sealing penetrations and sealing of vapour barrier to walls.

1.5 DELIVERY AND STORAGE

- .1 Deliver and store materials, undamaged in original wrappings, in a clean, dry environment.
- .2 Provide adequate protection of materials and work of this Section from damage or contamination by weather and other causes.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Vapour barrier:
 - .1 Permeance shall be less than 0.01 perms, tested after conditioning (ASTM E1745, paragraphs 7.1.2 - 7.1.5)
 - .2 Strength Class A (ASTM E1745)
 - .3 Minimum thickness 0.38mm (15 mil)

SECTION 07 26 16 - UNDER-SLAB VAPOUR BARRIER

- .4 15 mil polyolefin sheet vapour barrier; "Stego Wrap" by Stego Industries LLC. or "Perminator 15mil" by W.R. Meadows Inc.
- .2 Accessories:
 - .1 Seam Tape: as recommended and provided by vapour barrier manufacturer; Stego Tape or Perminator Tape
 - .2 Vapour-proofing Mastic: Stego Mastic, or as recommended and provided by vapour barrier manufacturer
 - .3 Construction Adhesive:
 - .1 One part moisture curing polyurethane non-sag sealant
 - .2 to CAN/CGSB-19.13; ASTM C 920-11, Type S, Grade NS, Class 35
 - .3 Dymonic FC by Tremco Ltd., or Pourthane NS by W.R. Meadows.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Do not proceed until stone base below slab-on-grade has been placed and compacted.
- .2 Examine surfaces to receive membrane. Notify Consultant if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.
- .3 Prepare surfaces in accordance with manufacturers instructions. Level and tamp or roll aggregate immediately prior to commencing installation of vapour barrier.
- .4 Ensure adjacent surfaces are clean, dry, smooth and free of fines, voids, honeycomb, and free of sharp edges and protrusions.
- .5 All concrete surfaces shall be surface dry and have negative alkalinity when surface tested.
- .6 Tie in underslab vapour barrier with existing membranes, if present.

3.2 VAPOUR BARRIER BELOW SLABS-ON-GRADE

- .1 Provide membrane vapour barrier under all new areas of slab-on-grade.
- .2 Install the vapour retarder membrane in accordance with manufacturer's instructions and ASTM E1643.
- .3 Place vapour barrier over granular base for slabs-on-grade, prior to placement of concrete floor slabs-on-grade.
- .4 Unroll vapour barrier with the longest dimension parallel with the direction of the pour.
- .5 Install using taped lap method, lapping joints 150mm, and taping and sealing all seams with manufacturer's tape. Lap all edges of vapour barrier minimum 150mm and place upper layer of lap so that the direction of concrete placing will be from upper layer to lower layer.
- .6 Lap vapour barrier over footings and seal to foundation walls.

- .7 Turn vapour barrier up walls minimum 200mm at edges of slab, sealing to walls (below finished floor level) with construction adhesive.
- .8 Construct pipe collars from vapour retarder material and pressure sensitive tape per manufacturer's instructions.
- .9 Seal all penetrations, including pipes, with mastic in accordance with manufacturer's instructions. Avoid penetrations as much as possible; do not use screed pins.
- .10 Repair any tears or holes (including pin holes) immediately, before concrete is placed. Repair damaged areas with patches of vapour barrier material, overlapping damaged area 150mm and taping all sides.
- .11 Trim vapour barrier after concrete has cured.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 All prefinished aluminum fascias at canopy, and all related framing and accessories.
- .2 Provide prefinished aluminum cap at parapet at canopy with prefinished aluminum fascias, to match fascia.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Sheet Metal Flashing & Trim Section 07 62 00
- .2 Soffit framing Section 09 29 00

1.3 REFERENCE STANDARDS

- .1 CAN/CSA-S136-01 North American Specification for the Design of Cold-Formed Steel Structural Members
- .2 CSA-S136S1 Supplement 2004 to the North American Specification for the Design of Cold-Formed Steel Structural Members
- .3 CSA-S136.1 Commentary on North American Specification for the Design of Cold-Formed Steel Structural Members
- .4 CSA-S157 Strength Design in Aluminum
- .5 CSA-S157.1 Commentary on CSA S157

1.4 QUALIFICATIONS

- .1 Installation of metal fascia system to be by manufacturer's construction forces, or by an accredited applicator under direct control and responsibility of manufacturer, and in accordance with manufacturer's instructions.
- .2 Manufacturer/installer to have minimum 10 years experience in design, fabrication and erection of wall panel systems, including 5 major projects in the previous 5 years. Submit proof of experience when requested by the Consultant.

1.5 DESIGN AND PERFORMANCE

- .1 Rain Penetration: Design panel system based on "Rain Screen Principle" by National Research Council. System must drain moisture to the exterior.
- .2 Wind Load: Design panel system to resist wind loads for this geographic location without vibration or rattling, deflection of panels or other detrimental effects on panels and fastening system.

07 42 13 - PREFINISHED ARCHITECTURAL PANELS

- .3 Structural and Thermal Movement:
 - .1 Design panel system to accommodate movement in the supporting structure and movement caused by thermal expansion and contraction of system components without resulting in detrimental effects such as bowing, oil canning, excessive stressing of fasteners or failure of joint seals.
- .4 Panel Flatness Tolerance: 1.5 mm in either concave or convex direction, measured perpendicular to normal plane, based on lengths up to 3000mm. Panels with bumps and dents will not be accepted.
- .5 Deviation in Erected Panels: Maximum deviation from horizontal and vertical alignment in installed panels to be 6mm in 6000mm. Maximum deviation from panel flatness to be 3mm in 1500mm in any direction for assembled units.
- .6 Panel Removal: System to allow for removal of any individual panel without requiring the removal of adjacent work.
- .7 Design support system to be adjustable as may be required to accommodate deviations from dimensions indicated on drawings due to construction tolerances.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in conformance with Section 01 33 23.
- .2 On shop drawings, clearly show and describe in detail, materials, finishes, sub-girt support, fastening devices, fastener spacing, flashings, trim, caulking, forming, erection details, and relationship to adjoining Work.
- .3 Confirm all relevant dimensions on site. Indicate field dimensions on shop drawings. Ensure that depth of soffit is sufficient to enclose pipe from roof drain. Final installation details to be based on as-built conditions.
- .4 Shop Drawings to be sealed by a professional engineer, registered in the Province of Ontario, attesting to the ability of the complete metal wall panel assembly to withstand specified loading.
- .5 Do not commence fabrication until in receipt of reviewed shop drawings.

1.7 SAMPLES

- .1 Submit colour samples for confirmation of colour selection.
- .2 Submit one (1) sample of panel in colour selected for approval prior to delivery on Site.

1.8 MAINTENANCE

- .1 Provide maintenance data for the cleaning and care of aluminum finishes, to be included in Maintenance Manual.
- .2 Include instructions for finish touch-up, repair and removal of panels.
- .3 Provide a new 1 litre can of touch-up paint, properly labelled, for each colour of panel installed.

1.9 **PRODUCT HANDLING**

- .1 Unload and handle panels using methods recommended by manufacturer.
- .2 Store clear of ground on wooden stringers of full sheet width, spaced 750mm maximum.
- .3 Keep stock piled panels dry with plastic tied-down covers.

1.10 **WARRANTY**

- .1 Warranty metal wall panel system for a period of **two (2) years** against defects, deficiencies and failure in materials or installation.

PART 2 - PRODUCTS

2.1 **MATERIALS**

- .1 Prefinished Architectural Panels
 - .1 Metal Composite Material:
 - .1 Aluminum face sheets: Aluminum alloy 3105-H14, thickness 0.51 mm.
 - .2 Two sheets of aluminum bonded to either side of a fire rated extruded thermoplastic core, formed in a continuous process without the use of glue or adhesive between dissimilar materials. Bond integrity testing to adhere to ASTM D 1781.
 - .3 Panel thickness: 4 mm
 - .4 Core material: Alpolic FR Core
 - .2 Panel Finish:
 - .1 Lumiflon fluoropolymer resin coating for aluminum sheet, factory applied and oven baked; Flurodize by Valspar Corp. or Duranar by PPG Industries.
 - .2 Three coat metallic finish system; colour "Silver Metallic".
- .2 Provide proprietary aluminum perimeter extrusions and extrusion clips for attaching panels to the sub-structure; "System 3 Dry Joint" architectural panel wall system by Vic West, Axiom Plus dry joint, by Flynn Canada Ltd., "System III" by Ontario Panelization, or equivalent "dry joint" system as manufactured by Kanalco Ltd.
- .3 Joint Filler Strip: of same material as panels.
- .4 Fasteners: Concealed, non-corrosive; type as recommended by panel manufacturer.
- .5 Sealants: Where sealant may be required, use one component polysulphide sealant or epoxy urethane in accordance with CAN/CGSB 19.13-M (latest edition). Select colour to match adjacent panels at exposed bead locations.
- .6 Extrusions and extrusion clips for attaching panels to sub-structure to be purpose-made aluminum. Provide separator between extrusions and subgirts.
- .7 Form cap flashing of 2.5mm thick prefinished aluminum sheet; finish and colour to match prefinished architectural panels. Profile to match prefinished metal cap flashing at masonry walls. Work to conform generally to Section 07 62 00, Sheet Metal Flashing and Trim.

07 42 13 - PREFINISHED ARCHITECTURAL PANELS

- .8 Adjustable angles, Z-bars and channel subgirts to be manufactured from Z-275 galvanized steel and shall be designed to accommodate expansion and contraction, dynamic movement and design loading.
- .9 Field Touch-Up Paint: Zinc rich coating, ZRC 221 or equivalent, and top coating of type and colour to match finish sheet.
- .10 Insulation: Conform to specifications for cavity wall insulation in Section 07 21 00.
- .11 Insulation clips: Impale type, perforated 50mm x 50mm cold rolled steel; spindle of length to suit thickness of insulation, with speed washers.

PART 3 - EXECUTION**3.1 EXAMINATION**

- .1 Examine work of other Sections upon which this work depends. Report any unsatisfactory conditions to the Consultant. Do not proceed until conditions are acceptable.

3.2 INSTALLATION

- .1 Erect preformed metal panels and accessories in strict accordance with reviewed shop and erection drawings and manufacturer's instructions.
- .2 Co-operate with other trades to ensure proper installation and anchorage of this Work. Use concealed fastenings only.
- .3 Damaged, bent or dished sheets will be rejected.
- .4 Place panels against supporting framing and adjust to final position before permanently securing. Bring each unit to bear evenly on framing.
- .5 Install panels plumb, true, level and in alignment to the established lines and elevations.
- .6 Align units to provide accurate fit with corresponding sections parallel and straight. Ensure complete nesting of interlocking and sealed side lap joint and fasten sheets as indicated on Drawings.
- .7 Where indicated on drawings, or as required to complete this work, provide closures, caps, fascias, covers and trims, in material matching colour and finish, where exposed. Install necessary closure and trim or neoprene closures at openings and penetrations, fastening at maximum 300mm o.c.
- .8 Install prefinished aluminum cap flashing at parapets at canopy with aluminum fascias. Installation shall be as specified in Section 07 62 00 for sheet metal cap flashing.
- .9 Where welding has been performed on this Work, or field cutting or scratches have been made, field coat such areas with touch-up paint after thoroughly cleaning affected surfaces.

3.3 CLEAN-UP

- .1 Remove debris and surplus materials from Site upon completion of Work.
- .2 Clean dirt, soil and misplaced sealants from panels with recommended cleaners and solvents, in accordance with manufacturer's instructions.
- .3 Repair and touch-up minor surface damage with colour matching high grade enamel, to satisfaction of the consultant.
- .4 Replace any damaged panels and components that cannot be repaired to the Consultant's satisfaction.

3.4 SEPARATE PRICE

- .1 Cost of canopy and associated prefinished metal panels shall form part of Separate Price Item No. 1

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Remove existing roofing assemblies, down to level of roof deck, in areas where new roof curbs are required for new roof mounted equipment, in areas of new roof penetrations, and where indicated on drawings.
- .2 Provide new roofing at new entrance canopy.
- .3 Prepare existing deck to receive new roofing curbs and accessories, and new roof mounted equipment.
- .4 Infill existing roof with new roofing where existing roof mounted equipment, curbs, and accessories are removed.
- .5 Repair roofing affected by demolition work and removal of existing equipment.
- .6 Provide new roof assemblies, to match existing, complete with the following:
 - .1 Vapour retarder
 - .2 Gypsum board
 - .3 Polyisocyanurate insulation
 - .4 Tapered insulation
 - .5 Cover board
 - .6 1 ply organic felt
 - .7 4 ply glass felts
 - .8 Double pour asphalt with ballast
 - .9 All associated sealants
 - .10 Sheet metal flashing, as specified in Section 07 62 00
 - .11 Roof scuppers
 - .12 Flashing sleeves
- .7 Asphalting work must be undertaken when the school is vacant. If work is done during the school academic year, asphalting must be done after hours or on weekends. Contract shall include all overtime work required.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-------------------------------|------------------|
| .1 | Demolition | Section 02 40 00 |
| .2 | Steel Deck | Section 05 30 00 |
| .3 | Metal Fabrications | Section 05 52 00 |
| .4 | Wood nailing strips, curbs | Section 06 10 00 |
| .5 | Sheet Metal Flashing and Trim | Section 07 62 00 |
| .6 | Tunnel Skylights | Section 08 62 15 |
| .7 | Rooftop mechanical equipment | Division 23 |
| .8 | Electrical | Division 26 |

1.3 QUALITY ASSURANCE

- .1 Work of this Section shall be performed by a member, in good standing, of the OIRCA.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING

- .2 Carry out Work in accordance with recommendations of the Ontario Industrial Roofing Contractors Association (OIRCA) and the Canadian Roofing Contractors Association (CRCA). Use only competent mechanics.
- .3 Install all products in conformance with manufacturer's printed instructions.
- .4 Provide proof of compliance and letter certifying that roofing system complies with Class A roofing system an CAN/ULC S-170.
- .5 Roofing installer must be approved by the manufacturer of the roofing system for the installation and warranty of their products.

1.4 REFERENCE STANDARDS

- .1 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC S126 Test for fire spread under roof deck assemblies.
 - .2 CAN/ULC-S704 Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-51.26 Thermal Insulation, Isocyanurate Board, faced
 - .2 CAN/CGSB-37.5 Cutback Asphalt Plastic Cement
 - .3 CGSB 37-GP-9MA Primer, Asphalt, Unfilled, for Asphalt roofing, Dampproofing and Waterproofing.
 - .4 CGSB 37-GP-15M Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .5 CGSB 37-GP-56M Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA A123.2 Asphalt Coated Roofing Sheets
 - .2 CAN/CSA-A123.21 Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-roofing Systems
 - .3 CSA A123.3 Asphalt Saturated Organic Roofing Felt
 - .4 CAN/CSA A123.4 Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
 - .5 CSA A231.1 Precast Concrete Paving Slabs
 - .6 CAN/CSA-A247 Insulating Fibreboard.
 - .7 CSA B35.3 Tapping and Drive Screws.
- .4 Canadian Roofing Contractor's Association (CRCA)
 - .1 CRCA Roofing Specifications Manual.
- .5 FM Approval Standard 4470 Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction
- .6 FM Global Data Sheet 1-29 Roof Deck Securement and Above-Deck Roof Components
- .7 American Society for Testing and Materials (ASTM)
 - .1 ASTM E 108 Standard Test Methods for Fire Tests of Roof Coverings

1.5 ROOFING SYSTEM

- .1 Generally the roofing systems consist of a built-up roof of 4-ply Type IV glass felts and 1-ply organic felts, with modified bitumen flashings, over polyisocyanurate foam insulation all in conformance to CAN/ULC S126. Insulation must conform to S126 without the requirement for a gypsum board membrane.
- .2 Roofing shall be FM approved system, Class A.
- .3 Conform to ULC R210.

1.6 SUBMITTALS

- .1 Submit manufacturer's data sheets for roofing system to be installed, including a list of all products to be incorporated. Submit data sheets for all system components. Provide samples when requested by Consultant.
- .2 Submit shop drawings for tapered insulation indicating layout, board thickness, percentage of slopes and direction of flow. List materials used. Do not order materials until drawings have been reviewed and accepted by the Consultant. Submittals to be in accordance with Section 01 33 23 of these specifications.
- .3 Submit Minutes of Meeting for pre-roofing meeting.

1.7 PRODUCT HANDLING

- .1 Store materials on raised wooden platforms in approved manner at Site preceding application, and protect from inclement weather at all times. Roofing felts which become wet will be rejected.
- .2 Store roofing felts and insulation in heated atmosphere at 21°C for 24 hours before application in cold weather. Polywrap roofing felts.
- .3 Guard against condensation inside plastic wrapped insulation by slitting or removing wrap. Cover with tarps and secure with ropes.
- .4 Do not store gravel on roof ahead of demand. Bring gravel to roof only as it is required for spreading as Work proceeds.

1.8 PROTECTION

- .1 Protect Work of other trades from roofing procedural damage. Cover vertical surfaces with tarpaulins at hoisting locations.
- .2 When using open flame in connection with this Work, maintain at all times 9 kg dry chemical fire extinguisher fully charged and in operable condition at location where open flames are in use.
- .3 Locate kettles at grade level and minimum 750mm from face of building.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING

- .4 Protect completed portions of roofing from damage due to traffic and materials handling until completion of Work.

1.9 ENVIRONMENTAL CONDITIONS

- .1 Do not apply built-up roofing materials during rain, fog, snow, or other damp or otherwise unsuitable surfaces.

1.10 WARRANTY

- .1 Furnish a **five (5) year** "Workmanship, Labour and Material" warranty on the complete roofing system, including all materials and labour against leakage, subsurface moisture, degradation of materials and insulation thermal value, failure to stay in place, undue expansion, deformation, delamination, buckles, blisters, ridges and splitting seams.
- .2 Contractor's warranty shall include the OIRCA standard warranty for the first two years, plus an additional three years.
- .3 The warranty period shall commence at the date of issue of the Certificate of Substantial Performance.
- .4 Defective work shall include, but not limited to: leaking, wind uplift, delamination of roofing materials, reduction of thermal value due to moisture in insulation, crazing and ridging. Dislodged surfacing and degradation of colour that detracts from its performance or visual appearance will also be judged as defective work and will require correction under the Contract.
- .5 All defective workmanship and material evident during the period of the Warranty must be repaired to restore the work to good condition and to the original intent of the Drawings and Specifications.
- .6 Warranty must cover repairs to other work damaged resulting from defects in the roofing system and from any work to repair said defects.
- .7 Within 24 hours of the Owners notification, repair any leaks into the building or roof assembly.
- .8 The warranty shall include annual inspections by the roofing trade and manufacturer's agent. Such inspections shall be scheduled with the Owner's maintenance department.

1.11 INSPECTION AND TESTING

- .1 An independent inspection and testing agency nominated by the Consultant will be appointed to inspect and test roofing and sheet metal work.
- .2 Arrange site meeting with Roofing Inspector and Consultant, maximum two weeks prior to commencement of Work on Site. Obtain Inspector's instructions re procedures to be followed.
- .3 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. Act immediately on instructions given by the inspector. Where the inspector deems a change is required which will involve a change in cost, obtain Consultants written approval BEFORE proceeding.

- .4 Make cut-outs for testing purposes when required and make good roofing at no extra cost to the Owner.
- .5 Pay Inspection and Testing Agency from cash allowance in Section 01 10 00.

PART 2 - MATERIALS

2.1 MANUFACTURERS

- .1 All materials specified are as manufactured by Johns Manville and IKO Industries Ltd. Equivalent products by Firestone Building Products Canada, Tremco, Soprema, or GAF are acceptable, subject to conformance with these specifications. The characteristics of the listed materials, including physical properties and performance statistics, shall be interpreted as forming part of these specifications.
- .2 All materials shall be the products of a single manufacturer, who shall provide the manufacturer's warranty specified above.

2.2 MATERIALS

- .1 Roofing Asphalts:
 - .1 Type 2 and Type 3 oxidized asphalts, conforming to CAN/CSA A.123.4.
 - .2 Provide a label on each container, or certification with each load, indicating flash point (FP), softening point (SP), and equiviscous temperature (EVT).
 - .3 Source of asphalts shall be approved by roofing materials manufacturer.
- .2 Roofing Felts:
 - .1 Glass felts conforming to ASTM D2178
 - .1 Premier type Glasply Type IV by Johns Manville, Type IV Glass by IKO,
 - .2 15lb organic saturated felts to CSA 123.6.
- .3 Asphalt Primer: Conforming to CGSB 37-GP-9A.
- .4 Roof Insulation:
 - .1 Polyisocyanurate insulation with coated glass facers, 1220 x 1220mm boards
 - .1 CAN/ULC S704, Type 2, Class 3; ASTM C 1289, Type II, Class 2, Grade 2 (20 psi)
 - .2 E'NRG'Y 3 CGF by Johns Manville, IKOTherm III rigid polyisocyanurate insulation by IKO,
 - .2 Lay insulation in 2 layers, in thickness to match existing roof.
- .5 Protection Board: 12mm "RetroPlus" board by Johns Manville, high density perlite based board, conforming to ASTM C728, or 12.5mm asphalt impregnated fibreboard conforming to CAN/CSA A247.
- .6 Tapered insulation:
 - .1 Standard fibreboard tapered insulation over flat fillers of polyisocyanurate insulation.
 - .2 Materials shall be as manufactured by the roofing materials manufacturer, and/or specifically approved by the roofing manufacturer for inclusion in the warranted roof assembly.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING

- .3 As supplied by Accu-Plane Enterprise Inc., or Posi-Slope Enterprises;
- .4 slopes as indicated on drawings (min. 2%).
- .7 Roof Ballast:
 - .1 clean, well graded stone within limits of 9.5mm to 15.9mm, no fines permitted.
- .8 Cant Strips:
 - .1 Wood fibre cants or perlite board cants. Use non-combustible perlite cants where flashings are torch applied.
 - .2 "Fescant Plus" perlite board by Johns Manville.
- .9 Sealant: One part polysulphide base, conforming to CAN/CGSB - 19.13.
- .10 Gypsum Board:
 - .1 DensDeck Fireguard Roof Board by Georgia Pacific, or equal by CGC; 16mm thick.
- .11 Vapour Barrier:
 - .1 DynaGrip Base P/SA, self-adhering membrane, by Johns Manville or IKO MVP self-adhering vapour retardant membrane.
- .12 Primer for Vapour Barrier: As recommended by vapour barrier manufacturer.
- .13 Mechanical Fasteners: FM approved fasteners and stress plates of type recommended by insulation manufacturer for FM approved system.
- .14 Modified Bituminous Roofing and Flashing System:
 - .1 Base sheet:
 - .1 181 g/m², SBS modified bitumen base sheet
 - .2 1 ply of "DynaBase PR" mop grade SBS modified bitumen membrane with polyester reinforcement, by Johns Manville; or 1 ply of "Modiflex MP-180-SS-Base", flexible reinforced polyester mat, sanded top surface, SBS modified bitumen base sheet, by IKO.
 - .2 Cap Sheet:
 - .1 250 g/m², SBS modified bitumen cap sheet
 - .2 1 ply of "DynaLastic Cap 250" modified bitumen membrane, polyester reinforced, white granular surfaced, SBS modified bitumen cap sheet by Johns Manville or 1 ply of "Modiflex Prevent MP-250-Cap" flexible reinforced polyester mat, Frostone Grey ceramic granular surfaced, SBS modified bitumen cap sheet by IKO.
- .15 Elastic Flashings:
 - .1 Red line expansion flashings by Situra for mopped application.
 - .2 Flamline expansion flashings by Situra for torch application.
- .16 Vent Pipe & Mechanical Flashings:
 - .1 SJ-39 aluminum pre-insulated stack jacks, 483mm high, complete with EPDM triple pressure grommet seal and EPDM base seal, by Thaler Metal Industries Inc.
 - .2 Gas pipe flashing: Thaler MEF-9-18; 457mm high

- .3 Pipe supports:
 - .1 Model MERS-600 for single uninsulated pipe.
 - .2 Model MERS-605A for two pipes, and
 - .3 Model MERS-630 for single, large diameter insulated pipe
- .4 Flexible conduit flashing: Thaler MEF series for single & multiple conduit
- .5 Rigid conduit flashing: Thaler MEF-AE1-18; 457mm high
- .17 Roof Mastic: As recommended by manufacturer of roofing materials

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Remove existing roofing in areas to be re-roofed; remove roofing only in areas that can be made watertight again in the same day; building must remain watertight at all times.
- .2 Examine conditions of existing deck, parapets, walls, drains, projections and openings, etc., and confirm suitability to receive new work. Advise Consultant immediately if existing deck or other substrates are in need of repair before re-roofing work can commence. Commencement of the work of this section will be taken as acceptance of existing conditions.
- .3 Examine materials over which Work of this Section are applied and ensure that roof deck is free of snow, ice, loose or adhering materials which would impair this Work. Substrate shall be clean, dry and suitable for roofing application.
- .4 Metal deck must be free of rust. Any surface rust must be removed and area coated with zinc-rich paint in conformance with CGSB 1-GP-181M; coat thickness one mil minimum. Do not install roofing over corroded deck; this must be removed and replaced by the Contractor.
- .5 The use of salts, or other ice melting chemicals, on the roof deck is not permitted.
- .6 Ensure that all redundant openings in roof deck have been covered. Refer to Section 02 40 00 for covering of redundant openings in existing roof deck.

3.2 WORKMANSHIP

- .1 Employ experienced and qualified workmen and competent supervision to ensure satisfactory installation in accordance with specified requirements.
- .2 Install roofing materials in accordance with manufacturers printed instructions and these specifications.
- .3 Maintain roofing equipment in good working order.
- .4 Provide a separate kettle for each type of roofing asphalt on site; no mixing of asphalt types will be permitted.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING

- .5 Apply asphalt generally within 13°C of its equiviscous temperature (EVT). Confirm EVT range of each type of asphalt with supplier.
 - .1 Where roof insulation is applied in asphalt mopping, apply asphalt at 15-20°C lower than the EVT for a heavier mopping, for an minimum application rate of 1.5kg/m².
 - .2 For flood coats for ballast adhesion, apply asphalt at 22-33°C lower than the EVT, for an application rate of 3.7kg/m².
- .6 Do not heat bitumens in excess of their final blowing temperature. Confirm final blowing temperature with supplier. Once asphalt exceeds these temperatures, the material will be considered unsatisfactory and must be removed from the site.
- .7 Construct roof in conformity to Class 1A roof assembly as approved by U.L.C. S126/S127.
- .8 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.
- .9 Locate bitumen kettles and tankers to avoid smoke discolouration of existing and adjacent buildings.
- .10 Handle and store materials carefully to prevent damage. Keep manufacturer's labels and seals intact. Store bitumen containers in an upright position and store roofing rolls on end to prevent flattening. Protect materials from moisture at all times. When temperature is below 5°C., store roofing felts in a warm atmosphere for 48 hours before using.
- .11 Do not apply roofing materials during inclement weather.
- .12 All plies of roofing felt, except when otherwise specified, shall be "mopped solid" and squeezed into bitumen. Apply felts in straight lines, free from air pockets, wrinkles, fishmouths, open laps or tears.
- .13 Do not leave installed insulation or roofing felts unprotected. Provide minimum 2-ply organic felts, fully coated with bitumen, and ensure that edges are sealed against penetration of moisture.
- .14 Where roofing elements are torch applied, confirm that no combustible items have been ignited. Carefully inspect roof areas with an infrared scanner for at least one hour after completion of days work and before trade leaves site, to ensure that there is no combustion.

3.3 CANT INSTALLATION

- .1 Provide fibre cants at junction of roof and all vertical surfaces and other locations where wood cants are not provided. Cants are to be installed after vapour barrier, as noted below.
- .2 Apply a continuous and uniform mopping of Type 3 asphalt to sufficiently cover the area being taken up by the cant, and while the asphalt is hot embed the cant strips into the asphalt.
- .3 Cut and fit around corners, angles, etc., mitre joints and seal with asphalt.

- .4 Where roof abuts steel framed metal panelled walls, roofer shall install 18 ga. galv. upstands, as detailed, to extend roof installation up wall, installation, and install mod. bid flashing as specified below.

3.4 ROOFING - APPLICATION

- .1 Tie all new roofing into existing systems. Cut back existing roofing components as required to achieve successful tie in. Final flood coating and ballast shall be feathered out over adjacent, existing, roof areas.
- .2 Vapour Barrier
 - .1 Provide continuous vapour barrier over areas to receive new roofing, including over parapets, and tie into existing roof vapour barrier and into vapour barriers at walls, windows, metal roofing, and other surfaces.
 - .2 Apply vapour barrier over surface of roof deck, prior to installation of wood nailers, blocking and cants. Extend up vertical face behind blockings and cants to top of cant. Provide vapour barrier under all cants and blocking and extend up and over parapets to join to wall vapour barrier, lapping all joints minimum 200mm.
 - .3 Vapour barrier shall be self-adhering membrane as specified above. Prime all surfaces to receive self-adhering vapour barrier in accordance with manufacturer's printed instructions.
 - .4 Provide additional vapour barrier under all cants and blocking and extend up vertical face behind blockings and cants to top of cant. Lap minimum 200mm onto first layer of vapour barrier.
 - .5 Apply self-adhering vapour barrier to primed surfaces in accordance with manufacturer's printed instructions, lapping all joints a minimum of 150mm.
- .3 Thermal Insulation
 - .1 Keep insulation dry at all times. Insulation showing evidence of having been dampened since its manufacture or separation of laminations shall not be used.
 - .2 Lay only as much insulation in one day as can be covered by felts the same day.
 - .3 Installed roof insulation which has become wet shall be removed and replaced with dry insulation.
 - .4 Lay insulation boards in parallel courses. Stagger end joints in alternative courses. Lay boards to moderate contact without forcing joints. Cut boards to fit neatly around projections through roof.
 - .5 Lay insulation in two layers, as follows:
 - .1 Over roof deck, fasten insulation base course with mechanical fasteners, with min. 5 plates per 1220 x 1220mm section. Secure insulation board within 1200mm of the roof perimeter over metal deck with 50% additional mechanical fasteners. Provide 75% additional fasteners within 1200mm of corners.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING

- .2 Stagger joints in second layer half board width or length and embed second layer in full mopping of Type 3 asphalt.
- .6 Reduce thickness of insulation at roof drains by 25mm to prevent puddling.
- .7 Provide tapered insulation at locations noted on drawings.
- .8 Install protection board over insulation in a full mopping of type 3 asphalt. Butt joints tightly together.
- .4 Roofing Felts
 - .1 Prior to commencing installation of roofing felts, ensure that the substrate is dry. Any moisture present in the top layer of the protection board will result in blistering and a potential delamination of the membrane from the substrate .
 - .2 Built up roofing membrane shall consist of one layer of 15lb organic felt and 4 plies of type IV glass ply felts.
 - .3 Installation shall start at lowest point of roof. Install membrane one ply at a time, parallel to flutes in metal deck.
 - .4 Over protection board, provide a single ply of #15 organic felt in a full mopping of asphalt, overlapping edges minimum 150mm.
 - .5 Over organic felt layer, install 4 plies of type IV glass ply felts, each ply lapped $\frac{3}{4}$ width of sheet plus 15 mm over the preceding sheet. Lap end joints minimum 150mm. Terminate all plies at the top of the cant strips, unless otherwise specified or detailed. Provide additional plies where detailed.
 - .6 Apply Type 2 hot asphalt uniformly and continuously at the rate of 1.2 kg/m² of roof area over the protection board and each layer of membrane.
- .5 Gravelling
 - .1 Aggregate must be clean and dry before embedding into asphalt. In cold weather, heat aggregate as recommended by roofing manufacturer and roof inspector.
 - .2 Apply flood coating of Type 2 asphalt at rate of 3.7 kg/m² and embed aggregate at rate of 20 kg/m².
 - .3 A double pour of asphalt and gravel is required. After first pour, broom off all loose stone and apply additional 3 kg/m² asphalt and embed specified aggregate at rate of 20 kg/m².
 - .4 Terminate aggregate at base of cant strips.

3.5 TWO PLY MODIFIED BITUMINOUS FLASHINGS

- .1 Apply modified bituminous flashings in accordance with membrane manufacturer's requirements and CRCA requirements for a 2 ply modified bituminous flashing system.

- .2 Apply modified bituminous base sheet with hot type 3 asphalt, with side laps of 75mm and end laps 150mm. Terminate base sheet at highest possible points and at parapets extend and mop-in over top ply roof felt.
- .3 Cap sheet flashing shall be mopped on.
- .4 To prevent possible voids at end/side laps at base or cap sheets, cut the corner piece off the selvage edge that will be covered by the next roll. The cut piece shall be the width of the lap (75mm) and extended along the selvage edge 150mm.
- .5 Stagger locations of all end laps on roof area minimum 75mm.
- .6 Cap sheet flashing shall be applied to extend down outside face of parapet, across top of parapet, down interior vertical surface and on to flat roof a distance of 150mm.
- .7 Cap sheet shall be mopped on in accordance with recommendations of the membrane Manufacturer.
- .8 Care must be taken to avoid asphalt seepage greater than 6mm. At seams, ensure that membrane is properly bonded, without air pockets, wrinkles, fishmouths or tears.
- .9 Cap sheet shall have side laps of 75mm and end laps 150mm. Surface granules on end laps shall be embedded prior to installation of following sheet.
- .10 After installation of the cap sheet, check all lap seams. Adhere and reseal all seams found to be poorly mopped and bonded.
- .11 Face nail total flashing system to outside face of parapet wood blocking with galvanized roofing nails.
- .12 At low roof/exterior wall interface where wall flashings extend down over mod bit flashings, lightly trowel a continuous 75mm width of cap sheet and lap and bond wall flashing onto mod bit flashing. Refer to details as shown on Drawings.
- .13 Strip-in flanges of roof accessories, 'stack jacks' and other flashing flanges with a single ply of base sheet embedded in continuous mopping of asphalt of the same type used for the roof membrane. Set flanges into a bed of plastic cement. Similarly, gravelstop flanges must be primed and secured at 300mm o.c.

3.6 EXPANSION AND ELASTIC FLASHINGS

- .1 At expansion joints, install expansion joint flashings, in accordance with manufacturer's instructions.
- .2 Align work plumb, level, and flush with adjacent surfaces. Anchor rigidly to substrate.
- .3 At elastic flashings, where indicated on drawings, apply the first coat of type 3 asphalt, at manufacturer's recommended minimum thickness, and immediately embed the waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press material into hot asphalt. Lay expansion joint material in lengths not to exceed 3 m, to allow for contact with hot asphalt material. Do not lay in cold asphalt.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING

- .4 Spread an even coat of hot rubberized asphalt on the top surface of the expansion joint, ensuring the top polyester fleece is completely covered. Embed a reinforcing fabric mesh overlapping the edge of the expansion joint material by 50 mm to 75 mm, and ensuring full contact. Apply a second coat of hot rubberized asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.
- .5 Carry elastic flashing down over cant and out 150mm onto membrane before top pour. Adhere to membrane. Seal all joints and edges.
- .6 Cover lower, flat part of elastic flashing with a 350 mm wide strip of modified bitumen cap sheet, secured with top pours of bitumen and aggregate.
- .7 Do not stretch elastic flashing during installation. Provide a minimum overlap of 100mm when forming laps and flashing corners.
- .8 At vertical surfaces, use elastic or metal edged elastic flashing. Fasten top of flashing as detailed.

3.7 ROOF PENETRATION FLASHINGS AND ACCESSORIES

- .1 Supply and install stack jacks and flashings at cables, conduits and anchors, at all vents, pipes and roof penetrations to make watertight.
- .2 Horizontal metal flanges shall be back painted on both sides. Set deck flange in a layer of plastic cement and strip in the metal flange with 3 plies of roofing felt each thoroughly embedded into hot bitumen. The first ply of roofing felt extending 900mm from the base of the flange onto the roof, the second ply extending 660mm from the base and the third ply extending 900mm from the base onto the roof. Extend the top pour of bitumen to finish tight and flush against the base of the flange.
- .3 If using limestone ballast, apply an asphaltic or other type protective coating to aluminum stack jack flashings to a height of 50 mm above the ballast to avoid a corrosive reaction.
- .4 Install roofing accessories in accordance with manufacturer's printed instructions and as indicated on Drawings.

3.8 CLEANING

- .1 Prior to occupancy of building, clean roof of all debris.
- .2 Stone must be clean and white to maximize solar reflectance properties. Clean or replace any ballast stone that has been discoloured.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 All metal flashing for new roof curbs and where indicated on drawings.
- .2 Repairs to existing sheet metal flashing where affected by the Work of this Contract and where indicated on drawings.
- .3 Replacement of metal cap flashing at roof adjacent to demolished building section, where damaged by demolition work.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-----------------------------|------------------|
| .1 | Demolition | Section 02 40 00 |
| .2 | Through-Wall Flashing | Section 04 21 00 |
| .3 | Built-Up Bituminous Roofing | Section 07 51 00 |
| .4 | Joint Sealants | Section 07 92 00 |

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - .3 ASTM D41 Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
 - .4 ASTM D2092 Standard Guide for Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting
- .2 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI S8 Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products (Canadian Sheet Steel Building Institute)
 - .2 CSSBI 20M Standard for Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications
 - .3 CSSBI SSF No. 6 Metallic Coated Sheet Steel Products for Structural Building Products
- .3 Sheet Metal & Air Conditioning Contractors's National Association
 - .1 SMACNA Architectural Sheet Metal Manual, 7th Edition

1.4 QUALITY ASSURANCE

- .1 Work of this Section shall be executed by same trade specialists installing membrane roofing, in accordance with practices and details of Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM**1.5 SUBMITTALS**

- .1 Submit typical 300 mm long sample of flashing indicating design method of locking and method of anchoring and corner section fabricated from materials specified.

1.6 WARRANTY

- .1 Contractor hereby Warrants that Work performed under this Section shall remain free against leakage, joint spalling and similar defects in accordance with General Conditions, but for a period of **five (5) years**.

1.7 INSPECTION AND TESTING

- .1 Inspection and testing of this Work is included in inspection and testing of roofing and roof insulation.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Prefinished Metal Flashing (PMF):
 - .1 Minimum 26 ga. prefinished sheet steel supplied in flat sheet stock
 - .2 Baycoat Perspectra Series or Valspar WeatherX, 2-coat system, colour to match existing metal cap flashing.
- .2 Nails: Chromium/Nickel, No.12 x 25mm flat headed, annular threaded stainless steel.
- .3 Cleats, Starter Strips and Back-up Plates:
 - .1 Same metal and thickness as metal flashing;
 - .2 cleats minimum 38mm wide and interlocked with metal flashing; starter strips, continuous.
 - .3 Back-up plates minimum 300mm wide where adjacent lengths of cap flashing meet, fabricated of same material thickness and finish as cap flashing.
- .4 Screws, Bolts and Expansion Shields:
 - .1 Non-ferrous metal compatible with adjacent surfaces.
 - .2 Exposed fastenings shall be same materials as metal surfaces through which they penetrate.
 - .3 Use cadmium plated screws with round heads suitable for soldering for galvanized Work.
- .5 Solder: ASTM B32-70, 50% block tin and 50% pig lead.
- .6 Flux: Commercial hydrochloric acid cut with zinc, or 10%-20% solution of orthophosphoric acid in water, for use with galvanized Work.
- .7 Sealants: As specified in Section 07 92 00.

- .8 Asphaltic Primer: CGSB 37-GP-9M and ASTM D41; Henry/Bakor "Primer 910-01", quick drying asphaltic base paint.

PART 3 - EXECUTION

3.1 FABRICATION

- .1 Where possible, shop fabricate flashing components in accordance with applicable requirements of SMACNA Architectural Sheet Metal Manual.
- .2 Carry out fabrication in clean shops, located away from areas where carbon steel is torch cut, ground, or cut with abrasive wheels to ensure that carbon steel dust will not be embedded in prefinished surfaces. Clean tools and dies which have been used on carbon steel prior to fabrication to prevent contamination of surface with carbon steel dust.
- .3 Form sheet metal on bending brake. Perform shaping, trimming and hand seaming on bench, where practicable, using proper sheet metal working tools.
- .4 Form sections square, true and accurate to size. Flashings shall be free from distortion, waves, twists, buckles or other defects detrimental to appearance and performance.
- .5 Make allowances for thermal movement when forming, installing, interlocking and soldering sheet metal Work to avoid buckling, fullness of metal straining of joints or seams. Maximum length of flashing pieces; 2400mm. Double back exposed edges at least 12mm for appearance and stiffness.
- .6 Fabricate flashings, copings, closures, plastic boxes, pipe sleeves and flashings for roof mounted equipment to details shown, unless otherwise indicated.
- .7 Wipe and wash clean, soldered joints immediately after joint is soldered to remove acid.
- .8 Where soldered joints are absolutely necessary and where approved for use in prepainted metal, clean paint off both surfaces before soldering for minimum area necessary.

3.2 INSTALLATION

- .1 Carry out Work in accordance with industry standard sheet metal practice with joints lapped, locked, cleated with "S" cleats and caulked or soldered as required. Hem exposed edges 12mm. Type of joints used shall be adequate for various conditions, subject to approval.
- .2 Fabricate exposed fastening, where used, in such a manner as to prevent water penetration at point of fastening.
- .3 Provide starter strips where indicated or required to present true, non-waving, leading edge. Anchor to back-up to provide rigid, secure installation.

- .4 Make end joints where adjacent lengths of metal flashing meet using 300mm. long back-up flashing secured in place before installing flashing. Apply beads of caulking compound on face of back-up plate to seal ends of metal flashing. Leave 12mm wide space between end of adjacent lengths of metal flashings. Fabricate back-up of same material and finish as metal flashing with which it is being used. Make back-up plate exact profile of flashing allowing for thickness of flashing joints.
- .5 Form metal fascia with inner edge extended over fascia top and down cant to meet roofing aggregate. Nail with roofing nails and neoprene washers at 300mm C. Avoid placing nails in face of fascia, through membrane or flashing.
- .6 Interlock counter flashing pieces with prepainted metal base flashing and fold locking seam into position ensuring complete sealing. Continue counter flashing down to hemmed and sprung position at base of cant and junction of aggregate.
- .7 Provide underlay of resin sized paper under sheet metal installed over masonry, concrete or wood. Lay underlay dry as sheet metal Work is installed. Secure in place and lap joints 100mm.
- .8 Imperfections in sheet metal Work such as holes, dents, creases, or oil-canning is cause for rejection.
- .9 Repair damaged sheet metal Work, wash entire installation down, and leave in neat condition.
- .10 Provide all flashings required for proper execution and completion of the Work in acceptable manner including metal flashing around mechanical and other equipment occurring on roof.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 Sprayed fireproofing applied directly to structural steel framing members where shown on the Drawings.
- .2 Requirements of regulatory agencies: Provide materials and application procedures which have been tested and listed by U.L.C., and are acceptable to the Building Department for the hourly fire protection. UL (cUL), WH, and FM tested products/designs, tested for Canada, will be accepted subject to their approval by the Building Department.
- .3 Spray fireproofing is to be used for fireproofing which will be concealed from view. Members which will be permanently exposed to view are to be fireproofed with intumescent paint.

1.2 RELATED SECTIONS

- .1 Firestopping and Smoke Seal Section 07 84 00
- .2 Gypsum Board Section 09 29 00

1.3 QUALITY ASSURANCE

- .1 Manufacturer: Manufacturer shall be one of the approved manufacturers listed below.
- .2 Applicator: Company having a minimum of three (3) years experience in the installation of materials specified herein, on projects comparable to this project, who is certified, licensed or otherwise qualified by the manufacturer as having been provided the necessary training to install fireproofing products in accordance with the specified requirements.
- .3 Contractor and applicator shall assume responsibility for ensuring the member or assembly being fireproofed conforms to the specifications of the tested fireproofing design being utilized.

1.4 SUBMITTALS

- .1 Submit proposed tested assembly designs to Consultant for approval before proceeding.
 - .1 Details shall include galvanized steel mesh, welded to steel, as required in item 3.1.3, below.
 - .2 If subcontractor wishes to omit steel mesh, submit request to Consultant, together with evidence that the primer used is compatible with the fireproofing materials and that the surface has been adequately cleaned.
- .2 Submit product data sheets for applied fireproofing products proposed for use; products to be in accordance with submitted designs.
- .3 Upon completion of the fireproofing application the General Contractor must submit a certificate stating what system of fireproofing material was applied and that it complies with the fire protection requirements.

1.5 HANDLING

07 81 00 - APPLIED FIREPROOFING

- .1 Deliver materials, other than those normally shipped in bulk form, in unopened containers bearing their manufacturer's label showing compliance with Building Code requirements.
- .2 Comply with manufacturer's printed recommendations for product handling, storage and protection.

1.6 JOB CONDITIONS

- .1 Environmental requirements: Comply with manufacturer's printed recommendations for ambient temperature requirements before, during and after the installation of the sprayed fireproofing.
- .2 Provide natural or mechanical ventilation to properly dry this work during and after its application in confined areas.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Sprayed fireproofing: Monokote MK6 as manufactured by W.R.Grace Canada Ltd., or A/D Type FP as manufactured by A/D Fire Protection Systems, or Blaze-Shield II by Cafco/Isolatek International.
- .2 Water: Clean and fresh, free of substances harmful to the fireproofing mix.

2.2 MIX

- .1 Proportion mix to comply with requirements of regulatory agencies for the required hourly fire resistance ratings. Add mixing water only with calibrated equipment.

PART 3 - EXECUTION**3.1 PREPARATION**

- .1 Inspect adjacent construction and make sure that all conditions detrimental to the timely or proper execution of this work have been corrected before proceeding.
- .2 Clean steel surfaces of all grease, oil and other foreign matter which would prevent the proper adhesion of the sprayed fireproofing.
- .3 Weld galvanized steel mesh to all steel to be fireproofed, to ensure bond between structure and fireproofing materials. This requirement will be strictly enforced, unless the Contractor has obtained permission from the Consultant to omit the steel mesh, as outlined in subsection 1.4, Submittals, above.

3.2 SPRAYED FIREPROOFING

- .1 Do not apply sprayed fireproofing until all hangers and other attachments to the members being fireproofed have been installed, and steel mesh has been welded to structural steel.
- .2 Do not spray junction boxes or wiring or any other item that will require future servicing.

- .3 Protect adjacent surfaces and equipment from being damaged by the application, overspray, fall-out and dusting of fireproofing material. Remove excess and spillage promptly.
- .4 Comply with manufacturer's printed instructions and recommendations for mixing, handling and machine application of fireproofing material.
- .5 Mix sprayed fireproofing using mechanical mixing equipment, except hand mixing will be permitted for small applications requiring less than 1 bag of cementitious materials.
- .6 Apply the sprayed fireproofing at the various locations in the thicknesses required to obtain the required fire resistance ratings. Take care to spray the material completely into inverted corners. Cover substrates in a monolithic blanket of the uniform density, texture and thickness necessary to achieve the required hourly protection.
- .7 Where required to apply fireproofing in more than one coat to obtain necessary thickness, apply first coat 13mm to 19mm thick allow to set and partially dry, and follow with a second coat to bring the fireproofing to the necessary thickness. Carefully follow the manufacturer`s printed instructions for the time delay required for doubleback operation.
- .8 Fireproofing application must comply strictly with all requirements of the specifically listed Underwriters Laboratories of Canada test design assemblies.

3.3 FIELD QUALITY CONTROL

- .1 Take depth-gauge measurements, at maximum 3m on centre, as the work progresses to verify installed material thickness.
- .2 Take measurements along each surface covered with fireproofing.
- .3 Apply additional fireproofing materials where measurements indicate thicknesses less than required by the appropriate test data.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Maintaining of existing fire rated separations in building.
 - .1 This includes firestopping of penetrations through existing rated partitions and assemblies, where none exists.
 - .2 Refer to drawings for locations of fire rated walls. All roof assemblies shall be considered to have a one hour fire resistance rating.
 - .3 Examine existing building to determine the extent of the firestopping work required at existing corridors.
- .2 Firestopping of Penetrations in Rated Assemblies.
- .3 Fire Resistive Joint Systems.
- .4 Perimeter Fire Containment Systems.
- .5 Firestopping of Penetrations in Fire Blocking Compartments.
- .6 Smoke Seals
- .7 Provide all labour, materials, products, equipment and services, to supply and install the firestopping and smoke seal work for the entire project, including at the following locations:
 - .1 Openings in new and existing fire rated walls, floors and roofs both empty and those containing penetrations.
 - .2 Openings in new gypsum board enclosures at top of existing corridor walls.
 - .3 Gaps located within expansion joints.
 - .4 Openings in fire rated shafts.
 - .5 Gaps between the tops of new and existing fire rated walls and the underside of the roof deck, whether or not the ceiling is part of a "rated assembly". Note that the existing building assemblies do not conform to current standards.
 - .6 Gaps between the tops of new and existing fire rated walls and underside of fire rated floor or roof assemblies.
 - .7 Penetrations through construction enclosing compartmentalized concealed areas (fire blocks), involving both empty openings and openings containing penetrating items.
 - .8 Penetrations through smoke barriers, including 0-hour rated fire separations.
- .8 Note: It is not the intention of this section to delete firestopping work fully specified in the mechanical and electrical specifications. Coordinate with all mechanical and electrical sections to ensure the complete firestopping of the entire building. All firestopping not specifically called for in the mechanical and electrical specifications is to be included under this section.
- .9 For the purpose of pricing firestopping work at existing walls, assume that all walls have compromised fire separations above ceiling.
- .10 Include for supply and installation of two layers of continuous 300mm high fire rated gypsum board and continuous fire caulking on both sides of all corridor walls in work areas only.

1.2 RELATED WORK

- .1 Fire blocking of concealed spaces:
 - .1 Fire separation of concealed spaces shall be provided under applicable specification sections, and as indicated on drawings.
- .2 Non-Rated Openings through Floors and Walls:
 - .1 Non-rated openings through floors and walls shall be sealed under applicable architectural, mechanical, and electrical specification sections.
- .3 Metal sleeves for fire rated openings through floors and walls shall be provided under applicable mechanical and electrical specification sections.
- .4 Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies shall be sealed under applicable mechanical and electrical specifications sections and only in accordance with the equipment or device manufacturers' installation instructions.

1.3 RELATED SECTIONS

- | | | |
|----|--|-------------------|
| .1 | Clay Unit Masonry | Section 04 21 00 |
| .2 | Concrete Unit Masonry | Section 04 22 00 |
| .3 | Steel Decking | Section 05 31 00 |
| .4 | Applied Fireproofing | Section 07 81 00 |
| .5 | Joint Sealants | Section 07 92 00 |
| .6 | Aluminum Windows | Section 08 51 13 |
| .7 | Gypsum Board | Section 09 29 00 |
| .8 | Mechanical work requiring firestopping | Divisions 20 - 25 |
| .9 | Electrical work requiring firestopping | Divisions 26 - 28 |

1.4 REFERENCE STANDARDS/DOCUMENTS

- .1 Underwriters Laboratories of Canada (ULC):
 - .1 ULC List of Equipment and Materials, Firestop Systems and Components
 - .2 CAN/ULC-S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .3 CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems
- .2 Underwriters Laboratories, Inc. (UL):
 - .1 UL Fire Resistance Directory
 - .1 Firestop Devices Certified for Canada
 - .2 ANSI/UL 263 Fire Resistance Ratings
 - .3 UL 2079 Tests for Fire Resistance of Building Joint Systems
 - .4 UL 1479 Fire Tests Of Through-Penetration Firestops
- .3 Intertek WH Mark Product Directory

- .4 American Society for Testing and Materials (ASTM):
 - .1 ASTM E1966 Standard Test Method for Fire-Resistive Joint Systems
 - .2 ASTM E814 Test Method of Fire Tests of Penetration Firestop Systems
 - .3 ASTM E 2174 Standard Practice for On-Site Inspection of Installed Firestops
 - .4 ASTM E 2393 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers

- .5 Factory Mutual Approval Guide

1.5 PERFORMANCE REQUIREMENTS

- .1 Provide firestopping systems of sufficient thickness, width and density to provide and maintain a fire resistance rating, as indicated on drawings and in accordance with ULC, cUL or WH design numbers.
- .2 Provide a seal completely filling all annular spaces to prevent the passage of flame, smoke and gases through the opening in the fire separation in which it is installed.
- .3 Provide materials which are compatible with all materials used in the system including materials used in or on penetrating items as well as all construction materials used in conjunction or contiguous with the system.
- .4 Accessories:
 - .1 Provide components for each firestopping system that are needed to install fill materials.
 - .2 Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems.
 - .3 Accessories include but are not limited to the following items:
 - .1 Permanent forming/damming/backing materials
 - .2 temporary forming materials
 - .3 substrate primers
 - .4 collars
 - .5 steel sleeves
- .5 Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
- .6 Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
- .7 Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
- .8 Openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
- .9 Penetrations through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall.

SECTION 07 84 00 - FIRESTOPPING AND SMOKE SEAL

- .10 Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
- .11 Provide through penetration firestop systems and fire-resistive joint systems subjected to an air leakage test conducted in accordance with Standards UL1479 and UL2079, with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the through penetration firestop system or fire-resistive joint system to restrict the movement of smoke.
- .12 Testing agency shall be accredited by Standards Council of Canada and approved to perform fire endurance testing as outlined in this section of Work, which includes the following agencies;
 - .1 Underwriters Laboratories (Canada). ULC mark.
 - .2 Underwriters Laboratories, approved for Canada; cUL mark.
 - .3 Intertek Testing Service NA Ltd. (formerly Warnock Hersey); WH mark

1.6 SUBMITTALS

- .1 Manufacturer's Data:
 - .1 Provide submittals in accordance with Section 01 33 23.
 - .2 Submit all ULC, cUL, or WH tested systems or designs proposed for use on the project. Submissions must be in compliance with the requirements of the Contract Documents and certified for use in Canada.
 - .3 Submit manufacturer's specifications, installation instructions and product data for each material to be used. Materials must be as listed on the submitted tested system documents.
 - .4 Submit MSDS for all materials.
- .2 Shop Drawings: Submit shop drawings showing typical installation details, including reinforcement, anchorage, fastenings and method of installation for each type of firestopping condition.
- .3 Samples: If requested, submit samples of each type of firestopping systems, smoke seals and accessories. Indicate location where material/system shall be utilized.
- .4 Qualifications: Submit certificate indicating qualifications of installer.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Manufacturer shall be one of the approved manufacturers listed below.
- .2 Applicator: Company having a minimum of three (3) years experience in the installation of materials specified herein, on projects comparable to this project, who is certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products in accordance with the specified requirements.

1.8 REGULATORY REQUIREMENTS

- .1 Conform to the Ontario Building Code for fire resistance ratings.

- .2 Provide materials, accessories and application procedures which have been listed by ULC, cUL, or tested by a nationally recognized independent testing agency in accordance with ASTM E814, UL 1479, and CAN/ULC-S115 to achieve the required fire protection ratings.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Do not proceed with the installation of firestopping materials when temperatures or weather conditions exceed the manufacturer's recommended limitations for installation.
- .2 Ventilate solvent based and moisture-cure firestopping per firestopping manufacturer's instructions by natural means or, where this is inadequate, by forced air circulation.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to Site in manufacturer's sealed, undamaged containers, with labels intact. Labels shall identify product and manufacturer, date of manufacture; lot number; shelf life, qualified testing and inspection agency's classification marking, and mixing instructions for multi-component materials.
- .2 Handle and store materials in accordance with manufacturer's instructions.

1.11 PROJECT/SITE CONDITIONS

- .1 Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.
- .2 Maintain minimum temperature before, during, and for minimum 3 days after installation of materials.
- .3 Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.

1.12 SEQUENCING AND SCHEDULING

- .1 Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- .2 Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- .3 Do not install firestopping system until Work within opening has been completed. Coordinate with other applicable Sections.
- .4 Schedule installation of safing materials in linear opening at curtain wall prior to construction that limits access to safing slot.
- .5 Schedule work of other trades so that firestopping applications can be inspected prior to being covered by subsequent construction.

PART 2 - PRODUCTS**2.1 APPROVED MANUFACTURERS**

- .1 Provide firestopping silicone sealants, water-based sealants, intumescent sealant, mortars, or firestop devices from one of the following manufacturers:
 - .1 A/D Fire Protection Systems Inc.
 - .2 Tremco Fire Protection Systems Group
 - .3 Hilti (Canada) Corporation
 - .4 Nuco Inc., Self-Seal Firestops

2.2 MATERIALS

- .1 Firestop systems:
 - .1 Provide a complete system of asbestos-free firestop systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115, ASTM E814, and UL 1479 or UL 2079, and listed by ULC, cUL, or Intertek (WH), and approved by jurisdictional authorities and the Consultant.
 - .2 Comply with Ontario Building Code requirements for locations and ratings.
- .2 Materials specified below are as manufactured by A/D Fire Protection Systems Inc. Equivalent products manufactured by one of the approved manufacturers listed above are acceptable.
- .3 Silicone Sealants:
 - .1 Primerless, single component silicone sealant, curing to durable, flexible, silicone rubber; to ASTM C 920, Type S, Grade NS, class 25; A/D Firebarrier Silicone Sealant or equivalent.
 - .2 For use in: openings with penetrating items subject to high movement; multiple penetration systems; for combustible pipes up to 2-in. diameter; in control joints; in curtain wall joints; expansion joints; floor/wall joints; wall/wall joints; head of wall joints; and as a sealant for smoke barrier construction.
- .4 Pourable Sealant:
 - .1 Single component, water based, elastomeric sealants, forming durable, flexible, watertight bonds; A/D Firebarrier Seal (pourable) and Seal NS (non-slumping) or equivalent.
 - .2 Use non-slumping type for vertical applications.
 - .3 Water based firestop sealants for use with: control joints; head of wall joints; floor/wall joints; wall/wall joints; multiple penetration systems; plumbing; mechanical; electrical; and where sprayed sealant application is required or desired.
- .5 Intumescent Caulk:
 - .1 Single component, water based, elastomeric sealant for use in interior building locations; A/D Firebarrier Intumescent Caulk or equivalent.
 - .2 For general use as a firestop sealant with: insulated pipes; pipes; electrical cables and conduit; ducts.

- .6 Mortar:
 - .1 Non-combustible, fibre reinforced, foamed cement mortar; A/D Firebarrier Mortar or equivalent.
 - .2 For use in: large openings; static non-moving penetrations such as cable trays; for multiple penetration systems; electrical and communication bundles; conduits; non-combustible sleeves; and insulated pipes.
- .7 Collars:
 - .1 Steel collars with intumescent silicone strip, in diameters to suit pipe sizes; A/D Firebarrier Collar or equivalent.
 - .2 For use in openings with single combustible pipe penetrations greater than 50mm diameter; confirm maximum pipe diameter (for applicable tested assemblies) with manufacturer.
- .8 Pillows:
 - .1 Self-supporting, sealed polyethylene bags containing intumescent materials and non-combustible insulation; A/D Firebarrier Pillows or equivalent.
 - .2 For use in openings with: cable tray; multiple cable penetrations; where retrofitting of penetrating items is anticipated; and as a temporary firestop system.
- .9 Mineral Wool:
 - .1 Non-combustible, semi-rigid, preformed mineral wool strips and sheets; A/D Firebarrier Mineral Wool or equivalent.
 - .2 For use in tested firestop systems, as fire barrier and forming material.
- .10 Additional Materials:
 - .1 All materials shall be by the manufacturer's listed above and shall be components of tested assemblies, acceptable to local authorities having jurisdiction, for the fire rating required.

2.3 ACCESSORIES

- .1 Damming and backup materials, supports and anchoring devices: Non-combustible, to manufacturer's recommendations and in accordance with the tested system being installed, and as acceptable to local authorities having jurisdiction.
- .2 Primers: As required by firestopping manufacturer and compatible with selected system and contiguous materials.
- .3 Water: Potable.
- .4 Tape: Pressure sensitive masking tape as recommended by the firestopping manufacturer.
- .5 Fasteners: Provide suitable fasteners, for applicable substrates, for all collars and other field fastened firestopping components.

PART 3 - EXECUTION**3.1 EXAMINATION**

- .1 Examine substrates, openings, voids, adjoining construction and conditions under which the Work is to be installed. Confirm compatibility of surfaces scheduled to receive firestopping.
- .2 Verify that penetrating elements are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings.
- .3 Do not proceed with Work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Surfaces to receive firestopping shall be free of dirt, dust, grease, oil, rust, loose materials, form release agents, frost, moisture or any other matter which would impair the bond of firestopping material to the substrate of penetrating item(s).
- .2 Prime substrates in accordance with manufacturer's written instructions or recommendations. Confine primers to areas of bond; do not allow spillage or migration onto exposed surfaces.
- .3 Do not apply firestopping and smoke seals to surfaces previously painted or treated with sealers, curing compounds, water repellent or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other related materials used in the actual fire tests are provided.
- .5 Mask where necessary to prevent firestopping materials from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing firestopping seal with substrates.
- .6 Installation is not to proceed until submittals have been reviewed and returned by the Consultant.

3.3 INSTALLATION

- .1 Manufacturer's Instructions:
 - .1 Comply with ULC, cUL, or WH listings and manufacturer's instructions for the type of material and condition of opening in each case.
 - .2 Consult with the manufacturer's technical representative to determine proper procedure for conditions not fully covered by printed instructions.
 - .3 Record in writing any oral instructions received, with copy to manufacturer.
- .2 Firestopping for vertical applications:
 - .1 Non-sag caulk or spray grade sealants, Mortar, Collars or Pillows.
 - .2 Mineral wool fire resistant filler, per tested design.
 - .3 Install sealants on both sides of walls and other vertical elements.
- .3 Firestopping for horizontal applications:
 - .1 Non-sag caulk or self-levelling or spray grade sealants, Mortar, Collars or Pillows.
 - .2 Mineral wool fire resistant filler, per tested design.

- .4 Firestopping for overhead applications:
 - .1 Non-sag caulk or spray grade sealants or Mortar.
- .5 Install firestopping with sufficient pressure to properly fill and seal openings to ensure an effective smoke seal. Tool or trowel exposed surfaces. Remove excess firestopping material promptly as the Work progresses and upon completion.
- .6 Damming: Provide leak-proof dams as required to seal openings and contain liquid sealants, putty or mortar until cured. Install damming in accordance with manufacturer's instructions.
- .7 Damming Boards: Install forming/damming materials and other accessories of type required to support fill materials during their application and in the position needed to produce the shapes and depths required to achieve fire ratings of through-penetration firestop systems.
 - .1 Combustible Type: For temporary dams only. Remove after firestopping material has cured.
 - .2 Non-Combustible Type: For temporary or permanent dams. Provide non-combustible type wherever damming material cannot be removed after applying firestopping materials.
- .8 Void Filler: Use materials recommended by the firestopping manufacturer to seal gaps created by non-combustible type damming boards and to seal around cables, conduits, pipes and where void filler material becomes part of the fire rated assembly.
- .9 Sealant:
 - .1 Install damming material or mineral wool as required.
 - .2 Apply sealant so air voids are not present and sealant is in full contact with penetrating items. Tool sealant to ensure substrate contact.
 - .3 Remove excess sealant in accordance with manufacturer's recommendations.
- .10 Mortar:
 - .1 Install damming material as required.
 - .2 Mix mortar in strict accordance with manufacturers instructions.
 - .3 Pump, trowel or hand pack mortar through openings to minimum thickness as recommended by manufacturer and as listed by ULC, or cUL, to achieve required fire rating.
- .11 Firestopping Mineral Wool:
 - .1 Install firestopping by compressing material to the minimum required by ULC, cUL, or WH listing.
 - .2 Apply firestopping in sufficient thickness, depth and density so as to achieve the required fire resistance rating.
 - .3 Use impaling clips to support and secure firestopping where required by tested system.
 - .4 Provide mineral wool additionally to provide acoustic separation between spaces.
- .12 Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications.

3.4 FIELD QUALITY CONTROL

- .1 Notify Consultant when completed installations are ready for inspection prior to concealing or enclosing an area containing firestopping materials.
- .2 Arrange for inspections by the Owners independent inspection and testing company, appointed and paid for by Owner.
- .3 Following field inspections, provide all repair as required to ensure compliance with the Contract Documents.
- .4 Keep areas of work accessible until inspection by authorities having jurisdiction.

3.5 CLEANING AND PROTECTION

- .1 Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.
- .2 Upon completion of this work, remove all materials, equipment and debris from the site.
- .3 Leave work area and adjacent surfaces in a condition acceptable to the Consultant.
- .4 Leave installed work with sufficient protection to enable it to remain untouched until project turnover.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Sheet Metal Flashing and Trim	Section 07 62 00
.2	Firestopping and Smoke Seal	Section 07 84 00
.3	Aluminum Windows	Section 08 51 13
.4	Acoustic sealant	Section 09 29 00
.5	Ceramic Tile	Section 09 30 16

1.2 REFERENCE STANDARDS

- .1 ASTM International:
 - .1 ASTM C 510 Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants
 - .2 ASTM C 719 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
 - .3 ASTM C 794 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - .4 ASTM C 834 Standard Specification for Latex Sealants
 - .5 ASTM C920 Standard Specification for Elastomeric Joint Sealants
 - .6 ASTM C 1087 Standard Test Method for Determining Compatibility of Liquid- Applied Sealants with Accessories Used in Structural Glazing Systems
 - .7 ASTM C 1193 Standard Guide for Use of Joint Sealants
 - .8 ASTM C 1247 Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
 - .9 ASTM C 1248 Standard Test Method for Staining of Porous Substrate by Joint Sealants
 - .10 ASTM C 1311 Standard Specification for Solvent Release Sealants
 - .11 ASTM D 2203 Standard Test Method for Staining from Sealants

1.3 APPROVED MANUFACTURERS

- .1 The products of the following manufacturers are approved for use subject to meeting the specifications for the particular type of sealants listed below. However, this is not an approval to substitute another type of sealant for those specified unless the material manufacturer requests change in his product in writing to the Consultant.
 - .1 Canadian General Electric Company Ltd.
 - .2 Dow Corning Canada Inc.
 - .3 Tremco
- .2 Material manufacturers must be willing to review Shop Drawings and drawing details, visit the site to review sealant installation and provide written reports to the Consultant.

1.4 INSTALLER QUALIFICATIONS

- .1 Sealants and caulking shall be installed by a specialized Subcontractor, having skilled mechanics thoroughly trained and competent in all aspects of caulking work, with minimum 5 years documented experience.

SECTION 07 92 00 - JOINT SEALANTS**1.5 SUBMITTALS**

- .1 Submit samples of each sealant, in conformance with Section 01 33 23.
- .2 Provide colour cards for Consultants selection.
- .3 Submit written adhesion and compatibility approval from the sealant manufacturer for all materials to be sealed.

1.6 WARRANTY

- .1 Extend Contractor's warranty to **five (5) years**, in writing. Warranty shall commence on the date of Substantial Performance.
- .2 Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjacent surfaces
- .3 Provide manufacturer's project-specific 20 year non-staining warranty and 10 year weatherseal warranty for "Type A" sealant listed below.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Sealant Type A: For exterior locations. Non-Staining, primer less, silicone weather-proofing sealant:
 - .1 SilPruf SCS9000 NB, manufactured by Canadian General Electric Company Limited,
 - .2 Dow Corning 756 SMS, manufactured by Dow Corning Canada Inc., or
 - .3 Spectrem 3, manufactured by Tremco Ltd., and
 - .4 conforming to the product properties published.
 - .5 to ASTM C920 Type S, Grade NS, Class 50, Use NT, M, G, A, and O
- .2 Sealant Type B: For interior locations. Non-staining, primer less, silicone hybrid sealant:
 - .1 SCS7000, manufactured by Canadian General Electric Company Limited.
 - .2 Dow Corning 756 SMS, manufactured by Dow Corning Canada Inc., or
 - .3 Spectrem 3, manufactured by Tremco Ltd.
 - .4 to ASTM C920 Type S, Grade NS, Class 50, Use M, G, A, and O
- .3 Sealant Type C: For interior locations where conditions of high humidity exist such as washrooms. Mildew resistant, one component silicone conforming to CGSB 19-GP-22M and ASTM C920:
 - .1 CGE SCS1700 Sanitary Sealant,
 - .2 Dow Corning 786, or
 - .3 Tremco Tremsil 200 White

- .4 Sealant Type D: For interior locations. Paintable, non-staining, primer less, silicone hybrid sealant:
 - .1 SCS7000, manufactured by Canadian General Electric Company Limited.
- .5 Sealant Type E:
 - .1 One-part, moisture cure, medium modulus silicone sealant; Contractors Weatherproofing Sealant (CWS) BY Dow Corning; to ASTM C 920 Type S, Grade NS, Class 50, Use NT, M, A, O (granite).
 - .2 One-part, moisture-cure, low-modulus silicone sealant; Contractors Concrete Sealant by Dow Corning; to ASTM C 920 Type S, Grade NS, Class 50, Use T, NT, M, G, A, O.
- .6 Colours of sealants and caulking when exposed in the finished work to later selection by the Consultant. Allow different colours for different situations and materials. Allow for custom colours for exterior sealants.
- .7 Primers for sealing: As manufactured or recommended by the manufacturer of the sealing materials for the specific applications.
- .8 Joint backing material:
 - .1 circular foam strips, of approved manufacture, compatible with sealant and 50% greater width than joint width;
 - .2 Vertical Surfaces: extruded polyolefin foam, Sof Rod by Tremco Ltd.
 - .3 Horizontal Surfaces: closed cell polyethylene foam, Standard Backer Rod by Tremco.
- .9 Bond Breaker: pressure sensitive plastic tape backing material, which will not bond to sealant; 3M #226 or #481, or Valley Industries #40.
- .10 Cleaning material for surfaces to receive sealant to be as recommended by the manufacturer of the sealant.

PART 3 - EXECUTION

3.1 LOCATIONS

- .1 Seal all exterior junctions and joints wherever required to close gap and wherever sealant is essential to maintain the continuity of air barrier, water barrier, or non-rated smoke separation of wall with Sealant Type A. Areas to be caulked include:
 - .1 Concrete to metal, masonry, concrete and precast concrete.
 - .2 Masonry to metal, concrete, precast concrete, and masonry.
 - .3 Metal to metal, masonry, concrete, and precast concrete.
 - .4 Around pipes and conduit through foundation walls.
 - .5 Between hollow metal frames and screens and adjacent materials.
 - .6 Between metal siding and metal panels and adjacent materials.

SECTION 07 92 00 - JOINT SEALANTS

- .7 Between window, louvre, and skylight frames and sills and adjacent materials.
- .8 At all control and expansion joints.
- .2 Seal all interior junctions and joints wherever required to close gap and wherever sealant is essential to maintain the continuity of air barrier, water barrier, or non-rated smoke separation of wall with Sealant Type B. Areas to be caulked include:
 - .1 Concrete to metal, masonry, concrete and precast concrete.
 - .2 Masonry to metal, concrete, precast concrete, and masonry.
 - .3 Metal to metal, masonry, concrete, and precast concrete.
 - .4 Around pipes and conduit through walls.
 - .5 Between hollow metal frames and screens and adjacent materials.
 - .6 Between window, louvre, and skylight frames and sills and adjacent materials.
 - .7 At all joints between millwork and masonry, to provide neat junction.
 - .8 At junction between all counters and/or splashbacks and adjacent substrate with neat 3mm bead.
 - .9 At all control and expansion joints.
- .3 Seal with Sealant Type C at the following locations:
 - .1 Around access panels in ceramic tile faced walls with a neat 3mm bead.
 - .2 Around perimeter of piping penetration at tile work.
 - .3 At junctions between all counter tops and/or splashbacks and adjacent substrate in washrooms, with neat 3mm bead.
 - .4 At junctions of lavatories, toilets, and other plumbing fixtures and adjacent substrate.
- .4 Seal with Sealant Type D at all interior non-moving joints to be painted.
- .5 Seal at all other vertical and horizontal joint locations with Sealant Type E.
- .6 Refer to Section 07 84 00, Firestopping and Smoke Seal, for location of fire stopping and fire resistant caulking.
- .7 Refer to Section 09 29 00, Gypsum Board, for acoustic sealant work.

3.2 SUPERVISION

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

- .2 Arrange for the sealant manufacturer's technical representatives to visit the site prior to the commencement of the sealing to meet with the Contractor and the Consultant.
- .3 Sealant manufacturer to visit site periodically and to provide written reports to Consultant ensuring sealant is in accordance with good trade practice, the manufacturer's recommendations and the intent of this Specification.

3.3 PREPARATION

- .1 Install sealants only when surfaces and ambient temperatures are suitable for the material used, as per manufacturer's recommendations.
- .2 Clean all joints and spaces to be sealed.
- .3 Ensure that surfaces are structurally sound, free from grease, chalk or other contaminants which may adversely affect the adhesion of the sealing materials. Use dry oil free clean compressed air stream if necessary to clean out the joint.
- .4 Clean surfaces with a solvent or cleaner recommended by the manufacturer of the sealant materials.
- .5 Remove chalk lines completely. Do not place clear sealant over coloured chalk lines.
- .6 Test materials for indications of staining or poor adhesion before any sealing is commenced.
- .7 Submit colour chart to Consultant and obtain his written instructions for colours and locations of colours.

3.4 PRIMING

- .1 If recommended by the manufacturer of the sealing materials, prime joints to prevent staining, or to assist the bond, or to stabilize porous surfaces.
- .2 Apply primer with a brush which will permit the priming of all joint surfaces.

3.5 MASKING

- .1 Where necessary to prevent contamination of adjacent surfaces, mask the areas adjacent to the joints with masking tape.

3.6 INSTALLATION

- .1 Install joint backing materials at all locations as detailed or where required by sealant manufacturer's printed directions.
- .2 Install a bondbreaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.
- .3 Ensure that the correct sealant depth is maintained.

SECTION 07 92 00 - JOINT SEALANTS

- .4 Finished joints shall be free of wrinkles, sags, air pockets, ridges and embedded impurities.
- .5 Tool all sealant surfaces to produce a smooth surface.
- .6 Remove droppings and excess sealant as work progresses and before material sets.
- .7 Sealing materials shall be gun grade or tool grade consistency to suit the joint conditions.
- .8 Commence sealing only after all adjacent surfaces have been painted under Painting Section.

3.7 CLEANING

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess sealant and droppings using recommended cleaners as work progresses.
- .3 Remove masking after joint tooling.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Concrete Masonry Units	Section 04 22 00
.2	Wood Doors	Section 08 14 00
.3	Joint Sealants	Section 07 92 00
.4	Door Hardware	Section 08 71 00
.5	Glazing, fire glass	Section 08 81 00
.6	Gypsum Board	Section 09 29 00
.7	Painting	Section 09 90 00
.8	Electrical	Division 26

1.2 WORK INCLUDED

- .1 Supply and install all hollow metal products including doors, frames, transom frames, screens, sidelight and window assemblies with provision for glazed, panelled or louvred openings, fire labelled and non-labelled, as scheduled or shown on the Drawings.
- .2 Work shall including the following:
 - .1 Door cutouts, complete with reinforcing, stops and closers required for glazing.
 - .2 Reinforcing for Finishing Hardware.
 - .3 Preparations for wiring for security and control systems and electronic hardware.
 - .4 Supply of all necessary fastening and anchoring devices for above items.
 - .5 Steel closure pieces at metal panels, steel columns, horizontal members, and hollow metal frames and screens. Refer to Drawings.
 - .6 Metal panels in hollow metal frames.
 - .7 Provision of zinc-rich coating on all exterior steel doors, frames and screens.
 - .8 Fire rated and labelled doors, frames, and screens, glazed and unglazed, where noted on schedule.
 - .9 Supply and install HSS and channel reinforcing members where shown at screens and door frames/sidelights.
 - .10 Supply and installation of transfer grilles and door louvres, where indicated on Door and Frame Schedule; fire labelled where door rating is indicated.
 - .11 Supply and install door silencers on metal frames.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES**1.3 REFERENCES**

- .1 ULC Standards:
 - .1 CAN/ULC-S104 Standard Method for Fire Tests of Door Assemblies
 - .2 CAN/ULC -S105 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104
 - .3 CANULC-S106 Standard Method for Fire Tests of Window and Glass Block Assemblies
- .2 Canadian Steel Door Manufacturers Association (CSDMA):
 - .1 Recommended Specifications for Commercial Steel Doors and Frames
 - .2 Recommended Dimensional Standards for Commercial Steel Doors and Frames
 - .3 Recommended Specifications for Sound Retardant Steel Doors and Frames
 - .4 Canadian Fire Labelling Guide for Commercial Steel Door and Frame Products
 - .5 Guide Specification for Installation and Storage of Hollow Metal Doors and Frames
- .3 CSA Group:
 - .1 CSA W59 Welded Steel Construction (Metal Arc Welding)
- .4 ASTM International:
 - .1 ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .3 ASTM C553 Specification for Mineral Fiber Blanket Insulation for Commercial and Industrial Applications
 - .4 ASTM C578 Specification for Rigid, Cellular Polystyrene Thermal Insulation
 - .5 ASTM C591 Specification for Un-Faced Pre-formed Rigid Cellular Polyisocyanurate Thermal Insulation
 - .6 ASTM C592 Specification for Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction
 - .7 ASTM C1289 Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- .5 American National Standards Institute:
 - .1 NFPA 80 Standard for Fire Doors and Fire Windows
 - .2 ANSI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors Frames and Frame Anchors
 - .3 ANSI/DHI A115.IG Installation Guide for Doors and Hardware
 - .4 ANSI A250.11 Recommended Erection Instructions for Steel Frames

1.4 PERFORMANCE

- .1 Doors and frames covered by this specification shall be certified as meeting Level "A" acceptance criteria when tested in strict conformance with ANSI-A250.4. Swing Test duration shall be 1,000,000 cycles. For door twist tests maximum deflection is not to exceed 32mm (1¼") when loaded to 136kg (300 lbs), and permanent deflection is not to exceed 3.2mm (1/8"). Tests shall be conducted by an independent nationally recognized accredited laboratory.

- .2 Fire labelled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Consultant. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN/ULC-S104. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service Procedures issued to the manufacturer.
- .3 Should any door or frame specified by the Consultant to be fire rated, not qualify for labelling due to design, hardware, glazing or any other reason, advise the Consultant before manufacturing commences.
- .4 Core materials for exterior doors shall attain a thermal resistance rating RSI 1.06 (R6.0) when tested in accordance with ASTM C518.
- .5 Product quality shall meet, or exceed, standards set by the Canadian Steel Door Manufacturers Association.

1.5 QUALITY ASSURANCE

- .1 Supply all steel door and frame product from one manufacturer member company of the CSDMA.
- .2 Manufacturer must be capable of labelling the fire rated doors, frames, and screens, glazed with specified fire glass. Refer to Section 08 81 00 for fire glass specifications. No Georgian Wired Glass will be permitted on the job.
- .3 CSDMA Specification 08 11 13 "Commercial Steel Doors and Frames" is the minimum fabrication standard for this section, as if printed in its entirety herein, except where specified otherwise.
- .4 Handle and install product in strict compliance with CSDMA 08 11 13, DHI A115.IG and NFPA 60.
- .5 A cash allowance is included in the tender price to cover cost of an independent inspection company, to be selected by Consultant. Allowance is the responsibility of the Contractor and any ensuing deficiency correction costs are the responsibility of the supplier and/or the installer(s), as determined by the inspection report. The Owner reserves the right to have inspection include manufacturing facilities, and work in progress for this project, prior to award of contract or Substantial Performance of the contract.

1.6 SUBMITTALS

- .1 Submit confirmation that the manufacturer can label all fire rated doors, frames, and screens, glazed with the fire rated glass to be used on the project, for the fire separation required.
- .2 Prepare and submit shop Drawings in accordance with Section 01 33 23, and show the following:
 - .1 Door and frame schedules, identifying each unit, with door numbers referencing the numbering in the contract documents.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .2 Provide columns for Stock Code Numbers for both doors and frames.
 - .3 Typical and special details; including mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, panelled or louvered) and arrangement of hardware.
 - .4 Materials and finishes; including steel, core, material thickness.
 - .5 Hardware preparation.
 - .6 Frame anchorage details.
 - .7 Submit manufacturer's standard catalogue data for specified products demonstrating compliance with referenced standards.
 - .8 Other pertinent information.
- .3 Submit information on standard shop drawing sheets as approved by the Canadian Steel Door and Frame Manufacturers Association.
 - .4 Shop drawings for hollow metal screens over 8m² in size, and for all screens which are required by code to be designed as guards at variations in floor level, must be sealed by a professional engineer, registered in the Province of Ontario.
 - .5 Submit manufacturer's printed installation instructions.
 - .6 Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.7 PRODUCT HANDLING

- .1 Matchmark doors, panels, frames and windows with Stock Code Numbers as shown on the Door Schedule. If Stock Code Numbers are not shown on the Schedule, matchmark with Door Numbers.
- .2 Deliver, store and handle components so as to prevent damage, distortion and corrosion.
- .3 Store Steel Frames under cover, raised on wood skids at least 100mm above grade, and as required to prevent damage and rusting. Store assembled frames in an upright position. Stack frames to prevent twisting; maximum 5 units per stack. Provide minimum 6mm airspace between frames to permit air circulation. Covers must be vented so as to avoid a build-up of humidity within.
- .4 Doors to be delivered to site immediately prior to installation. Store doors protected at corners to prevent damage or marring of finish. Store in upright position, in enclosed, dry space, in a manner to prevent rust and damage. Use vented covers.

1.8 TESTING

- .1 One door will be selected at random by the Consultant and shall be subjected to destructive testing by an Inspection Company appointed by the Consultant, to verify conformance to the specifications. Replace the doors at no additional cost to the Contract.

1.9 WARRANTY

- .1 Provide an extended warranty of **three (3) years** from date of Substantial Performance against defects of workmanship including failure of welded seams or of reinforced hinge anchorage plates. Work showing defects during this period shall be repaired or replaced without cost to the Owner.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 General: All materials shall be new and suitable for their various purposes and shall be free from flaws and imperfections.
- .2 All doors, frames, and screens shall be from one manufacturer. Only the following manufacturers will be accepted:
 - .1 Manufacturers:
 - .1 Fleming Baron Door Products (Assa Abloy)
 - .2 Daybar Industries Ltd.
 - .3 All Steel Doors
 - .4 Gensteel Doors
 - .5 Trillium Steel Doors
 - .6 Vision Hollow Metal
 - .2 Manufacturers must be able to provide and label the fire rated doors, frames, and screens required for this project, using the fire glass specified. If the manufacturer carried in the tender is not capable of providing the fire labelled products, the contractor will be required to use one of the other listed manufacturers for the work, at no additional cost to the Owner.
- .3 Sheet Steel:
 - .1 General: cold rolled, carbon steel, stretcher levelled. Steel to have hardness of Rockwell 'B' maximum 65 (ASTM E103) suitable for forming and bending without metal or coating fracture.
 - .2 ASTM A653/A653M commercial grade tension levelled hot-dipped galvanized steel sheet, coating designation Z275
 - .3 Doors, over 3m²: commercial quality zinc coating, comply with ASTM A1008/A1008M.
- .4 Steel Thicknesses:
 - .1 Doors: 1.6mm (16ga)
 - .2 Panels: 1.3mm (18 ga)
 - .3 Frames: 1.6mm (16 ga)
 - .4 Hinge Reinforcement: 3.5mm (10 ga)

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .5 Door Materials:
 - .1 Exterior, High Use and Oversize Doors:
 - .1 Includes all exterior doors,
 - .2 high use doors, including doors at vestibules, stairwells, corridors, Gymnasium, Cafetorium, Library (Learning Commons), Computer Lab, General Office, washrooms, and change rooms, and
 - .3 all doors over 3m² and over 1200mm wide or over 3000mm in length.
 - .4 Semi-rigid glass fibre insulation in all exterior doors.
 - .5 Reinforce steel doors with 20 ga. vertical interlocking weld steel stiffeners at 150mm o.c., spot welded to face sheets.
 - .6 Doors to be Fleming H-Series, 16 gauge, with continuous welded edge seams.
 - .2 Other interior doors and panels up to 3m² and maximum width of 1200mm or maximum length of 3000mm:
 - .1 Doors to be Fleming D-Series, 16 gauge, or equivalent.
 - .2 Interior Doors to be Honeycomb Core, except high use doors which shall be as specified above.
- .6 Fire rated doors: in accordance with fire test requirements.
 - .1 locate U.L.C. label on inside of hinge jamb on frame.
 - .2 locate U.L.C. label on the top hinged edge of door midway between top hinge and top of door. Doors to be as noted above.
- .7 Sound Insulated Doors:
 - .1 Where sound insulated doors are indicated in the door schedule, provide assemblies that have been tested in accordance with ASTM E90, certified to a minimum rating of STC 46. Locations include music classrooms, music practice rooms, and technical workshop classrooms.
 - .2 Assembly includes manufacturer's proprietary door and frame construction, and acoustical gasketing system. Doors to be Fleming Whisper Core Series, 16 gauge.
- .8 Honeycomb: Structural small cell (25.4 mm max) Kraft paper "Honeycomb"; weight: 36.3kg per ream minimum; density: 16.5kg/m³ minimum.
- .9 Frame reinforcement:
 - .1 Reinforce frames for high frequency hinge preparation.
 - .2 Stiffen all mullions and hinge jambs with continuous 3.5mm channel where continuous hinges are required.
 - .3 Reinforce and provide cut outs and boxes for security devices.
 - .4 Reinforce for overhead stops.
 - .5 Frames at acoustic doors to be filled with mortar.
- .10 Exterior Top Caps: galvanized steel caps, flush with top of door.
- .11 Zinc Rich Coating: ZRC 221 Cold Galvanizing Compound by ZRC Worldwide, low VOC coating, or equivalent approved by the Consultant.
- .12 Metal Filler: Two component epoxy type.
- .13 Primer: Rust inhibitive primer

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .14 Glass Stop Screws: Oval head, cadmium plated, self-tapping steel screws. Other mechanical locking methods may be used but shall be detailed on Shop Drawings for review.
- .15 Door Silencers: Rubber - Ives SR64 or approved equal.

2.2 FABRICATION

- .1 General
 - .1 Dissimilar metals in contact, or metals which will be in contact with concrete or masonry when installed, shall be insulated one from another by methods and materials required for such results, as approved by the Consultant.
 - .2 Components shall be the types and sizes shown on the Drawings.
 - .3 Reinforce components, where required, for the installation of Finishing Hardware. Drill and tap to suit templates.
 - .4 Prepare doors and frames for the installation of the security system. Confirm requirements with Consultant.
 - .5 Ensure adequacy of anchoring devices.
 - .6 No patching, plugging, skimming or other such means of overcoming defects, discrepancies or errors shall be resorted to without written permission of the Consultant.
 - .7 Fabricate components from clean steel, free of rust and scale, which has been thoroughly degreased.
 - .8 The dimensions shown on the Drawings are the full rebate size of the frame.
 - .9 In addition to specified requirements for hollow metal doors and frames, fire doors and frames shall comply with the Underwriters Laboratories requirements for the specified rating and be provided with the appropriate labels.
 - .10 All seams in exterior doors, stairwell doors and other high use doors, and all doors over 3m² and over 1200mm wide or over 3000mm in length, and seams in all frames must be continuously welded. No spot welding will be permitted. All welds must be ground flush. No visible seams will be accepted.
 - .11 All exterior steel doors, frames and screens to be painted with 2 coats of zinc-rich coating after fabrication and before delivery to site.
 - .12 All areas where shop applied zinc-rich coating has been damaged on site shall immediately be cleaned and touched up with the same zinc-rich coating product.
 - .13 Steel framed doors, screens and windows are to be glazed as specified in Section 08 81 00. Exterior and acoustic doors and screens are to be prepared for double glazed units.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .2 Edge Clearances
 - .1 Unless otherwise specified, allow edge clearances in accordance with Canadian Manufacturing Specifications for Steel Door and Frame Manufacturers Association.
 - .2 Where hardware items are to be attached to, or mortised into, bottom edges of doors, provide proper clearance between door and floor or threshold to accommodate such hardware.
- .3 Hardware Preparation
 - .1 Refer to Hardware Schedule, included in Section 08 71 00, and prepare doors for hardware listed.
 - .2 Templated hardware: prepare work in accordance with templates supplied in Section 08 71 00. Prepare doors for mortice locksets according to Hardware Schedule.
 - .3 Reinforce doors and frames for concealed, mortised and surface mounted hardware in accordance to "Thickness of Steel for Component Parts" in the "Canadian Manufacturing Standards for Steel Doors and Frames", published by the Canadian Steel Door and Frame Manufacturers' Association.
 - .4 Prepare doors and frames for security system where noted.
 - .5 At oversized door locations, provide minimum 4 butt hinge preparations.
 - .6 Prepare all exterior doors and vestibule doors and frames for four hinges.
- .4 Hollow Metal Doors and Panels
 - .1 Doors and panels shall be of seamless, continuously welded construction with no visible seams or joints on faces. Doors to be 44.4mm minimum thickness.
 - .2 Secure edge seams with suitable continuously welded seams to the approval of the Consultant.
 - .3 Interlocking seams for doors shall be fully seam welded, for full length of door. All welding to be ground smooth.
 - .4 Core construction:
 - .1 Exterior doors to be filled with glass fibre insulation between steel reinforcing. All Type H doors to be steel stiffened as specified herein.
 - .2 All high use and oversized interior doors shall have steel reinforcing.
 - .3 Interior Doors for Classrooms, Closets and Storage Rooms to be Honeycomb Core

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .4 Temperature Rise Rated (TRR): Solid slab core of non-combustible, inorganic composite to limit temperature rise on the "unexposed" side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Consultant.
- .5 Welds shall be ground, filled, and dressed smooth to provide an invisible joint and smooth flush surface.
- .6 Fully reinforce doors as required for specified hardware. All exterior, stairwell, and washroom doors and all doors classified as "high use" shall be reinforced with Fleming high frequency angle top hinge reinforcement, welded to door skin.
- .7 Close top and bottom edges of doors with a continuous, recessed, minimum 1.5mm thick steel channel, extending full width of door and welded to both faces. At exterior doors, provide an additional flush closing channel at top edge and, where required for attachment of weather stripping, a flush closure at bottom edge.
- .8 Surround openings in doors with minimum 1.5mm thick steel edge channels, welded to both face sheets.
- .9 Vertical edge profile for single acting swing doors: bevelled 3mm in 50mm.
- .10 Glazing Stops:
 - .1 Equip glazed doors with minimum 0.9mm steel glazing stops, mitred and welded at corners. Where least dimension of stop is less than 12mm, make stop from solid square bar.
 - .2 Glazing stops at outside of exterior doors and at secure side of interior doors shall be rendered non-removable by welding to door. Secure removable stops with screws.
 - .3 Glazing stops may be mechanically locked in place, providing details have been reviewed on Shop Drawings.
 - .4 Glazing stops at fire rated doors and screens shall conform to the requirements of the tested assemblies.
- .11 Fabricate exterior panels with a full width steel drip on the outer, lower edge.
- .12 Doors for installation in channel frames shall be double-depth mortised to accommodate both butt flanges.
- .13 Construct fire rated doors to meet fire test requirements and provide U.L.C. labels.
- .5 Steel Frames
 - .1 Frames shall be of sheet steel, formed profiles shown on the Drawings.
 - .2 Fabricate frames in sections as large as practicable to minimize field jointing. Internally reinforce all mullions and hinge jambs with 1.3mm channel.
 - .3 Steel thickness: 1.6mm (16 ga.) galvanized steel.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .4 Glazing stops shall be as specified for doors above.
- .5 Sidelight framing shall be of same metal and thickness as adjacent door frame.
- .6 Assemble components with accurately cut joints. Mitre outside corner joints of frames. Continuously weld joints on inside of profile; grind welds flush and sand to smooth uniform surface. Provide semi-rigid insulation to exterior frames.
- .7 Tack weld two (2) removable 1.2mm steel spreader channels to inside faces of door frames at base, for protection during shipping.
- .8 Provide adjustable base clips at bottom of each door jamb for anchorage to floor.
- .9 Provide button type rubber silencers; three per strike jamb of single doors: two per head member of double door frames.
- .10 Prepare door frames for ANSI strike, where doors to be fitted with latchsets or lockets.
- .11 Provide removable mullions where noted. Reinforce removable mullions with 3.5mm channel to prevent forcing of latching hardware.
- .12 Masonry Anchors:
 - .1 At interior frames, provide masonry anchors of 1.5mm galvanized corrugated tee anchors or 3mm diameter galvanized wire anchors - supplied loose, at rate of 3 per jamb up to 2.2m high; one additional per jamb for each 0.6m over 2.2m high. Frames for observation windows shall be provided with 2 anchors per jamb.
 - .2 At exterior frames, provide galvanized tee anchors fabricated from 3mm steel plates, installed at rate of 3 per jamb up to 2.2m high; one additional per jamb for each 0.6m over 2.2m high.
- .13 Provide two 38mm by 38mm by 4.8mm thick steel stiffening angles in the head member of frames for two or more doors totalling over 1980mm, wide. Provide necessary vertical stiffeners where required and carry to structure above. Provide stiffener angles in all exterior door jamb with sidelights and in all centre mullions between doors.
- .14 Mounting bars for sidelights shall be as detailed on the Drawings and shall be completely filled with glass fibre insulation.
- .15 Frames at STC rated doors shall be mortar filled to meet door manufacturers requirements for the STC rating.

2.3 INTERIOR SCREENS

- .1 Supply and install interior steel screens/windows where indicated on drawings. Frames for screens shall be similar to door frames and as detailed on drawings.
- .2 Provide rated frames at screens in fire rated walls. Frames to be labelled.
- .3 Steel framed windows are to be glazed as specified in Section 08 81 00.

- .4 Provide masonry anchors, as specified above, at interior screen frames; minimum 2 anchors per jamb.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Store doors and frames as specified under item 1.7, Product Handling, above.
- .2 When installing frames during cold weather, installer to coat inside of frames with a corrosion inhibiting bituminous product, prior to installation, to protect against cold weather additives in masonry grout.
- .3 Silencers, gaskets, etc., are to be installed in holes in frames prior to installation of frames; so to avoid filling these holes with grout during installation.
- .4 Keep steel surfaces free of grout, tar, other bonding materials, and sealers; clean surfaces immediately following installation.

3.2 INSTALLATION

- .1 Frame and Screen Installation
 - .1 Remove all steel spreaders, which are provided to avoid damage during shipping. Provide wood spreaders at base and midpoint of frames. Wood spreaders to be min. 38 x 89mm lumber, notched to clear frame stops; width to be equal to opening between jambs at header level. Wood spreaders to remain in place until frames are set permanently in walls.
 - .2 Set frames and screens plumb, square, aligned, without twist and at correct elevation. Maximum allowable limits of distortion shall be as follows:
 - .1 Plumbness: Not more than 1.6 mm out of plumb, measured using a line from the intersection of vertical members and the head to the floor.
 - .2 Squareness: Not more than 1.6 mm difference between diagonal measurements between corners.
 - .3 Alignment: Not more than 1.6 mm, measured on jambs, through a horizontal line parallel to the plane of the wall.
 - .4 Twist: Not more than 1.6 mm, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall.
 - .3 At masonry walls, build in frames using the corrugated or wire masonry anchors. Brace frames solidly in position while being built in, with wood spreaders as noted above. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
 - .4 After installation, fill countersunk screw heads flush with frame and sand smooth ready for painting. Fill exterior frames with glass fibre batt insulation. Cooperate with masonry trade to fill interior frames with mortar.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .5 Where large screens are assembled on site, they must be joined by continuously welded seams, ground smooth. Provide formed covers for structural columns built into screens.

.2 Door Installation

- .1 Install hollow metal doors plumb and true.
- .2 Co-ordinate installation of hardware.
- .3 Adjust operable parts to ensure proper operation. Lubricate using a suitable lubricant compatible with door and frame coatings.
- .4 Install hollow metal panels with concealed fastenings.

3.3 TOUCH UP

- .1 Remove rust, clean and touch up any damaged galvanizing with "ZRC 221" coating.
- .2 Remove rust, clean and touch up any damaged paint with approved rust inhibitive primer.

3.4 CLEANING AND PROTECTION

- .1 Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged products. Clean installed products in accordance with manufacturer's instructions before Owner's acceptance.
- .2 Remove construction debris associated with this work from project site, and dispose of in accordance with applicable laws.
- .3 Protect installed products and finished surfaces from damage during construction.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Ultra Heavy Duty Flush Wood Interior Doors:
 - .1 NAUF particleboard core for intensive use wood doors.
 - .2 Finishing of interior wood doors.
- .2 Flush Wood Interior Fire Doors:
 - .1 Fire rated wood doors - mineral core.

1.2 RELATED WORK

- | | | |
|----|------------------------|------------------|
| .1 | Concrete Masonry Units | Section 04 22 00 |
| .2 | Wood doors in casework | Section 06 41 13 |
| .3 | Steel Doors and Frames | Section 08 11 13 |
| .4 | Door Hardware | Section 08 71 00 |
| .5 | Glass and Glazing | Section 08 81 00 |
| .6 | Painting | Section 09 92 00 |

1.3 REFERENCES

- .1 All Work to conform to minimum standard for Premium Grade Work as specified in Quality Standards for Architectural Woodwork prepared by Architectural Woodwork Manufacturers Association of Canada (AWMAC) and the Architectural Woodwork Institute (AWI).
- .2 ULC
 - .1 CAN/ULC-S104 Standard Method for Fire Tests of Door Assemblies
 - .2 CAN/ULC-S113 Standard Specification for Wood Core Doors Meeting the Performance Required by CAN/ULC-S104 for Twenty Minute Fire Rated Closure Assemblies

1.4 SUBMITTALS

- .1 Prepare and submit shop Drawings in accordance with Section 01 33 23, and show the following:
 - .1 Product data sheets for each type of door and frame
 - .2 Door and frame schedules.
 - .1 Provide columns for Stock Code Numbers for both doors and frames.
 - .3 Materials and finishes.
 - .4 Hardware preparation.
 - .5 Installation instructions and details
 - .1 Typical and special details.
 - .2 Frame anchorage details.
 - .3 Method and location of exposed fastenings.
 - .6 Storage and handling requirements
 - .7 Glazing requirements for fire rated doors
 - .8 Other pertinent information.
 - .9 Include confirmation that materials, including adhesives, do not contain added urea formaldehyde.

SECTION 08 14 00 - WOOD DOORS

- .2 Samples:
 - .1 Submit corner sample of door, 300mm x 300mm, cut away to show stile, rail, crossbanding, core, and face veneer, accompanied by written description.
 - .2 Submit veneer samples representing manufacturer's full range of available colours and finishes.
 - .1 Submit duplicate 200mm x 250 mm samples of colours selected by the Consultant, on veneer typical of grain patterns and colouration for the specified species and cut selected.
 - .3 Submit duplicate 200 x 250 mm samples of each colour of plastic laminate finish and pattern required.

1.5 PRODUCT HANDLING

- .1 Matchmark doors, panels, frames and windows with Stock Code Numbers as shown on the Door Schedule. If Stock Code Numbers are not shown on the Schedule, matchmark with Door Numbers.
- .2 Deliver, store and handle components so as to prevent damage. Store components off the ground and under cover in a dry, protected area.

1.6 WARRANTY

- .1 Provide an extended warranty of **three (3) years** from date of Substantial Performance against defects of workmanship including core ghosting, warping and delamination of veneer. Work showing defects during this period shall be repaired or replaced without cost to the Owner.
- .2 Warranty to include hanging and finishing of any replacements that may be necessary.

PART 2 - MATERIALS**2.1 PRODUCTS**

- .1 Provide premium grade, ultra-heavy duty, 5-ply, 45mm flush slab doors, NAUF/FSC, finished with plastic laminate.
 - .1 Arborite, Formica, Nevamar, Wilsonart, Lamitech, or Pionite, conforming to CAN3-A172.
 - .2 1.6mm thick, general purpose grade, Arborite "diamond" texture or equivalent.
- .2 Plastic laminate finish shall be in colour to match existing doors,. Provide fire retardant laminate at rated doors.
- .3 Typical Doors shall have particleboard core. Provide acoustic doors where noted below or indicated on schedules.
- .4 Doors, including cores, adhesives, and finishes shall be low VOC, with no added urea-formaldehyde (NAUF), and FSC Certified Wood.

- .5 Wood Doors shall be from one of the following manufacturers:
 - .1 Baillargeon Door Inc.
 - .2 JWS Manufacturing Inc.
 - .3 Lambton Doors
 - .4 Marshfield Wood Doors
 - .5 Masonite
 - .6 Mohawk Doors
 - .7 VT Industries
- .6 Provide all wood doors and frames from a single manufacturer, to ensure uniformity in quality of appearance, finish and construction.
- .7 Solid Wood Doors:
 - .1 Stiles and rails shall be bonded to core.
 - .2 Stiles: minimum 85mm wide structural composite lumber
 - .3 Rails: minimum 85mm wide structural composite lumber
 - .1 Anti-warp rail: provide central rail of 133mm wide structural composite lumber at doors wider than 914mm
 - .4 Edges: 11mm min. solid hardwood (Compatible colour edge)
 - .5 Core: NAUF/FSC solid mat formed particle board, density 513 - 577kg/m³, conforming to CSA-O188. No added urea-formaldehyde resins.
 - .6 Adhesive: Type 1, Waterproof, no urea formaldehyde, VOC < 0.683 g/L.
 - .7 Face: Plastic Laminate bonded to 2mm min. hardwood veneer Crossband, NAUF.
- .8 Acoustic Doors:
 - .1 STC 40 or better.
 - .2 Stiles: 102mm structural composite lumber
 - .3 Rails: 76mm structural composite lumber
 - .4 Edges: 24mm min. solid hardwood (Compatible colour edge)
 - .5 Cores: Sound dampening material
 - .6 Adhesive: Type 1, Waterproof, no urea formaldehyde, VOC < 0.683 g/L.
 - .7 Face: Plastic laminate bonded to 2mm min. hardwood veneer crossband
 - .8 Provide sound gaskets and drop seal.
 - .9 Provide acoustic doors at Music Room and Music Storage Room.
 - .10 Provide fire rated acoustic doors in fire separations.
 - .11 Glazing is specified in Section 08 81 00. Obtain Consultant's approval of alternate glazing if glazing is supplied with acoustic door as part of the tested acoustic/fire-rated assembly.
- .9 Fire Rated Doors:
 - .1 Provide rated doors where indicated or required, with U.L.C. or Warnock Hersey labels attached. Openings must conform to limits noted in Ontario Building Code.
 - .2 Rails: 51mm fire proof, structural composite material
 - .3 Edges: 24mm min. solid hardwood (Compatible colour edge)
 - .4 Cores: Non-combustible mineral core
 - .5 Adhesive: Type 1, Waterproof, no urea formaldehyde, VOC < 0.683 g/L.
 - .6 Face: Plastic Laminate bonded to composite crossband.
- .10 Seal top and bottom edges of all doors.

SECTION 08 14 00 - WOOD DOORS

- .11 Prepare doors for installation of glass where indicated on door schedule. Provide glazing stops of solid oak, square design. Finish stops using finishing nails - no staples. Provide U.L.C. approved custom colour metal glazing stops where required for fire rating
- .12 Manufacture doors in accordance with CSA-O132.2.
- .13 Provide rated doors where indicated or required, with U.L.C. or Warnock Hersey labels attached. Openings must conform to limits noted in Ontario Building Code.
- .14 Provide acoustic doors at music rooms, complete with perimeter sound seals and bottom drop-down seal. Coordinate with forces providing metal frames at acoustic doors, to ensure acoustic provisions are incorporated.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Fit all wood doors accurately in their frames. Doors must swing easily and close tightly without movement when latched.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Clay Unit Masonry	Section 04 21 00
.2	Concrete Unit Masonry	Section 04 22 00
.3	Insulation	Section 07 21 00
.4	Air Barriers	Section 07 27 00
.5	Sealants (other than this Section)	Section 07 92 00
.6	Door Hardware	Section 08 71 00
.7	Glazing	Section 08 81 00
.8	Window shades	Section 12 24 00

1.2 REFERENCES

- | | | |
|----|--|--|
| .1 | AAMA/WDMA/CSA 101/I.S.2/A440 | NAFS - North American Fenestration Standard/
Specification for Windows, Doors, and Skylights |
| .2 | Canadian Standards Association (CSA): | |
| .1 | CSA A440S1 | Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440,
NAFS - North American Fenestration Standard/Specification for
Windows, Doors, and Skylights |
| .2 | CAN/CSA-A44.1 | User Selection Guide to CSA Standard CAN/CSA-A440-00,
Windows |
| .3 | CAN/CSA A440.4 | Window, door and Skylight Installation |
| .4 | CAN/CSA-G40.21 | Structural Quality Steels |
| .5 | CSA-S136 | Cold Formed Steel Structural Members |
| .6 | CAN/CSA-S157 | Strength Design of Aluminum |
| .7 | CSA-W59.2 | Welded Aluminum Construction |
| .3 | Canadian General Standards Board (CGSB): | |
| .1 | CAN/CGSB-12.1 | Tempered or Laminated Safety Glass |
| .2 | CAN/CGSB-12.9 | Spandrel Glass |
| .3 | CAN/CGSB-12.20 | Structural Design of Glass for Buildings |
| .4 | CAN/CGSB-19.13 | Sealing Compound, One Component, Elastomeric Chemical
Curing |
| .5 | CAN/CGSB-19.24 | Multi-Component, Chemical Curing Sealing Compound |
| .6 | CAN/CGSB-51.10 | Mineral Fibre Board Thermal Insulation |
| .4 | ASHRAE 90.1 | Energy Standard for Buildings Except Low-Rise Residential
Buildings |
| .5 | American Architectural Manufacturers Association (AAMA): | |
| .1 | AAMA-GSM-1 | Metal Curtain Wall, Window, Store Front and Entrance Guide
Specifications Manual |
| .6 | ASTM International: | |
| .1 | ASTM-A123 | Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on
Iron and Steel Products |
| .2 | ASTM-A446 | Specification for Sheet Steel, Zinc-Coated by the Hot-Dip
Process, Structural Quality |

08 51 13 - ALUMINUM WINDOWS AND DOORS

.3	ASTM-B209	Specification for Aluminum and Aluminum-Alloy Sheet and Plate
.4	ASTM-B221	Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
.5	ASTM E119	Standard Test Methods for Fire Tests of Building Construction and Materials.
.6	ASTM E2010	Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.
.7	ASTM-E283	Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
.8	ASTM E 330	Test for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
.9	ASTM-E331	Test Method for Water Penetration Through Exterior Windows, Curtain Wall and Doors by Uniform Static Air Pressure Difference

.7 Do sealant work in accordance with Section 07 92 00 unless otherwise specified herein.

.8 Do glazing work in accordance with Section 08 81 00 unless otherwise specified herein.

1.3 WORK INCLUDED

- .1 Glazed aluminum windows include thermally broken tubular aluminum sections with self supporting framing, shop fabricated, factory prefinished, glazing, spandrel infill, related flashings, anchorage and attachment devices.
- .2 Sheet metal air/vapour barrier closures and finish closures, and aluminum angle closures at jambs.
- .3 Insulation and air/vapour barrier seals between work of this section and adjacent construction
- .4 Sealants for work of this section and between work of this section and adjacent construction
- .5 Supply and installation of finish hardware for work of this section. Installation of door hardware, supplied under Section 08 71 00.
- .6 Prefabricated expansion joint assemblies
- .7 System to permit replacement of individual glass and spandrel panels without necessitating removal of structural mullion sections
- .8 Insulated aluminum faced infill panels.
- .9 It is the intention that new windows, doors, frames, and glazing match existing in finish and colour.

1.4 DESIGN

- .1 Design and fabricate windows, brackets and anchorage devices to provide:
 - .1 Resistance to pressure differentials.
 - .2 Adequate provisions for thermal movement without thermal fractures.
 - .3 Adequate provision for live and dead loads without failure, distortion or fracture.
 - .4 For differential movement of structural live load deflection.
 - .5 Adequate support and anchorage of components taking into consideration all loading factors.
 - .6 Conformance to Rain Screen principles including:
 - .1 Provision of gaskets, baffles, overlaps and seals as required to provide a "Rain Screen" barrier effectively to deter rain water entry into the cavities of the system.
 - .2 Incorporation of air seals to effectively prevent air passage from the system into the building and vice versa.
 - .3 Air and vapour seals required to minimize airborne vapour exfiltration from the building into the system cavities.
 - .4 Openings between system cavities and the outside of sufficient cross-sections to provide pressure equalization. All such openings to be effectively drained to allow moisture entering cavity to escape.
 - .7 For long range shrinkage (creep) of concrete structure.
 - .8 A continuous air seal from the non-glass wall systems air seal to the aluminum curtain wall frame and from there to the inside glass face. These seals shall be made in such a manner that with anticipated structural and thermal movement there will be no break in the seal.
- .2 Windows are to be designed to meet the requirements of the lateral design loads as required for guards and rails as specified by the Ontario Building Code; refer to OBC Division B, section 3.4.6.6.(7). Shop drawings shall include calculations verifying that the above criteria has been met and shall bear the stamp of the Professional Engineer registered in the Province of Ontario.
- .3 Deflection of members when under full loads shall maintain adequate clearance of glass. Maximum deflection shall not be more than 1/175 of the span of any member.
- .4 Design window systems to perform as an effective air and vapour barrier.
- .5 Design windows such that glass replacement can be accomplished from the building interior.
- .6 Condensation: Not more than 25mm high across the bottom of inside pane and none on aluminum frames under conditions of - 33.3 deg. C. exterior, 22.2 degrees C interior, 30% relative humidity interior 25 m/h wind measured on lee side of building, or zero condensation with no wind.

08 51 13 - ALUMINUM WINDOWS AND DOORS

- .7 Conform to Ontario MMAH Supplementary Standard SB-10 and ASHRAE 90.1.

- .1 Conform to SB-10 table SB5.5-6, for Climate Zone 6, as follows:

<u>Fenestration Type</u>	<u>Max. U value (W/m²-K)</u>	<u>Max. SHGC</u>
Curtainwall/Storefront	U-1.987	
Entrance doors	U-3.974	0.4
Other metal-framed fenestration	U-2.555	

- .2 Conform to ASHRAE 90.1, subsection 5.4.3.2, for fenestration and doors . When tested as indicated, air leakage shall not exceed:

- .1 Storefront glazing: 0.06 cfm/ft²
- .2 Entrance doors: 1.0 cfm/ft² for glazed swinging doors
- .3 Other metal framed fenestration:
- .1 0.2 cfm/ft² when tested at a pressure of 1.57 lbs/sq.ft. in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 or NFRC 400;
- .2 or 0.3 cfm/ft² when tested at a pressure of 6.24 lbs/sq.ft. in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

- .3 Label windows and doors in accordance with ASHRAE 90.1 requirements for "Labeling of Fenestration Products" [and "Labeling of Doors"]. If the units do not have permanent labels, the Subcontractor shall provide a signed and dated certificate for the windows [and doors] listing the U-value, solar heat gain coefficient, and air leakage rate of the installed products.

- .8 Conform to AAMA/WDMA/CSA 101/I.S.2/A440 Classifications as follows:

	<u>Operating Vents</u>	<u>Fixed Sash</u>
Air tightness	A3	0.02m ³ /hr/m (0.004 cfm/ft)
Water tightness	B5	B7
Wind resistance	C4	C4

1.5 **QUALITY ASSURANCE**

- .1 Window Subcontractor must have ten years experience in the installation of aluminum windows and doors of the type specified, in installations of similar scope, and be approved by the window manufacturer for this installation.
- .2 Sherwood Windows, Old Castle Building Envelope, Windspec, Kawneer, Alumicor, Peterborough Glass, and Aerloc Industries are approved installers of their own products. All other installers must provide references for approval by Owner and Consultant prior to Contract award.

- .3 Window manufacturer to provide letter certifying that they are supplying fully assembled window units to the Subcontractor.

1.6 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit Shop Drawings in accordance with Section 01 33 23. Shop drawings shall be prepared by the window manufacturer, and shall be accompanied by a letter certifying that fully assembled windows are being supplied to the installer.
- .2 Show detailed assembly, including large scale details of members and materials, of brackets and anchorage devices and of connection and jointing details; full dimensioned layouts for positioning of brackets and anchorage devices to structures; dimensions, gauges, thicknesses; glazing details, description of materials including catalogue numbers, products and manufacturer's names; aluminum alloy and temper designations, finish specifications and all other pertinent data.
- .2 Submit certification of the U-value, solar heat gain coefficient, and air leakage rates for the windows [and doors], in accordance with ASHRAE 90.1 and as specified above. This is not required if the windows and doors will have permanent labels indicating these values; indicate on shop drawings if units will bear permanent label.
- .3 Submit test data on doors, screens and windows being proposed, prepared by an approved testing laboratory. The window unit described herein shall meet the local requirements for operating vents and fixed framing in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
- .4 Submit a written adhesion and compatibility approved from sealant manufacturer stating all materials in contact with sealants are compatible.
- .5 Submit one representative sample window concurrent with Shop Drawing submittal.
 - .1 Show frame, sash, sill, glazing and waterproofing method, insect screens, surface finish and hardware. Include 150 mm. long samples of head, jamb, sill, meeting rail, mullions to indicate profile.
- .6 Provide copies of manufacturers printed maintenance instructions in Maintenance Manuals; refer to Section 01 78 00.

1.7 **DELIVERY AND STORAGE**

- .1 Adequately protect glazing, aluminum and aluminum finishes to prevent damage thereto during fabrication, storage, shipping, handling and installation.
- .2 Deliver, handle and store units by methods approved by manufacturer. Protect from damage and staining.
- .3 Protect glass, sills and stools after installation with boards, heavy paper or other suitable protection, secured in place, to prevent staining or scratching. Do not remove protection until final cleaning.

08 51 13 - ALUMINUM WINDOWS AND DOORS**1.8 COORDINATION WITH OTHER TRADES**

- .1 Coordinate delivery and installation of windows to occur prior to installation of exterior masonry, to permit sealing of window perimeter with air/vapour barrier membrane. Refer to drawing details.
- .2 Provide protection of installed windows to prevent breaking of glass during installation of masonry, and other work.

1.9 INSPECTION AND TESTING

- .1 An independent Testing Company will be appointed by the Consultant to test windows for conformance to these specifications. Pay for testing from the Cash Allowance specified in Section 01 10 00.
- .2 Testing of two window locations with one re-test on each window is included in the Allowance. Perform any further re-tests of failed windows at no cost to Owner.
- .3 Window manufacturer shall repair or replace window units not meeting specified performance requirements and the cost of re-testing an equal quantity of windows shall be borne by the window manufacturer.

1.10 WARRANTY

- .1 Warranty the Work of this Section for a period of **five (5) years** from date of Substantial Performance, in writing. Warranty shall include all products and work to repair or replace defective units.
- .2 Provide an extended warranty to **ten (10) years** against water leakage.
- .3 In addition to the above, insulating glass units shall carry manufacturer's warranty of **ten (10) years** from date of Substantial Performance of the Work.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- .1 Aluminum windows specified below are as manufactured by Sherwood Windows Ltd. Products conforming to these specifications as manufactured by Aerloc Industries Ltd., Oldcastle Building Envelope, Kawneer Company Inc., Windspec Inc., and Alumicor Ltd. will also be accepted.
- .2 Manufacturer shall supply assembled windows to window Subcontractor.
- .3 Manufacturer of aluminum windows must be same as manufacturer of curtain wall.
- .4 The Window Subcontractor must warrant the supply and installation of all Work of this Section.

2.2 MATERIALS

- .1 Aluminum Extrusions: Extruded shapes, Aluminum Association alloy AA 6063 T54, mechanically straightened and free of marks, of size and shape specified and detailed, minimum 3mm thick.
- .2 Sheet and Plate Aluminum: AA 1100 alloy, anodizing quality.
- .3 Finish:
 - .1 Windows: Clear anodized finish, to match existing.
 - .2 Doors and frames: Clear anodized finish, to match existing.
 - .3 Insulated bands: Clear anodized finish.
- .4 Steel Sections and Plates: to CSA G40.21 Type 300W. Hot dip galvanized with minimum zinc coating of 600g/m².
- .5 Steel Reinforcing for screens: to CSA G40.20, Class H
- .6 Thermal Break: Rigid PVC or hard rubber.
- .7 Bolts, Screws, Fasteners: Hot dipped galvanized, or cadmium plated steel or 302 stainless steel.
- .8 Tempered Glass: 6.4mm clear tempered glass conforming to CAN/CGSB 12.1.
- .9 Double-Glazed Insulating Units:
 - .1 Hermetically sealed, CAN/CGSB-12.8, Low E units
 - .2 6mm clear inner pane, 13mm argon gas filled (min. 90%) space, 6mm Low E clear outer pane.
 - .1 Glazing units to be PPG Solarban 60 or AGC Energy Select 40; clear, solar control, Low E (soft/sputtered coat) exterior pane.
 - .2 Outer pane to be clear laminated glass.
 - .3 Inner pane shall be clear tempered glass.
- .10 Laminated Glass: 3 mm glass, 0.38mm lamination, 3 mm glass.
- .11 Glazing Sealant: One component silicone; Spectrum 2 by Tremco.
- .12 BES Sealant: Building Envelope System sealant HE925 BES Sealant by Henry Company; one-part, medium modulus sealant, low odor, moisture cure product, weathering resistant, for sealing of wall/window penetrations. Sealant must be fully compatible with air/vapour barrier membrane. Colour to be as selected by the Consultant.

08 51 13 - ALUMINUM WINDOWS AND DOORS

- .13 Expanding Foam Sealant:
 - .1 Semi-flexible soft, single-component polyurethane foamed-in-place sealant, to CAN/ULC-S710.1; and having the following properties:
 - .1 Core Density (ASTM D1622): 27.24 kg/m³
 - .2 Fire Resistance (ASTM E84): Flame spread = 10, Smoke Developed = 20
 - .3 Cure Time: approximately 12 hours
 - .4 Tack-free Time: 6-9 minutes
 - .2 Great Stuff Pro Window & Door Insulating Foam Sealant by Dow Chemical Canada
- .14 Setting Blocks: Neoprene 100mm long, 80A durometer.
- .15 Steel: Brake formed, galvanized sheet steel.
- .16 Glazing Tape: Vulcanized butyl tape with continuous neoprene spacer. Colour as selected by Consultant.
- .17 Insect Screens: All opening sashes to have side hinged stainless steel mesh screens with aluminum frames to match windows.
- .18 Aluminum Closures: Closures, caps, flashings, panels as detailed, from 2mm aluminum to match frame.
- .19 Insulated Aluminum Panels: Provide 50mm thick insulated aluminum panels in existing aluminum frames where glazing is indicated to be removed.
- .20 Condensation Gutters: Supply and install formed aluminum condensation gutter at sill, 110x25mm deep, where indicated on drawings.

2.3 FABRICATION

- .1 Aluminum windows shall be Sherwood Series TB-602, thermally broken windows, 45mm wide x 152mm deep, as manufactured by Sherwood Windows Limited.
- .2 Framing shall consist of closed tubular aluminum sections, reinforced as necessary, thermally broken. Open channel profiles are not acceptable.
- .3 Make profiles of framing members as shown on Drawings. All perimeter frames shall be fully closed sections, including at corners.
- .4 Operating vents:
 - .1 Opening units to be Sherwood Heavy Duty 237 Series, outward opening; top hung vents, as indicated on drawings.
 - .2 Equip each top-hung vent with 2 heavy duty extruded hinges with stainless steel pins, (3 if vent more than 750mm wide) with "Truth Scissors Arm Operator" with high pressure die cast zinc case, crank handle, and knob.

- .3 Vents located high above the floor level are to have wall mounted operators with teleflex control cables installed in conduit. Where new walls are being constructed, install conduit inside walls; coordinate with mason. Provide all window operating hardware, wall plates and mounting hardware.
- .4 Cut vent corner joint at 45 degrees and swage with 3 heavy duty reinforcing angles per corner. Screwed corners on vents will not be accepted.
- .5 Provide opening limit stops. Limit opening distance generally to 150mm; confirm with Consultant.
- .5 Doors:
 - .1 Aluminum doors shall be Sherwood Series W-2000, 50mm thick heavy duty wide stile doors.
 - .2 Supply and install aluminum doors in thermally broken aluminum frames and screens.
 - .3 Doors shall be insulated with polyurethane.
 - .4 Corner construction shall be butt joined with two hidden welds. At each corner, welds shall be of the inert gas process with maximum penetration and without heat discolouration on exposed surfaces.
 - .5 Aluminum frames and screens for aluminum doors shall be similar to window framing, and with 13mm solid aluminum bar reinforcing.
 - .6 Prepare for and install finishing hardware on aluminum doors. Provide cutouts, recesses, mortising required for finish and operating hardware. Coordinate with hardware supplier; refer to Section 08 71 00.
 - .7 Provide rails and transoms to sizes and profiles shown on drawings.
 - .8 Make provision for security devices, concealed magnetic door hardware, etc., as indicated on hardware schedule, drawings, and specifications.
- .6 Entire assembly shall be weathertight throughout.
- .7 Fabricate complete units in shop to provide minimum tolerance and hairline joints throughout.
- .8 Assemble members by stainless steel screws. All connections shall be internally sealed in factory with approved sealing compound. Exposed frame sealants are not acceptable.
- .9 Aluminum extrusions shall be designed to provide sufficient section modules to safely resist imposed loads but minimum thickness of any part of the load bearing extrusion shall be 3mm. Glazing stops may be 1.6mm. Be prepared to submit design data as requested by Consultant.
- .10 Conceal interconnecting members and fasteners in completed assembly.
- .11 Do not place manufacturer's name plates, labels or any other finished means of identification on exposed or finished parts.
- .12 Provide weep holes in tubular members to drain condensation.
- .13 Provide an extruded rigid thermal break integrated with the inner and outer aluminum extrusions to form a rigidly interconnected assembly without the use of fasteners or other thermal bridging elements.
- .14 Glass stops shall provide edge margins recommended by glass manufacturer.

08 51 13 - ALUMINUM WINDOWS AND DOORS

- .15 Paint all metal surfaces in contact with concrete or masonry, plaster, mortar or dissimilar metals with protective lacquer or bituminous coating.
- .16 Mitre and full strength vulcanize joints in weatherstripping.
- .17 Provide 3.2mm extruded aluminum sills as indicated and to suit wall conditions, complete with chair type anchoring devices at 600mm. o.c. maximum and drip deflectors at sill ends and abutting vertical surfaces.
- .18 Stools, cap flashings, closures, covers and trim shall be minimum 3mm thick aluminum, extruded or formed to profiles shown.

2.4 GLAZING

- .1 Glaze windows and doors in shop.
- .2 Clean aluminum and glass surfaces that are to receive glazing materials with an oil removing solvent and wipe dry.
- .3 Glaze windows with factory glazed wrap around vinyl glazing channels.
- .4 Place setting blocks at quarter points for each light of glass.
- .5 Comply with tape manufacturer's recommendations regarding use of spacers for certain glass sizes.
- .6 Install glass with clean cut edges, leaving spaces for expansion and contraction between edge of glass and inside of frame as recommended by glass manufacturer.
- .7 Glaze windows and doors with sealed double glazed units, as specified above.
- .8 Finish tape and glazing wedge with straight unwavering sight lines.
- .9 Conform to sealant manufacturer's written recommendations for cleaning, priming, backing and joint design to suit type and location of joint and environmental conditions. Conform to Section 07 92 00.
- .10 Apply heel of sealant at perimeter of glass. Ensure drainage space below exterior pane to weep holes in frame and install heel bead at inner pane.
- .11 Apply sealant in such a manner as to assure good adhesion to sides of joints and to completely fill voids in joint. Form surfaces of sealant smooth, concave, free from ridges, wrinkles, sags, air pockets and imbedded impurities.
- .12 Glazing shall be completely weathertight.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Confirm that existing conditions are satisfactory before commencing installation. Check structural elements and adjoining work on which this work may depend. Verify dimensions of openings and minimum clearances. Verify that openings are level and plumb.
- .2 Coordinate with forces installing air/vapour barrier system. Windows are to be installed in advance of the air/vapour barrier, which is to be sealed to the window frames. Where delivery of windows is late and air/vapour barrier has been installed first, protect unsecured pieces of the membrane that have been provided for application to window frames.
- .3 Commencement of installation will signify acceptance of existing conditions. No extras will be considered due to subsequent problems related to unsatisfactory conditions of openings and surfaces.

3.2 INSTALLATION

- .1 Provide all fastenings or anchors required to be built in under work of other Sections.
- .2 Use only concealed fastenings.
- .3 Securely install components so that they line up square in true, straight flat and/or flush planes, plumb and level, free from distortion.
- .4 Make joints neat and fine as practicable. Allow for full expansion and contraction and take into consideration climatic conditions prevailing at time of installation.
- .5 Fasten galvanized steel supports and clips with galvanized bolts and fasten aluminum members with stainless steel screws and bolts.
- .6 Ensure that corner joints of frames are weathertight.
- .7 Fill all voids between windows and rough opening with expanding foam insulating sealant.
- .8 Remove masking tape, soils and sealant which may have been deposited on surfaces near joints.
- .9 Seal all window frames to adjacent materials both sides after filling all voids with expanding foam insulation, using silicone sealant as specified above.
- .10 Provide for continuity of air/vapour barrier, which is to be sealed to the window frames.
- .11 Install metal sills straight and plumb, with uniform drainage away from building. Use maximum lengths possible. Secure sills in place with anchoring devices located at ends and at 600mm o.c.
- .12 Install drip deflectors at window sills tight to face of masonry, with self tapping stainless steel screws. File all sharp edges to smooth, rounded finish.
- .13 Install door hardware at aluminum doors, supplied under Section 08 71 00.

08 51 13 - ALUMINUM WINDOWS AND DOORS

3.3 CLEANING AND PROTECTION

- .1 After installation, remove all sealants and other misplaced materials from all surfaces, including adjacent work.
- .2 Thoroughly clean window frames, casings, and glass using materials and methods recommended by the window and glass manufacturer.
- .3 Protect installed products until completion of project.
- .4 Touch-up, repair or replace any damaged products before Consultant's review for Substantial Performance.
- .5 Immediately prior to building occupancy, when directed, inspect work and remove protective wrappings, coatings and devices and clean glass and aluminum surfaces. Use methods which will not scratch or damage glass, paint or coatings.
- .6 Perform final cleaning as per Section 01 74 00.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Note that this section includes hardware supply, installation and inspection of all finish hardware, which in total may involve more than one Subcontractor. The Contractor shall ensure in submitting his tender that specific roles and scope delineations are clear.
- .2 Supply and installation of door hardware for wood and hollow metal doors.
- .3 Supply of door hardware for exterior aluminum doors, for installation by the Aluminum Door manufacturer.
- .4 Supply of locksets for 38 mm thick doors at tall millwork units, for installation by millwork subtrade.
- .5 Supervision and inspection of door hardware installation by hardware supplier.
- .6 Supply and installation of automatic operators.
- .7 Supply and installation of all low voltage wiring required for hardware, in conduit.

1.2 RELATED SECTIONS

- | | |
|----------------------------------|------------------|
| .1 Architectural Casework | Section 06 41 13 |
| .2 Hollow Metal Doors and Frames | Section 08 11 13 |
| .3 Wood Doors | Section 08 14 00 |
| .4 Aluminum doors | Section 08 51 13 |
| .5 Door Hardware List | Section 08 71 05 |
| .6 Electrical | Division 26 |

1.3 PRODUCTS SUPPLIED BUT NOT INSTALLED IN THIS SECTION

- .1 Power supplies, compressor/control boxes, junction boxes installed by Division 26.

1.4 REFERENCE STANDARDS

- | | |
|---|---|
| .1 CAN/CGSB-69.17-M | Bored and Pre-assembled Locks and Latches |
| .2 CAN/CGSB-69.18-M/ANSI/BHMA-A156.1 | Butts & Hinges |
| .3 CAN/CGSB-69.19-M/ANSI/BHMA-A156-3 | Exit Devices |
| .4 CAN/CGSB-69.20-M/ANSI/BHMA-A156-4 | Door Controls (Closers) |
| .5 CAN/CGSB-69.29/ANSI/BHMA-A156-13 | Mortise Locks & Latches |
| .6 CAN/CGSB-69.34/ANSI/BHMA-A156.18 | Materials & Finishes |
| .7 Canadian Steel Door & Frame Manufacturers Association (CSDFMA), Canadian Metric Guide for Steel Doors & Frames (Modular Construction | |
| .8 NFPA 80-Standard for Fire Doors and Windows | |
| .9 Door and Hardware Institute: | |
| .1 Recommended locations for Architectural Hardware for Standard Steel Doors and Frames | |
| .2 Recommended locations for Architectural Hardware for Flush Wood Doors | |

SECTION 08 71 00 - DOOR HARDWARE

- .3 Sequence Format for Hardware Schedule
- .4 Key Systems and Nomenclature
- .5 Abbreviations and Symbols used in Architectural Door and Hardware Schedules and Specifications
- .6 Installation Guide for Doors and Hardware

1.5 ALLOWANCES

- .1 A cash allowance is included in the contract to cover the cost of an independent inspection and is to be expended at the Owner's discretion. Provision of this allowance shall not infer the deletion of any requirements for inspection by the hardware supplier, as specified below.
- .2 An additional allowance has been provided for rekeying locksets in entire school. Contractor shall co-ordinate this work with the selected locksmith.
- .3 Expend allowance as directed by the Consultant and in accordance with Section 01 10 00.

1.6 GENERAL REQUIREMENTS

- .1 Hardware shall comply with requirements of authorities having jurisdiction.
- .2 Hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by the Standards Council of Canada.
- .3 All door closers shall have back checking features and shall be of proper size to operate door efficiently.
- .4 Confirm kick plate and threshold sizes before ordering them.
- .5 Use no wall stops on drywall.
- .6 Exposed screws for installing hardware shall have Phillips or Robertson heads.
- .7 Rim panic device strikes shall be mortise type application. Equip panic devices with six bolts.
- .8 Confirm degree of swing for door holders, closers, etc.

1.7 SUBMITTALS

- .1 Door and Hardware List
 - .1 Submit six copies of a detailed final door hardware list prepared by a qualified Architectural Hardware Consultant.
 - .2 List all items to be furnished and delivered under this section.

- .3 Indicate door hardware proposed, identifying each item by manufacturer name, manufacturer's catalogue model number, material, function, finish, location, and other pertinent information.
- .4 The list shall be in the same format as the door hardware list bound in this project manual.
- .5 Approval of the Final Door Hardware List by the Consultant and the Owner shall not relieve the Contractor from responsibility for providing all required door hardware.
- .2 Product Data:
 - .1 Within ten (10) calendar days after award of hardware supply subcontract, submit: In a three ring binder six (6) copies of product data sheets with the finish hardware schedule showing all items of hardware to be used on the project. Identify each hardware item supplied under this section by product number, function, hand & finish. Finish hardware schedule to be in conformance of door and Hardware Institute Standards. Six (6) copies of catalogue cuts and other data required to identify individual components listed and/or to demonstrate compliance with specified requirements for all items contained in the finish hardware set. Submission of manufacturer's full line brochure is not acceptable.
- .3 Samples:
 - .1 When requested in writing, provide (to the Consultants Site Office) one sample of each hardware item complete with fasteners, within fifteen (15) calendar days of award of a purchase order. Samples to be clearly labelled with their hardware schedule designation, installation location, and manufacturers' name and model number. Samples will be returned; approved samples may be incorporated into the work.
 - .2 Substitute new samples for those rejected by the Consultant.
 - .3 Do not supply door hardware to the site until all samples are approved by the Consultant.
- .4 Templates:
 - .1 Furnish templates within ten (10) calendar days of being requested by Architect and/or door & frame manufacturer, the Contractor must submit templates for door and frame preparations and/or mounting of finish hardware items, and identify each template by label indicating applicable specification paragraph number, brand name & number, door number & hardware package number.
- .5 Keying Schedule:
 - .1 Provide three (3) copies of keying schedule for review prepared and detailed in Reference 1.5.5. Include all special keying notes and stamping instructions. Locks and cylinders are not to be ordered until the key schedule has been approved by the Owner

SECTION 08 71 00 - DOOR HARDWARE

.6 Wiring Diagrams:

- .1 Furnish a written description of the functional use of all electrical hardware. Include door and frame elevations showing the location of each item of electrical hardware to be installed, including a diagram showing number and size of all conductors. Include drawings showing all terminal connections

.7 Operations and Maintenance Data:

- .1 Prior to Substantial Performance, provide the following information for inclusion in the Maintenance manuals, in accordance with Section 01 78 00, Closeout Submittals:
 - .1 Name of hardware distributor, address and contact name
 - .2 Copy of final "as-built" finish hardware schedule
 - .3 Wiring diagrams, elevations, risers, point to point
 - .4 Copy of final keying schedule
 - .5 Copy of floor plans with keying nomenclature assigned to door numbers as per the approved keying schedule
 - .6 Maintenance instructions for each product
 - .7 Catalogue cut sheets and product specifications for each product
 - .8 Parts list for each product
 - .9 Installation instructions for each product

.8 Maintenance Materials:

- .1 Provide maintenance materials, in accordance with Section 01 78 00, Closeout Submittals.
- .2 Supply four sets of wrenches for door closers, locksets, latchsets, and exit devices.
- .3 Supply five sets of other special parts or tools required for proper maintenance and adjustment of door hardware, including those used for locks/passage/privacy, all type of door closers, and all exit devices.

1.8 QUALITY ASSURANCE

- .1 Contractor shall coordinate a hardware pre-installation meeting with hardware installer, hardware supplier and hardware sub-consultant (original hardware specifier). Payment for original hardware sub-consultant's time to attend meeting shall be paid for through the cash allowance included for inspections (except where hardware supplier is also the hardware sub-consultant). Review installation procedures with the hardware suppliers.
- .2 Supplier and installer shall hold regular review meetings (at least every second week) during the installation period. Submit minutes of meetings to the Consultant.
- .3 The Contract contains a cash allowance for independent inspection, as noted in subsection 1.5, above. Supplier and installer shall attend such inspections; costs associated with their attendance shall be included in the Contract.

- .4 Substitutes:
 - .1 Only approved products specified will be accepted. Make substitution request in accordance with Division 01. Include product data and indicate benefit to the project.
- .5 Supplier Qualifications:
 - .1 Successful hardware distributor to have a minimum of five (5) years experience in the door and hardware industry. The distributor to have on staff an Architectural Hardware Consultant (A.H.C.) who will be responsible for scheduling, detailing, ordering and co-ordination of the finishing hardware for this project. This individual shall be required for jobsite visits, as outlined below and when so requested by the Architect.
- .6 Designated Installer:
 - .1 Hardware Installers must have a minimum of five (5) years experience in installation of hardware. Provide verification of installer's qualification to Consultant for approval. All installers to attend review meetings with the Hardware Distributor.

1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Marking and Packaging:
 - .1 Mark cartons with heading number, door number, and key-set symbol where applicable in original packaging provided by the manufacturer. Pack packaged hardware in suitable wrappings and containers to protect it from damage during shipping and storage. Accessories, fastening devices and other loose items shall be enclosed with each applicable item of hardware.
- .2 Delivery:
 - .1 Deliver hardware to those who are to install it, complete with keys, templates and installation instructions together with all required screws, expansion shields, anchors, jigs and other related accessories for satisfactory attaching or installing hardware.
- .3 Storage
 - .1 Store in a clean, dry room with lockable man door and adequate shelving to permit organization so item numbers are readily visible.

1.10 WARRANTY

- .1 Provide warranties by the accepted manufacturers:

Hardware Item	Length of Warranty
Mortise Hinges	Lifetime
Locks(Sargent-Series)	3 yrs.
Locks(All other Series)	2 yrs.
Exit Devices	3 yrs.
Door closers -mechanical	30 yrs.
Door Operators - Electro mechanical	2 yrs.
Door Hold open Devices - Electro mechanical	2 yrs.

SECTION 08 71 00 - DOOR HARDWARE

Overhead stops/holders	2 yr.
Floor/Wall stops	2 yr.
Electric Strikes/Key Switches/Power Supplies	2 yr.

- .2 Where manufacturers standard warranty period exceeds these requirements, it shall prevail.
- .3 Door hardware warranties shall cover all defects in material and workmanship that become apparent during the warranty period and such defects shall be made good or the defective product shall be replaced, to the satisfaction of the Owner and at no cost to the Owner.

1.11 MAINTENANCE

- .1 Maintenance Service:
- .1 After the building is occupied arrange an appointment with the Owner's maintenance staff for instruction of proper use, servicing, adjusting and lubrication of hardware furnished. Submit to the consultant a list of attendees and meeting date.
- .2 Extra Materials:
- .1 Provide Owner with maintenance materials as specified above.

PART 2 - PRODUCTS

2.1 DOOR HARDWARE – GENERAL

- .1 The hardware supplier shall thoroughly review the door hardware list included with this project manual, the architectural door and hardware schedules, and the drawings prior to preparing the final door hardware list.
- .2 The base bid shall be based on the manufacturers and products specified and listed in the attached Door Hardware List; no alternates.
- .3 Use one manufacturer's products only for similar items.
- .4 Ensure that the hardware specified is suitable in both dimension and function for the intended purpose and complies with building code requirements. Advise the Consultant of discrepancies or omissions.

2.2 MANUFACTURERS

- .1 Manufacturers listed in the Door Hardware List are as follows:

ABBREVIATION	MANUFACTURER NAME
CBH	Canadian Builders Hardware Mfg. Inc.
GJ	Glvnn-Johnson. Allegion Canada Inc.
IVES	Ives. Allegion Canada Inc.
KNC	K.N. Crowder Mfg. Inc.

LCN	LCN Door Closers. Allegion Canada Inc.
SARGENT	Schlage Locksets. Cylinders.
VON-DUPRIN	Von Duprin. Allegion Canada Inc.
ZERO	Zero International Inc. Allegion Canada Inc.

2.1 MATERIALS

.1 Screws and Fasteners:

- .1 Match screw finish to their product and be the manufacturer's standard. Door closers, door holders and exit devices installed on fire rated wood doors and hollow metal doors shall be attached with sex nuts and bolts.

.2 Materials and acceptable Manufacturers shall be as listed below. Supply all products in a given category from the same manufacturer.

.3 Mortise Hinges:

- .1 Provide five knuckle bearing hinges with NRP option on reverse bevel doors with locking hardware. Hinge width to accommodate door closer projection, door trim and allow for 180-degree swing. Doors up to 2286mm in height, supply 3 hinges, doors greater than 2286mm in height add one hinge for every additional 760mm of door height. Doors 915mm wide and less furnish 114 mm high hinges, doors greater than 915mm wide furnish 127mm high hinges, heavy weight or standard weight as specified.

- .1 As Specified: Ives Hinges, 5BB1, 5BB1HW

.4 Continuous Hinges:

- .1 Continuous hinges to be Ives heavy duty edge mount continuous gear type aluminum hinges. Ives aluminum hinges tested and approved to UL 10C (90 minutes). Material 6063-T6 aluminum, clear satin finish (628). Aluminum geared hinges certified to ANSI 156.26 Grade 1. Hinge length to suit door height. Hinge length 25mm (1") less door height.

- .1 Supply as Specified: Ives 112XY series

.5 Locksets/Deadlocks/Privacy Sets:

.1 Cylindrical-Lever:

- .1 Standard duty commercial exterior and interior cUL listed for functions up to 3-hour doors. Grade 2 lever sets to have through bolts to prevent chassis rotation with internal components and chassis constructed of cold rolled steel with zinc dichromate plating to resist corrosion.

- .1 Supply as Specified: Sargent "7 Line" series

SECTION 08 71 00 - DOOR HARDWARE

- .2 Cylindrical:
 - .1 Extra heavy duty residential, commercial, institutional and industrial applications. Latch bolts to be steel with minimum ½" throw deadlocking on keyed and exterior functions. ¾" throw anti-friction latchbolt on pairs of fire doors. Provide manufacturer's standard wrought box strike for each latch or lock, with curved lip extended to protect frame.
 - .1 Supply as Specified: Sargent "10 Line" series
- .3 Strike Plates:
 - .1 Provide lockset and latchset strike plates with lip centre dimensions sized to minimally clear trim. Where strike lip extends beyond the projection of the casing or other trim, provide curved lip strikes. Strike plates applied to inactive leaf of paired openings to have flat lip sized to fit flush with the face of the door skin.
- .6 **Exit Devices/Device Trims/Mullions:**
 - .1 Heavy Duty:
 - .1 Exit device to be cUL listed for panic hardware and fire exit hardware. Supply panic hardware and fire exit devices featuring coil compression springs on device mechanism subassemblies and dead latching mechanisms for active latch bolts. Supply exit devices with smooth mechanism case and "the quiet one" fluid dampener to eliminate noise associated with exit device operations. Non-handed device with touchpad assemblies with no exposed fasteners and cast end caps, reinforced aluminum with stainless steel touchpad and raised edge to minimize pinching. Roller strikes to be standard on rim and surface vertical rod devices, mortise exit devices (626) complete with strikes that match the same finish as the device. Doors greater than 950mm wide supply long bar exit devices, doors greater than 2134mm high supply extension rods for surface vertical rod series. 1,000,000cycle testing independently certified by ETL.
 - .1 Supply as Specified: Von Duprin 98 series
 - .2 Exit Device Trim:
 - .1 Supply device trim featuring recessed cylinder mounting and coil compression spring design with shear pin protection for lever designs. Similar lever designs for exits as specified for locksets.
 - .1 Supply as Specified Von Duprin 996 series
- .7 **Door Closers:**
 - .1 Door closers to have the following features (see separate closer sections below for further information):
 - .1 Fully hydraulic, rack and pinion action with high strength cast iron cylinders and one piece forged steel pistons.
 - .2 Include high efficiency, low friction pinion bearings.

- .3 Hydraulic fluid of a type requires no seasonal adjustments, ULTRA X TM fluid has constant temperature control from -35° C to +49°C.
 - .4 Hydraulic regulation controlled by tamper-proof, non-critical screw valves, adjustable with a hex wrench.
 - .5 Separate adjustments for backcheck, general speed and latch speed.
 - .6 Door closers with special template (ST-) numbers include required associated product, information sheets and instructions
 - .7 Size 1 manual door closers to provide less than 5 pounds opening force on a 900mm door leaf.
 - .8 Door closer with Pressure Relief Valves are not accepted.
 - .9 Door closer bodies, arms, covers to be powder coated
 - .10 Closers with powder coat finishes to exceed a minimum 100-hour salt spray test, as described in ANSI A156.18 and ASTM B117.
 - .11 Closers detailed with plated finishes to include plated covers (or finish plates), arms and visible fasteners.
- .2 Heavy Duty Mechanical (Top Jamb Mount):
- .1 Non-sized (1-5) and handed cylinder body to have 1 1/2" piston diameter with 11/16" double heat-treated shaft and certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory. Track closers sized 1,3 or 4. Closers to have forged steel main arm. Optional arms to be interchangeable within the series of closers.
- .1 Supply as Specified: LCN 4020 series
- .3 Heavy Duty Mechanical (Multiple Applications):
- .1 Non-sized (1-6) and non-handed cast iron cylinder body to have 1 1/2" piston diameter with 11/16" journal double heat-treated pinion shaft with 5/8" full complement bearings and certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory. Closer to have "FAST" Power Adjust speed dial to show spring size power. Track closers non-sized 1-4. Closers to have stamped main arm and forearm (forged steel main arm and forearm EDA and CUSH type arms). Optional arms to be interchangeable within the series of closers.
- .1 Supply as Specified: LCN 4040 series
- .4 Heavy Duty Mechanical (Multiple Applications):
- .1 Non-sized (1-6) and non-handed cast iron cylinder body to have 1 1/2" piston diameter with 3/4" journal double heat-treated pinion shaft with 5/8" full complement bearings. XP closer hydraulic regulation controlled by tamper-proof, non critical screw valves, abrasion resistant Vitron "O" ring, adjustable with a hex wrench. Closer to have "FAST" Power Adjust speed dial to show spring size power. Track closers non-sized 1-4. Closers to have forged steel main arm and forearm (forged steel main arm and forearm EDA and CUSH type arms). Optional arms to be interchangeable within the series of closers.
- .1 Supply as Specified: LCN 4040XP series

SECTION 08 71 00 - DOOR HARDWARE

- .2 NOTE: LOW ENERGY OPERATORS SUPPLIED AND INSTALLED BY THIS SECTION
- .5 Heavy Duty Electric Operator:
 - .1 Provide low energy automatic operator units that are electro-mechanical design. Powered by DC motor working through reduction gears. Spring force closing. Motor is off when door is in closing mode. Door can be manually operated with power on or off without damage to operator. Provide variable adjustments, including opening and closing speed adjustment. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface with accessories, mats, and sensors. Provide full length aluminum header, drop plates, angle brackets, or adapters for arms to suit details. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings, consult with owner.
 - .1 Supply as Specified: LCN 9542, series c/w rocker switch 8310-806R
- .8 **Actuators:**
 - .1 Wall Type:
 - .1 Wall plate switch to be hard-wired actuator with round, stainless steel touch plate 6" diameters. Engraved blue filled handicap symbol conforms to most accessibility codes. Units to include heavy grade components for vandal resistant mounting and weather resistant switch standard.
 - .1 Supply as specified: LCN 8310-852 (6"), 8310-876 (6") escutcheon
 - .2 Supply as specified: Camden mullion mounted actuator
- .9 **Overhead Door Stops/Holders:**
 - .1 Heavy Duty Surface Mounted:
 - .1 Surface overhead stops/holders to be stainless steel base, non-handed for single-acting doors with a heavy-duty channel/slide-arm design and offset jamb bracket to allow for simple field modifications of functions. Channel to be surface mounted to the door with thru bolts and the jamb bracket is surface mounted to the frame soffit.
 - .1 Supply as Specified: Glynn-Johnson 900 series
 - .2 Heavy Duty Concealed Mounting:
 - .1 Concealed overhead stops/holders to be stainless steel base, non-handed for single or double-acting doors with a low-profile channel, mortised in the door and jamb bracket is mortised in the doorframe. Unit to be fully concealed when door is in the closed position. Units to be field adjustable for function changes if required.
 - .1 Supply as Specified: Glynn-Johnson 100 series

.10 **Door Pulls/Flatware/Coat Hooks:**

- .1 Door Pulls are to be 19mm, 25.4 mm diameter
- .2 Flatware to be of stainless steel material, .050 gauge.
 - .1 Supply as Specified: CBH 7008-1, (Door Pull) mounting as indicated in the hardware sets.
 - .2 CBH 903 T304 SMS Mounting (Kickplates 40mm less door width single door and 25mm less door width double doors)

.11 **Floor/Wall Stops:**

- .1 Wall Stops (No Button on Locking Hardware):
 - .1 Wall stops to be constructed of stainless steel base with special retainer cup that makes the rubber stop tamper resistant. Convex design of rubber bumper.
 - .1 Supply as Specified: Ives WS406/407CVX
- .2 Wall Stops (Projecting Button on Locking Hardware):
 - .1 Wall stops to be constructed of stainless steel base with special retainer cup that makes the rubber stop tamper resistant. Concave rubber bumper to avoid damage to locks with projecting buttons.
 - .1 Supply as Specified: Ives WS406/407CCV

.12 **Weather/Smoke/Sound Seals:**

- .1 Supply as Specified:
 - .1 KN Crowder W-20N (head seal)
 - .1 Note: Mount head seal prior to soffit mounted hardware.
 - .2 KN Crowder W-16N (jamb seal, head/jamb seal))
 - .3 KN Crowder W-22 (head/jamb seal)

.13 **Thresholds/Weatherstrip/Door Sweeps:**

- .1 Supply as Specified:
 - .1 KN Crowder W-24S (Door Sweep)
 - .2 KN Crowder CT-45 (Threshold)
 - .3 KN Crowder CT-10 (Threshold)

2.2 **FINISHES**

- .1 Finishes are specified as follows:

BHMA CODE	Nearest Canadian Equivalent	Nearest Former U.S. Equivalent	DESCRIPTION
652	C26D	US26D	Satin Chrome Plated (Steel)
626	C26D	US26D	Satin Chromium Plated (Brass Bronze)
628	C28	US28	Satin Aluminum. Clear Anodized

SECTION 08 71 00 - DOOR HARDWARE

630	C32D	US32D	Satin Stainless Steel
689	SB. AL	----	Aluminum. Painted
B	----	----	Brush
NEO	----	----	Neoprene
P	----	----	Pile
V	----	----	Vinyl
S	----	----	Silicone

2.1 FASTENINGS

- .1 Supply screws, bolts, expansion shields and other fastening devices required for the satisfactory installation and operation of hardware, and as recommended by the hardware manufacturers for long life under hard use.
- .2 Exposed screws for installing hardware shall have Phillips or Robertson heads.
- .3 Exposed fastening devices shall match the finish and material of hardware.
- .4 Where a pull is scheduled on one side of a door and a push plate on the other side, supply fastening devices, and install so the pull can be secured through the door from the reverse side. Install the push plate to cover fasteners.
- .5 Where a pull is scheduled on one side of a door and a push plate on the other side, supply fastening devices, and install so the pull can be secured through the door from the reverse side. Install the push plate to cover fasteners.
- .6 Use fasteners compatible with material through which they pass.
- .7 Install door closers with through-bolt mounting.

2.2 CYLINDERS, KEYING SYSTEMS

- .1 Provide cylinders in "LA" keyway, final pinning/keying/supply of cut keys for cylinders to existing owner preferred locksmith's master key system by allowance, see Division 1.

PART 3 - EXECUTION**3.1 EXAMINATION**

- .1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.
- .2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.
- .3 Submit in writing a list of deficiencies determined as part of inspection required in 3.1.1 and 3.12 to supervising consultant prior to installation of finished hardware.

3.2 INSTALLATION INSTRUCTIONS

- .1 Furnish door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware. Advise door and frame manufacturers to be aware that strike heights as listed in the table below are required for this project.
- .2 Supplier shall furnish manufacturers' instructions for proper installation of each hardware component.

3.3 INSTALLATION / EXAMINATION

- .1 Conduct a pre-installation meeting to review installation procedures with the Contractor's Designated Installers. Hold instruction meetings with installers prior to installation and subsequent review meetings during the installation period. Submit minutes of meetings to the Consultant.
- .2 Install power door operators, complete with hook-up to power rough-in, low voltage control wiring with conduit, and exit device release, in accordance with the manufacturers' recommended installer.
- .3 Power door operators to be installed by hardware supplier. Supply and install all low voltage control wiring to push button locations, exit device release. 102mm x 102mm (4" x 4") back boxes and all conduit to be completed by Division 26 (Electrical Contractor.)
- .4 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.
- .5 Ensure that door frames and finished floor are plumb and level to permit proper engagement and operation of hardware.
- .6 Submit in writing a list of deficiencies determined as part of inspection prior to hardware installation to supervising consultant. Correct door frame installation before proceeding with finish hardware installation.
- .7 Architectural Hardware Consultant:
 - .1 The hardware supplier shall have in its employ an Architectural Hardware Consultant who is a current member of the Door and Hardware Institute, and who shall be made available for consultation during the course of construction at no additional cost to the Owner.
 - .2 The Architectural Hardware Consultant shall supervise hardware installation, provide assistance to the Hardware Installer, and carry out inspection and provide written certification of the finished door hardware installation.
 - .3 Allow for a minimum of three inspections during the course of hardware installation and one final inspection.
 - .4 Ten percent (10%) of this subtrade's contract will be considered as fair value for supervision and inspection with regard to progress certificates.

SECTION 08 71 00 - DOOR HARDWARE

- .8 Locate and mount hardware at standard location dimensions in accordance with CSDFMA, Canadian Metric Guide for Steel Doors and Frames (Modular Construction), and as indicated in the following table:

<u>Hardware Item</u>	<u>Dimension above Finished Floor</u>
LOCKSET or LATCHSET	1024mm to Centreline of Strike
DEADLOCK	1200mm to Centreline of Cylinder
EXIT DEVICE	950mm to Centreline of Strike
PUSH PLATE/DOOR PULLS	1060mm to Centreline of Plate or Pull

- .1 The Hardware Installer shall carefully check manufacturer's installation instructions supplied with hardware products for conflicts with the above noted dimensions.
- .2 The Hardware Installer shall use manual or "Yankee" screw drivers to turn screws into pre-drilled pilot holes for installation of hinges on mineral core fire protection rated doors. Please note that other methods of installation may void the door manufacturer's warranty.
- .3 The recommended mounting heights shall be considered a general guide unless conditions such as intermediate rails and lines of glass dictate otherwise.
- .4 Locate door stops to contact doors 75mm from latch edge.
- .5 Install hardware and trim square and plumb to doors.
- .6 Install mullion stabilizers at centre mullions at double doors and intermediate mullions on multiple door arrangements.
- .7 Supply locksets to millwork subcontractor for wood doors where such doors are a part of millwork units. Keying shall be in accordance with the building keying system for doors.
- .8 Supply hardware for exterior aluminum door to aluminum window and door manufacturer for installation.

3.2 FIELD QUALITY CONTROL

- .1 Verify each door leaf opens closes and latches. Inspect fire rated openings to ensure they are installed in compliance with NFPA 80 requirements. Test access control system and electrified hardware devices for proper operation, owner to sign off on verification of operation. Verify electric door release hardware operates properly upon activation of the fire alarm system.
- .2 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.
- .3 Third Party Inspection:
- .1 After all hardware has been installed, arrange for inspection by the original hardware consultant, Allegion Canada Inc., Mississauga, Ontario.

- .2 Upon completion of inspection, submit a certificate to the architect stating that final inspection has been made and that hardware has been checked for installation and operation by a technician from the manufacturer and hardware consultant, that any identified issues have been addressed, and that hardware installation has been approved.
- .3 Third party inspection shall be paid for through the Cash Allowance included in the Contract; which shall also include review of hardware submittals, a final inspection, one follow up inspection and a written report of each inspection. The Contractor will be invoiced by Allegion Canada Inc.

3.3 ADJUSTING, INSPECTION, AND CLEANING

- .1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.
- .2 Adjust doors with self-closing devices or automatic closing devices for operation after the HVAC system is balanced and adjusted. Adjust spring power of non-sized door closers to close and latch the door.
- .3 Hardware to be left clean and free of disfigurements.
- .4 Instruct owner personnel in the proper operation, adjustment and maintenance of hardware.

3.4 PROTECTION

- .1 Protect hardware from damage during construction. Wrap locks, panic hardware, fire exit hardware, door pull trim with kraft paper or plastic bubble materials to protect finish from damage until date of substantial completion. Remove and reinstall or where necessary, use temporary hardware to maintain finish in new condition and maintain manufacturer's warranty.

END OF SECTION

NOTE: PROVIDE CYLINDERS IN “LA” KEYWAY. FINAL PINNING/ KEYING/ SUPPLY OF CUT KEYS FOR CYLINDERS TO EXISTING OWNER PREFERRED LOCKSMITH’S MASTER KEY SYSTEM BY ALLOWANCE. SEE DIVISION 1.

HARDWARE GROUP NO. 01

SGL 900 X 2150 X 45 X WD X EXST X 45MIN
FOR USE ON MARK/DOOR #(S):
104A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 114X114MM	652	IVE
1	EA	CORRIDOR LOCK	10G54 LP	626	SAR
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA ST-3068 ST-2731	689	LCN
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	SMOKE SEAL	W-22 X 1@HD / 2@JMB	BLK	KNC

EXISTING OPENING - SITE VERIFY

HARDWARE GROUP NO. 02

SGL 600+/- X 2150+/- X +/-45 X UNK X UNK X NONRTD
FOR USE ON MARK/DOOR #(S):
TC-105A TC-105B TC-107 TC-114 TC-115 TC-116
TC-117

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CLASSROOM LOCK	7G37 LP	626	SAR
1			BALANCE OF HARDWARE BY MILLWORK		

NOTE: TEACHER CLOSET DOORS

HARDWARE GROUP NO. 03

SGL 960 X 2150 X 45 X WD X HMF X 45MIN
FOR USE ON MARK/DOOR #(S):
105

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 127X114MM NRP	652	IVE
1	EA	CORRIDOR LOCK	10G54 LP	626	SAR
1	EA	SURFACE CLOSER	4040XP EDA ST-3068	689	LCN
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	WALL STOP	WS406/407CCV	630	IVE

08 71 05 – DOOR HARDWARE LIST

1	EA	SMOKE SEAL	W-22 X 1@HD / 2@JMB	BLK	KNC
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HARDWARE GROUP NO. 04

SGL 960 X 2150 X 45 X HMD X HMF X NONRTD

FOR USE ON MARK/DOOR #(S):

105A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 127X114MM	652	IVE
1	EA	STOREROOM LOCK	10G04 LP	626	SAR
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	WALL STOP	WS406/407CVX	630	IVE

HARDWARE GROUP NO. 05

SGL 960 X 2150 X 45 X WD X HMF X NONRTD

FOR USE ON MARK/DOOR #(S):

105B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 127X114MM	652	IVE
1	EA	CORRIDOR LOCK	10G54 LP	626	SAR
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE GROUP NO. 06

SGL 960 X 2150 X 45 X WD X HMF X 45MIN

FOR USE ON MARK/DOOR #(S):

107

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 127X114MM	652	IVE
1	EA	CORRIDOR LOCK	10G54 LP	626	SAR
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA ST-3068 ST-2731	689	LCN
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	SMOKE SEAL	W-22 X 1@HD / 2@JMB	BLK	KNC

HARDWARE GROUP NO. 07

SGL 960 X 2150 X 45 X WD X HMF X 20MIN
FOR USE ON MARK/DOOR #(S):

114 116 117

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 127X114MM	652	IVE
1	EA	CORRIDOR LOCK	10G54 LP	626	SAR
1	EA	OH STOP	90S	630	GLY
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	SMOKE SEAL	W-22 X 1@HD / 2@JMB	BLK	KNC

NOTE: CONFIRM DOOR WIDTH, SUPPLY HINGE HEIGHT TO SUIT.

HARDWARE GROUP NO. 08

SGL 960 X 2150 X 45 X WD X HMF X 20MIN
FOR USE ON MARK/DOOR #(S):

115

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 127X114MM	652	IVE
1	EA	CORRIDOR LOCK	10G54 LP	626	SAR
1	EA	KICK PLATE	CBH 903 200 X 40MM LDW	630	CBH
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SMOKE SEAL	W-22 X 1@HD / 2@JMB	BLK	KNC

NOTE: CONFIRM DOOR WIDTH, SUPPLY HINGE HEIGHT TO SUIT.

08 71 05 – DOOR HARDWARE LIST

HARDWARE GROUP NO. 09

PR 2100 X 2150 X 45 X HMD X HMF X 45MIN
FOR USE ON MARK/DOOR #(S):

173

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 127X114MM NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	9849-L-F-06-LBL 4'	626	VON
1	EA	FIRE EXIT HARDWARE	9849-L-F-06-LBLAFL 4'	626	VON
2	EA	CYLINDER RIM	34	626	SAR
2	EA	SURFACE CLOSER	4040XP EDA ST-3068 ST-3312	689	LCN
2	EA	KICK PLATE	CBH 903 200 X 25MM LDW	630	CBH
2	EA	FIRE/LIFE WALL MAG	SEM7850 12/24/120	689	LCN
1	EA	SMOKE SEAL	W-22 X 1@HD / 2@JMB	BLK	KNC
1	EA	MEETING STILE	W-25 X DOOR HEIGHT	628	KNC
1	EA	THRESHOLD	CT-66 X OPENING WIDTH	627	KNC

THEORY OF OPERATION:

- DOORS ARE NORMALLY OPEN.
- IN THE EVENT OF FIRE ALARM OR LOSS OF POWER DOORS CLOSE AND LATCH.
- TO ENTER PRESS DOWN LEVER.
- TO EXIT PRESS EXIT DEVICE PUSH BAR.
- ONCE FIRE ALARM ENDS OR POWER IS RESTORED DOORS CAN BE RETURNED TO THE HELD OPEN POSITION.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 10

PR 2100 X 2150 X 45 X ALD X ALF X NONRTD
FOR USE ON MARK/DOOR #(S):
V02-1

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1		FIXED MULLION	BY FRAME SUPPLIER		UNK
1	EA	PANIC HARDWARE	CD-98-EO 4'	626	VON
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD 4'	626	VON
2	EA	CYLINDER MORTISE	42	626	SAR
		INVERT CAM FOR CYLINDER DOGGING			
1	EA	CYLINDER RIM	V10 ASSA	626	SAR
2	EA	DOOR PULL	CBH 7008-1 #6 MTG.	630	CBH
1	EA	OH STOP	100S	630	GLY
1	EA	OH STOP	100S ADJ (DOOR WITH ADO)	630	GLY
1	EA	SURFACE CLOSER	4021	689	LCN
1	EA	SURF. AUTO OPERATOR	9542 MS	ANCLR	LCN
1	EA	ACTUATOR, JAMB MOUNT	CM-35N/2	630	CAM
1	EA	MOUNTING PLATE	4020-18G	689	LCN
1	EA	ROCKER SWITCH	8310-806R	689	LCN
1	EA	ACTUATOR, WALL MOUNT	8310-852	630	LCN
1	EA	ESCUTCHEON	8310-876	689	LCN
2	EA	DOOR SWEEP	W-24S X DOOR WIDTH	628	KNC
2	EA	THRESHOLD	CT-10 X OPENING WIDTH	627	KNC
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			

THEORY OF OPERATION:

- DOOR IS NORMALLY CLOSED AND UNLOCKED DURING SCHOOL HOURS BY CYLINDER DOGGING.
- DOOR WILL BE LOCKED DURING NON-SCHOOL HOURS.
- EMERGENCY KEY IN CYLINDER MOMENTARILY UNLOCKS DOOR.
- TO ENTER PRESS EXTERIOR ACTUATOR OR PULL HANDLE TO OPEN DOOR.
- TO EXIT PUSH INTERIOR ACTUATOR OR PRESS EXIT DEVICE PUSH BAR TO OPEN DOOR.
- IN THE EVENT OF FIRE ALARM OR LOSS OF POWER DOOR REMAINS UNLOCKED/LOCKED.
- FREE EGRESS AT ALL TIMES.

08 71 05 – DOOR HARDWARE LIST

HARDWARE GROUP NO. 11

PR 2100 X 2150 X 45 X ALD X ALF X NONRTD
FOR USE ON MARK/DOOR #(S):
V02-2

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1		FIXED MULLION	BY FRAME SUPPLIER		UNK
2	EA	DUMMY PUSH BAR	350 4'	626	VON
2	EA	DOOR PULL	CBH 7008-1 #6 MTG.	630	CBH
1	EA	SURFACE CLOSER	4021	689	LCN
1	EA	SURF. AUTO OPERATOR	9542 MS	ANCLR	LCN
1	EA	MOUNTING PLATE	4020-18G	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-852	630	LCN
2	EA	ESCUTCHEON	8310-876	689	LCN
2	EA	WALL STOP	WS406/407CVX	630	IVE

THEORY OF OPERATION:

- DOOR IS NORMALLY CLOSED AND UNLOCKED.
- TO ENTER PRESS EXTERIOR ACTUATOR OR PULL HANDLE TO OPEN DOOR.
- TO EXIT PUSH INTERIOR ACTUATOR OR PUSH BAR TO OPEN DOOR.
- IN THE EVENT OF FIRE ALARM OR LOSS OF POWER DOOR REMAINS UNLOCKED.
- FREE EGRESS AT ALL TIMES.

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-------------------------------|------------------|
| .1 | Architectural Casework | Section 06 41 16 |
| .2 | Hollow Metal Doors and Frames | Section 08 11 13 |
| .3 | Wood Doors | Section 08 14 00 |
| .4 | Aluminum Windows and Doors | Section 08 51 13 |

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-12.1 Tempered or Laminated Safety Glass
 - .2 CAN/CGSB-12.8 Insulating Glass Units
 - .3 CAN/CGSB-12.9 Spandrel Glass
 - .4 CAN/CGSB-12.10 Glass, Light and Heat Reflecting
 - .5 CAN/CGSB-12.20 Structural Design of Glass for Buildings
- .2 Underwriter's Laboratory Canada (ULC)
 - .1 CAN4-S104 Standard Method for Fire Tests of Door Assemblies
 - .2 CAN4-S106 Standard Method for Fire Tests of Window and Glass Block Assemblies
 - .3 CAN/ULC-S101 Fire Endurance Tests of Building Construction and Materials
- .3 American Society for Testing and Materials (ASTM):
 - .1 ASTM E2190 Insulating Glass Unit Performance and Evaluation
- .4 Glass Association of North America.
 - .1 GANA Glazing Manual
 - .2 GANA Sealant Manual

1.3 QUALITY ASSURANCE

- .1 Coordinate with manufacturer of fire rated doors, frames and screens to ensure that the fire glass provided for the work is an acceptable component of their tested assemblies, and can be included as part of their labelled products.
- .2 Review drawings for fire separations and ensure fire glass is provided in all rated fire separations, including doors and screen. Inform Consultant of any discrepancies in drawings or schedules.

1.4 WARRANTY

- .1 Warranty all glass to be free from defects in workmanship and materials of any kind for a period of **ten (10) years**.
- .2 Warranty all fire rated glass to be free from defects in workmanship and materials of any kind for a period of **five (5) years**.
- .3 Replace (including removal and installation) all glass found to be defective.

08 81 00 - GLAZING**PART 2 - PRODUCTS****2.1 MATERIALS**

- .1 Tempered Glass: 6.4mm clear tempered glass conforming to CAN/CGSB 12.1.
- .2 Laminated Glass: 3 mm glass, 0.015 lamination, 3 mm glass.
- .3 Tempered Laminated Glass: 3 mm tempered glass, 0.015 lamination, 3 mm tempered glass.
- .4 Double-Glazed Insulating Units:
 - .1 Double-glazed units shall conform to the specifications for double glazed insulating units specified for aluminum windows; refer to Section 08 51 13.
- .5 Fire Rated Glass
 - .1 Fire protection rated, impact resistant, laminated clear glass ceramic; in all frames and doors where fire rated separations are required:
 - .1 "FireLite Plus" by Technical Glass Products, "Pyran Platinum L" by Schott North America, or "Keralite Select L" by Vetrotech Saint-Gobain.
 - .2 Fire rated glass must bear a permanent label acceptable to local Authorities Having Jurisdiction.
 - .3 Coordinate with manufacturer of hollow metal products to ensure the glass provided is an acceptable component in their labelled doors and frames.
- .6 Glazing accessories:
 - .1 Setting Blocks: Neoprene, 80 durometer hardness, 102mm x 6mm width to suit glass, to extend from the fixed stop to the opposite face of the glazing.
 - .2 Spacer Blocks: Neoprene, thickness to provide a minimum glass to face clearance of 3mm.
 - .3 Glazing Compounds:
 - .1 Tapes: Pre-formed polyisobutylene- butyl glazing tape with integral shim strip, 10-15 durometer hardness, paper release, black; Tremco "Polyshim" or approved equal.
 - .2 Gasket: Black neoprene "U" cavity type with lock strip.
 - .3 Sealant: One component silicone; Spectrum 2 by Tremco.
 - .4 Acoustic Sealant: Tremco Acoustical Sealant
 - .5 For fire protection rated applications, all glazing accessories at fire rated glass shall be as specified in the cUL or ULC tested assemblies for the specific glass type.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Examine framing, with glazier present, for compliance with the following:
 - .1 Manufacturing and installation tolerances, including size, squareness, offsets at corners.
 - .2 Minimum required face or edge clearances.
 - .3 Edge damage or face imperfections.
- .2 Do not proceed with glazing until unsatisfactory conditions have been corrected.
- .3 Clean frames immediately before glazing. Remove any coatings not firmly bonded to substrates.

3.2 SITE CUTTING OF GLASS

- .1 Site cutting of glass is prohibited except with the express permission of the Consultant after review of the Contractor's proposed methods.

3.3 INSTALLATION

- .1 Conform to the recommendations of the Glass Association of North America (GANA) Glazing Manual, most recent edition.
- .2 Inspect glass as installation proceeds. Discard any glass edge damage that could affect performance. Discard any glass with visible defects.
- .3 Protect edges of glass from damage during handling and installation.
- .4 Cut patterned glass so that pattern is parallel.
- .5 Set lights on setting blocks placed at quarter points. Glaze lights with glazing tape or dry gasket glazing system, channel shape to wrap completely around glass edge, or other approved means to prevent rattle.
- .6 Replace loose stops in their original positions, set all screws tight, countersink all nails.

3.4 INTERIOR GLAZING (DRY METHOD)

- .1 Glaze interior hollow metal doors and screens as follows:
 - .1 Fire-rated applications to be glazed as specified below.
 - .2 All hollow metal work to be glazed with clear laminated glass, unless noted otherwise on door schedule.
 - .3 All casework glass to be glazed with clear laminated glass.
- .2 Apply glazing tape to permanent stop; use tape of thicknesses to suit installation, projecting 1.6mm above sight line.
- .3 Place setting blocks at 1/4 points and not less than 150mm from edges of glass. Remove protective paper from tape immediately prior to placing glass. Centre glass in opening and set on setting blocks. Press glass firmly against tape.

08 81 00 - GLAZING

- .4 Apply glazing tape to perimeter of glass. Install removable stop, taking care not to displace tape. Press firmly to ensure continuous contact with glazing.
- .5 At acoustic glazing, provide acoustic sealant at full perimeter of glass at fixed stop before installing removable stop. Acoustic fire doors shall be glazed as specified for fire rated glazing.
- .6 Finish to neat appearance by trimming tape above sightline.

3.5 FIRE RATED GLAZING

- .1 Install impact resistant fire glass in all rated doors, frames, and screens.
- .2 Neither products incorporating applied safety film, nor wired glass products will be permitted; use specified products only.
- .3 Maximum area of fire rated glass shall be per the manufacturer's tested maximum area for the glass type used.
- .4 Install fire rated glass so that the appropriate rating marking remains permanently exposed.
- .5 Install fire rated glass vertically into fire rated frames. Glass and frames shall be of equivalent fire separation rating.
- .6 Installation shall be in accordance with tested assemblies; ULC or cUL, or equivalent acceptable to authorities having jurisdiction.
- .7 Apply glazing tape to stops, using tape of thickness to suit installation, flush with site lines, with stretch allowance considered.
- .8 Centre glass in opening and set on setting blocks located at quarter points of glass but no more than 150mm from corners.
- .9 Install glass, glazing tape and removable stops.

3.6 EXTERIOR GLAZING (WET/DRY METHOD)

- .1 Glaze exterior hollow metal doors and screens as follows:
 - .1 All exterior glazing shall be sealed units as specified in 2.1, above.
- .2 Apply glazing tape to fixed leg of frame accurately, cutting and butting joints at corners.
- .3 Run a bead of sealant 100mm up and 100mm along frame at corners of glass rebate, thick enough to make contact with glass, lapping tape and frame to ensure weathertight seal.

- .4 Apply setting blocks at 1/4 points and not less than 150mm from edges of glass. Remove protective paper cover from tape immediately before placing glass. Set glass in on setting blocks and press firmly in place against the glazing tape. Apply spacer shims to edges of glass maximum 600mm apart and more than 150mm from corners.
- .5 Install backer rod in voids below glass edge and apply continuous interior heel bead of sealant, making contact with glass edge and metal frame.
- .6 Install interior stop, with spacer strips or gasket between glazing and stops, 6mm below site line.
- .7 Apply sealant to fill void between glass and stops, finishing in a neat, smooth, even line, bevelled approximately 1.5mm onto glass.
- .8 Install insulating units in all exterior screens and doors.
- .9 Fire rated exterior glazing shall be double glazed with fire glass, installed in accordance with tested assemblies; use ULC assemblies or equivalent acceptable to authorities having jurisdiction.

3.7 CLEANING

- .1 As work progresses clean all glass, including fittings. Remove all setting and glazing compounds from adjacent surfaces. Remove all finger and hand prints and other soil.
- .2 Protect glass from contact with contaminating substances during construction.
- .3 Clean and wash glass by methods recommended by glass manufacturers.
- .4 All glass shall be cleaned immediately prior to the Consultant's review for Substantial Performance and again immediately prior to occupancy of the building by the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Patching and repair of existing concrete slab, to prepare for new flooring.
- .2 Levelling of concrete floors. For pricing purpose, assume 5% of renovated areas require self levelling.
- .3 Moisture Reduction Barrier:
 - .1 Note that new concrete in floor slabs is specified to have a moisture vapour reduction admixture (MVRA) in the mix. Obtain confirmation from the concrete supplier that the MVRA was added. If the MVRA is not incorporated into the concrete mix, a topical moisture reduction barrier will be required at no additional cost to the Owner.
 - .2 Provision of moisture reduction barrier, to reduce moisture vapour transmission through new sections of concrete slab which do not contain MVRA. Apply to properly prepared sound and stable concrete substrates, at least 7 days old.
 - .3 Apply moisture reduction barrier over new sections of concrete floor scheduled to receive any floor finish. Moisture reduction barrier to cover new concrete and extend over existing concrete indicated to receive new flooring, feathering to meet existing slab level at intersection with existing flooring.

1.2 RELATED WORK

- | | | |
|----|--------------------------|------------------|
| .1 | Demolition | Section 02 40 00 |
| .2 | Ceramic Tiling | Section 09 30 16 |
| .3 | Resilient Flooring | Section 09 65 00 |
| .4 | Resilient Sheet Flooring | Section 09 65 16 |
| .5 | Painting | Section 09 92 00 |

1.3 SUBMITTALS

- .1 Submit product data sheets, MSDS, and installation instructions.

1.4 STORAGE

- .1 Store materials in original containers in a dry area at normal room temperature (approximately 20°C).

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Patching Compound:
 - .1 Ardifix by Ardex Americas; two-part polyurethane repair compound

SECTION 09 01 61 - FLOORING RESTORATION

- .2 Moisture-Reduction Barrier:
 - .1 MC Rapid Moisture Control System by Ardex, one-coat; 100% solids epoxy moisture management system, for suppressing moisture vapour emissions in new or existing concrete.
- .3 Levelling Agent:
 - .1 K60 Ardite Rapid Setting Latex Smoothing and Levelling Compound by Ardex; Portland cement based, self-smoothing, trowelable, latex levelling compound.
- .4 Equivalent products as manufactured by Mapei, Laticrete, or TEC / H.B. Fuller will also be considered, subject to proof of equivalent properties and capabilities. Materials must be compatible with each other and with mortars and adhesives used for floor finishes.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Confirm environmental requirements with product manufacturer.
- .2 All moving joints and moving cracks must be continuous through entire floor system; install flexible compound designed for this purpose.
- .3 Flooring restoration and moisture barrier compounds to be "feathered" out at intersection with existing flooring to avoid raising floor level at junction between new and existing flooring.
- .4 Flooring restoration and moisture control system must be in place prior to installation of partition walls. Moisture control barrier must be continuous under new partitions and furring.

3.2 EXISTING CONDITIONS

- .1 Examine surfaces to receive the work of this Section and proceed only when conditions are satisfactory for a proper installation.
- .2 Do not apply over gypsum-based substrates or gypsum-based patching compounds.
- .3 Verify substrate is free of bond-inhibiting or bond-breaking materials such as curing compounds and dust.
- .4 Test concrete substrate using a Calcium Chloride Test (ASTM F1869) and concrete moisture probes to measure the relative humidity. Concrete substrate shall be acclimated to 23°C and 50% relative humidity prior to testing.

3.3 SURFACE PREPARATION

- .1 Substrate must be structurally sound, dry, solid and stable. Clean surface of dust, dirt, oil, grease, paint, curing compounds, concrete sealers, loosely bonded toppings, old adhesive residues (including cutback adhesive residue) and any other substances that may prevent or reduce adhesion, by mechanical methods acceptable to the Consultant and the product manufacturer. No chemical etching is permitted.

- .2 Mechanically prepare cracks as well as control, construction and expansion joints with a diamond crack-chasing/ concrete-cutting blade. Overcut the joint width to obtain a sound substrate. Use an industrial type of vacuum to completely remove the dust and contaminants. Use an appropriate attachment with a rubber seal around the suction end of the nozzle for maximum pickup of contaminants and dust.
- .3 Patch existing concrete floors with patching compound in accordance with manufacturer's printed instructions. Patch concrete before applying moisture reduction barrier.

3.4 INSTALLATION - MOISTURE REDUCTION BARRIER

- .1 If new concrete does not contain the specified moisture vapour reduction admixture (MVRA), a surface applied moisture barrier will be required at no additional cost to the Owner. Confirm with Contractor that the MRVA was incorporated into the concrete mix.
- .2 Apply over all new concrete without MVRA, to receive new floor finishes; extend 2 metres onto adjacent existing concrete floors and feather out beyond that point. Apply moisture reduction barrier in accordance with manufacturers printed instructions.
- .3 Apply using application methods and tools prescribed by the manufacturer. Allow 24 hours before re-coating.
- .4 Apply product at rate recommended by the manufacturer; assume median of application rate range is required for first application. Apply additional product as required to ensure complete coverage.
- .5 Finished application shall cover concrete floors completely, without voids or pinholes.
- .6 Allow moisture reduction barrier to cure as recommended by the manufacturer, generally for a minimum of 4 hours and a maximum of 8 hours, prior to installing smoothing and levelling compound.
- .7 Expansion and other movement joints must continue through finished floor system.

3.5 INSTALLATION - SMOOTHING / LEVELLING COMPOUND

- .1 Apply levelling coat to level floors and where required to build up concrete floors slabs to elevations as noted on the drawings or as directed by the Consultant.
- .2 Levelling coat to be used to correct substrate irregularities up to 8 mm thickness. Above 8 mm, use mortar bed method to correct irregularities.
- .3 Apply smoothing and levelling compound below floor finishes at all locations where finish material thickness varies, Feather out material from high point to low point, over a minimum distance of 1800mm.
- .4 Apply smoothing and levelling compound over moisture reduction barrier, to smooth and level floor prior to application of resilient flooring. Surface must be properly prepared, in accordance with manufacturers requirements.

SECTION 09 01 61 - FLOORING RESTORATION

- .5 Protect from excessive heat or drafty conditions during curing period.
- .6 Consult manufacturer to confirm when flooring materials may be installed. Do not apply adhesive or flooring before material is completely dry; for ARDEX K 60, cure 16-24 hours at 21°C (70°F) prior to installing finish flooring.

3.6 CLEANUP

- .1 Fresh, wet materials can be cleaned off with soapy, warm water.
- .2 Cured material must be mechanically removed from surfaces.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Structural metal stud framing	Section 05 41 00
.2	Rough Carpentry	Section 06 10 00
.3	Thermal and acoustic insulation	Section 07 21 00
.4	Vapour Barrier	Section 07 26 00
.5	Steel Doors and Frames	Section 08 11 13
.6	Gypsum Board	Section 09 29 00
.7	Acoustic tile ceilings, suspension systems	Section 09 51 00

1.2 REFERENCES

.1	CSA S136	North American Specification for the Design of Cold-Formed Steel Structural Members
.2	CAN/ULC-S101	Standard Methods of Fire Endurance Tests of Building Construction and Materials
.3	ASTM International	
.1	A641/A641M	Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
.2	A653/A653M	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.3	A792/A792M	Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
.4	A1003	Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic coated for Cold-Formed Framing Members
.5	C645	Standard Specification for Nonstructural Steel Framing Members
.6	C754	Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
.7	C841	Standard Specification for Installation of Interior Lathing and Furring
.8	C1002	Standard Specification for Steel-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster bases to Wood Studs or Steel Studs
.9	E90	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
.10	E413	Classification for Rating Sound Insulation
.11	E488	Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
.12	E1190	Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members
.4	Canadian Sheet Steel Building Institute (CSSBI) Technical Bulletins:	
.1	Volume 7, Number 1:	Maximum Height Tables for Interior Non-Loadbearing Partitions
.2	Volume 7, Number 3:	Specification of Non-Load Bearing Steel Studs
.3	Volume 7, Number 4:	Applications of Non-Load Bearing Steel Studs
.4	Volume 7, Number 8:	Non-Loadbearing Steel Stud Composite Limiting Height Calculation for Canadian Applications

09 22 16 - NON-STRUCTURAL METAL FRAMING**1.3 QUALITY ASSURANCE**

- .1 Fire-Test-Response Characteristics:
 - .1 For fire-resistance-rated assemblies that incorporate non-loadbearing interior steel framing, provide materials and construction identical to those tested in assembly indicated according to CAN/ULS-S101.
- .2 STC-Rated Assemblies:
 - .1 For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413.

1.4 DELIVERY AND STORAGE

- .1 Handle and store materials carefully to prevent damage.
- .2 Obtain approval of proposed locations for stockpiling material. Provide any necessary temporary covers, skids and the like.
- .3 Do not install damaged or deteriorated material but remove from Site.

1.5 RELATIONS WITH OTHER TRADES

- .1 Coordinate with other trades for the locations of items to be framed in and framed around, and locations of items to be wall mounted. Provide blocking at appropriate locations behind all wall mounted cabinetry, heavy millwork, washroom accessories, mirrors, equipment, service fittings, fixtures, and other surface mounted items indicated on the drawings.
- .2 Co-ordinate with mechanical and electrical trades to accommodate installation of all services and fittings prior to application of wall board or sheathing.
- .3 Co-ordinate with forces installing insulation and vapour barrier in exterior soffits.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Metal framing shall be as manufactured by Bailey Metal Products, as specified below. Equivalent products, where available, will be accepted from Steelform Group, Imperial Group, DCM Metal, or Trebor Building Products. Metal framing shall conform to ASTM C645.
- .2 Metal framing shall be fabricated from sheet steel with minimum base thickness of 0.455mm (18 mils), galvanized, and specially designed for application of impact-resistant or abuse-resistant gypsum board. Do not use standard 25 gauge framing for impact-resistant or abuse-resistant gypsum panels; where specialty framing is not available, provide framing with a minimum base thickness of 0.836 mm, (33 mils).

- .3 Metal Studs and Track:
 - .1 Fabricated from sheet steel, galvanized; depths as indicated on drawings.
 - .2 Typical studs and track shall be Bailey B18 Hard Board Stud, minimum 0.455mm (18mils) base metal thickness and 50 ksi (Grade 50) tensile strength, with min. 36.5mm (1 7/16") flange; required where abuse-resistant or impact-resistant panels, or cement board, are to be applied. Note that typical panels are abuse resistant for this project.
 - .3 Where standard gypsum panels are permitted, Bailey Platinum Plus steel framing, minimum 0.455mm (25 ga), is the minimum required for framing.
 - .4 Base thickness shall be 0.455mm and 0.836mm, as specified above.
 - .5 Conform to manufacturer's maximum height tables for steel studs. For heights in excess of height limitations for 0.455mm steel studs, use studs with base metal thickness of 0.836mm (33 mils).
 - .6 Track shall be of same base metal thickness as studs, with minimum 50mm deep flanges. Bottom track shall be single piece. Top track shall be single piece or double track, manufactured to prevent cracking of applied finishes resulting from deflection of structure above.
- .4 Metal Furring Channels:
 - .1 sheet galvanized steel channel and accessories as manufactured by Bailey Metal Products, or approved alternate; to ASTM C645.
 - .2 minimum 0.836 mm, design thickness, (20 ga) steel furring channels required at walls, and where abuse resistant or impact-resistant panels are to be applied.
 - .3 minimum 0.455mm (25 ga) required for all other furring channels.
 - .4 Hat channels shall be minimum 22mm deep, with minimum 12.7mm flanges.
 - .5 Resilient furring channels shall be designed to reduce sound transmission and shall have a minimum depth of 12.7 mm.
- .5 Carrying Channels:
 - .1 Channels shall conform to ASTM C754 and shall be cold-firmed from steel with minimum 228 MPa yield strength and 1.37 mm base steel thickness.
 - .2 Channels shall have a minimum coating of Z120 galvanizing in accordance with ASTM A653/A653M.
 - .3 Carrying channels shall have minimum 12.7mm wide flanges and minimum depth of 38mm.
- .6 Bracing and Blocking:
 - .1 Provide flat straps and backing plates of galvanized sheet steel for blocking and bracing; length and width as required.
 - .2 Minimum base steel thickness shall match studs or furring in which it is installed.
 - .3 Width of bracing shall match width of studs. Width of blocking shall be as required to sustain loading of wall mounted items.
- .7 Channel Bridging:
 - .1 Channel bridging shall have a minimum base steel thickness of 0.455mm with minimum 12.7 mm wide flanges and minimum depth of 19 mm.
- .8 Fasteners for Metal Framing:
 - .1 Fasteners to be of type, material, size, corrosion resistance, strength, and holding power, as required to fasten steel members to substrates in accordance with ASTM C1002.
- .9 Hanger wire: minimum 3.77mm (9ga) galvanized steel wire.

09 22 16 - NON-STRUCTURAL METAL FRAMING

- .10 Tie Wire: minimum 1.5mm (16 ga) galvanized, soft annealed, steel wire.
- .11 Screws: CGC Brand Screws (or approved equal) of type recommended by the board manufacturer.
- .12 Ceiling Anchors: Self drilling tie wire anchors, Phillips "Red Head" T-32 or approved equal.
- .13 Thermal Break: Permanent adhesive faced rubberized cork, 3 mm thick by width of stud on channel to be used between masonry in exterior wall and metal furring channels.
- .14 Dampproofing: 6.3mm thick closed cell polyethylene foam strip, by width of bottom track.
- .15 Acoustic sealant is specified in Section 09 29 00.
- .16 Note that where fire rated assemblies are required, the materials shall be of the types used in the fire test and listed on the tested design documentation.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Provide plumb, straight, level, rigid, and secure installation. Failing to achieve this result shall be cause for rejection and reinstallation of this work.
- .2 Where walls run parallel and under steel joists, the joists shall be framed both sides, for enclosing with gypsum board to provide sound barrier between rooms.

3.2 STEEL STUD SYSTEM (PARTITION) INSTALLATION

- .1 Conform to the guidelines for metal framing contained in The Gypsum Construction Handbook, CSA A82.31, and these specifications. The most stringent requirements shall apply.
- .2 Attach metal runners at floor and ceiling to structural elements with suitable fasteners located 50mm from each end and spaced 600 mm. o.c. with toggle or molly bolts spaced 400mm o.c.
- .3 Position studs vertically, engaging floor and ceiling runners, and spaced 400mm o.c., unless otherwise noted on drawings. When necessary, splice studs with 200mm nested lap and one positive attachment per stud flange. Place studs in direct contact with door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls install rubberized cork strip between studs and wall surfaces to provide thermal break.

- .4 Anchor studs for shelf-walls and those adjacent to door and window frames, partition intersections and corners to ceiling and floor runner flanges with an approved crimping tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bent at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.
- .5 Stiffen partitions exceeding 3m long or 2.7m high with 19mm. cold rolled channels. Fix horizontally and provide the number of rows necessary to ensure a rigid installation. Provide other partition reinforcing necessary to support wall hung components, cupboards, closets and the like. Use 2 studs at jambs of openings and corners.
- .6 Where horizontal runs of service lines are to be installed within the partition, erect studs with web openings aligned.
- .7 Provide reinforcing and necessary stiffeners to support hollow metal frames and screens. Reinforcing to be capable of supporting screens rigidly and solid without deflection.

3.3 CHASE WALL INSTALLATION

- .1 Align two parallel rows of floor and ceiling runners spaced apart as indicated. Attach to concrete slabs with concrete stub nails or power driven anchors 600 mm o.c. Attach to suspended ceilings with toggle or molly bolts 400mm o.c. Attach to wood framing with suitable fasteners 600mm o.c.
- .2 Align metal studs vertically in runners, 200mm o.c. with flanges in the same direction and with studs on opposite sides of chase directly across from each other. Anchor studs to floor and ceiling runner flanges with an approved metal crimping tool.
- .3 Cut cross bracing to be placed between rows of studs from gypsum panels, 400mm high by chase wall width. Space braces at quarter points not to exceed 600mm o.c. vertically and attach to stud webs with six 25mm screws 200mm o.c. maximum on each side.
- .4 Bracing with 64mm metal studs may be used in place of gypsum panels. Anchor web at each end of metal brace to stud web with two 10mm pan head screws. When chase wall studs are not opposite, install metal stud cross braces 400mm o.c. horizontally and securely anchor each end to a continuous horizontal 64mm runner screw-attached to chase wall studs with the cavity.
- .5 Adapt cross bracing as necessary to avoid interference with service.

3.4 WALL FURRING INSTALLATION

- .1 Direct Furring Channel Attachment
 - .1 Attach metal furring channels, vertically or horizontally spaced 400mm o.c. to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 600mm o.c. on opposite flanges.
 - .2 Nest channels 200mm at splices and anchor with two fasteners in each wing.
 - .3 Where furring channel is installed directly to exterior wall, install thermal break strip between furring channel and wall.

09 22 16 - NON-STRUCTURAL METAL FRAMING

- .4 For horizontally placed channels attach maximum 100mm from floor and ceiling.
- .2 Bracketed Furring Channel Attachment
 - .1 Attach adjustable wall furring brackets with serrated edges up, 900mm o.c. horizontally, 1200mm o.c. vertically, within 100mm of columns or other abutting construction, within 150mm of floor and ceiling, and as required above and below openings.
 - .2 Use 50mm cut nails in mortar joints of brick or clay tile or concrete block, or in field of lightweight aggregate blocks; use 16mm concrete stub nails or power driven nails or other suitable fasteners in monolithic concrete. Place fastener in top hole of bracket.
 - .3 Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double strand 16 ga. or triple strand 18 ga. wire at each junction with cold rolled channel.
- .3 Free Standing Furring:
 - .1 In locations where wall furring is indicated as self-supporting, use steel studs and furring channels installed to provide a rigid frame to receive wall board.

3.5 CEILING SUSPENSION

- .1 Do not regard grillage system indicated on drawings as exact or complete. The Specification for metal framing contained in CGC Gypsum Construction Handbook and ASTM C840 shall govern installation conditions not covered by this Specification. The more stringent specifications shall apply.
- .2 Hangers
 - .1 Install hangers for suspended wallboard ceilings to support the grillage independent of walls, columns, pipes, ducts and the like. Erect plumb and securely anchor to the structure. Submit details of proposed method to the Consultant for approval. If so requested, test hangers to prove that anchorage is adequate to support the proposed loading. Erect hangers plumb and securely anchor to structural steel or support channels fastened to structural steel (DO NOT FASTEN TO STEEL DECK).
 - .2 Space hangers at 1200mm maximum o.c. along the carrying channels and not more than 150mm from ends (or as required to conform with fire tested assemblies where applicable).
- .3 Carrying Channels
 - .1 Space channels at 1200mm maximum o.c. (or as required to conform with fire tested assemblies where applicable).
 - .2 Run channels transversely to structural framing members.
 - .3 Where splices are necessary, lap members at least 200mm and wire each end with two laps; avoid clustering or lining up splices.
 - .4 Attach to hangers by bending hanger under runner and securely wire in place with a saddle tie.

- .5 Provide 25mm clearance between channels and abutting walls and partitions.
- .4 Cross Furring
 - .1 Install drywall screw channels transversely across runner channels, joists or other supports.
 - .2 Space drywall screw channels at 600mm o.c. and not more than 150mm from perimeter walls. Provide 25mm clearance between channels and abutting walls and partitions. Use closer spacing if so noted on drawings.
 - .3 Secure drywall screw channels to each support with approved clip or attachment; splice joints by messing minimum 200mm and tying channels together with double strand 16 gauge tie wire.
 - .4 Level drywall screw channels to a maximum tolerance of 4mm over 3600mm.
 - .5 Drywall shall not be fixed directly to open web steel joists and the like. Provide cross furring as specified.
- .5 Openings
 - .1 Frame openings with suitable channels; check clearances with respective Trades. Provide support for edges of boards at all cut-outs and openings in ceilings.
 - .2 Provide all additional hangers and supports for fixtures as required.
 - .3 Provide additional hangers and framing for enclosure of radiant heating panels.
- .6 Bulkheads
 - .1 Furr out bulkheads in areas indicated and as required to conceal mechanical, electrical or other services in rooms where drywall finishes are scheduled, and elsewhere if called for on drawings.
 - .2 Use methods and materials as previously specified in this section.
- 3.6 **CONSTRUCTION OF FIRE RATED PARTITIONS**
 - .1 Where fire rated construction is required, the framing shall be governed by rating required and material used in approved assemblies.
 - .2 Provide 1 hour rated beam enclosures, where required, to ULC design.
- 3.7 **EXTERIOR SOFFITS**
 - .1 Frame all exterior soffits with 20 ga steel stud framing, anchored and braced to masonry walls and/or floor slabs.

09 22 16 - NON-STRUCTURAL METAL FRAMING

- .2 Cooperate with forces installing plywood sub-soffit, vapour barrier, insulation, and cement board at insulated soffits.
- .3 Cooperate with forces installing other work.
- .4 Coordinate with forces installing roof drains and associated piping in canopies.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Acrylic stucco finish, direct applied over sheathing at soffits.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|----------------------------------|------------------|
| .1 | Rough Carpentry | Section 06 10 00 |
| .2 | Thermal Insulation | Section 07 21 00 |
| .3 | Vapour Barrier | Section 07 26 00 |
| .4 | Joint Sealants | Section 07 92 00 |
| .5 | Framing and sheathing at soffits | Section 09 29 00 |

1.3 SUBMITTALS

- .1 Submit two (2) samples of finish coat, minimum 200 x 200mm in size, representative of texture and colour selected.

1.4 DELIVERY AND STORAGE

- .1 Handle and store materials carefully to prevent damage. Materials must be delivered to site in their original, unopened packages, clearly labelled as to contents.
- .2 Materials must be stored off the ground, in an enclosed shelter providing protection from exposure to the elements and away from direct sunlight.
- .3 All water-based materials, supplied in plastic pails, are to be kept above 4°C and below 40°C.
- .4 All dry-bagged materials shall be kept dry and protected from high humidity and moisture.
- .5 Any damaged materials shall not be used and are to be removed from site.

1.5 SITE CONDITIONS

- .1 Surface and ambient conditions for application of wet-state-materials must be kept above 4°C.
- .2 Finish coats applied in high humidity conditions will take longer than 24 hours to dry. In such conditions, provide supplemental heat to reduce the humidity, or provide protection until finish coats to dry completely.
- .3 Wet-state-materials shall not be applied in direct sunlight in temperatures exceeding 30°C without protective cover.
- .4 Protect all work from rain, snow, hail, and wind exceeding 25 km/hr for at least 24 hours after wet material application.
- .5 Do not apply materials in weather conditions which may compromise the appearance or performance of the material.

09 25 00 - ACRYLIC STUCCO FINISH**1.6 RELATIONS WITH OTHER TRADES**

- .1 Coordinate with forces installing soffit framing, sheathing, and reveals.
- .2 Coordinate with forces installing aluminum fascia assembly.
- .3 Coordinate with forces installing light fixtures in exterior soffits.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Acrylic stucco finish shall be DuRock DEFS exterior finish system, by DuRock Alfacings International Ltd., consisting of base coat, reinforcing mesh, primer and finish coat.
- .2 Base Coat: DuROCK Prep Coat NCP, non-cementitious, water-based, factory-mixed acrylic dispersion, used to pre-coat board joints, or DuRock Prep Coat Plus mixed in accordance with manufacturer's instructions.
- .3 Fibre Mesh: alkali resistant glass fibre reinforcing:
 - .1 DuROCK Fibre Mesh 4.5: nominal 153 g/m² weight, 965 mm wide by 45.7 m long rolls.
 - .2 DuROCK Fibre Mesh Tape: self-adhering, nominal 88 g/m² weight, 76 mm wide by 45.7 m long rolls.
- .4 Primer: DuROCK Base Primer; water-based, color-pigmented acrylic dispersion primer, applied by roller or brush.
- .5 Finish Coats: DuROCK Finish; water-based, colour-pigmented acrylic finish with integral texture, applied by trowel. Finish to be Sand Coat texture, in custom colour to be selected by the Consultant.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Substrate must be clean, dry, and free of cracks or loose material. Minimum ambient and surface temperatures must be above 4°C for at least 24 hours before commencement of application, and shall remain so until the finishes have dried.
- .2 Do not apply finishes in direct sunlight at temperatures exceeding 30°C. Protect from winds exceeding 25 km/hr as well as precipitation during installation and for at least 24 hours.
- .3 Mix materials in strict accordance with manufacturer's printed instructions. Ensure uniform colour and consistency is achieved.
- .4 Discard any materials which become stiff or hardened.

3.2 INSTALLATION

- .1 Provide acrylic stucco finish system over sheathing board, in accordance with manufacturer's specifications.
- .2 Apply masking and temporary protection to prevent staining of adjacent surfaces, reveals, light fixtures, columns, etc.
- .3 Apply fibre mesh tape over all joints in sheathing board.
- .4 Coat joints with base coat material. All joints to be coated before commencement of application of base coat to sheathing.
- .5 Apply base coat to sheathing board.
- .6 Embed fibre mesh into the wet base coat, with minimum coverage of 2mm wet thickness, overlapping edges of fibre mesh at least 65 mm. Render surface uniform and smooth.
- .7 Cure base coat at least 24 hours between coats, and before primer and finish are applied.
- .8 Apply primer to reinforced base coat with a roller, brush or spray equipment. Primer must dry at least 4 to 6 hours prior to finish coat application.
- .9 Apply finish coat with a stainless steel trowel, and then float with a plastic trowel to achieve the required texture, in accordance with the manufacturer's recommendations for the specific texture. The application must be continuous across each area, starting and ending at natural breaks in the surface, such as reveals, control joints, termination points, and corners.
- .10 Finish Coat shall match the approved colour and texture.
- .11 Protect DuROCK Finish until it is fully dried, and for at least 24 hours after application.
- .12 The surface shall be dry and firm to the touch before being exposed to ambient conditions.

3.3 CLEAN UP

- .1 Remove masking and temporary protection as required.
- .2 Remove all leftover materials and garbage from site.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Rough Carpentry	Section 06 10 00
.2	Thermal and acoustic insulation	Section 07 21 00
.3	Vapour Barrier	Section 07 26 00
.4	Roof sheathing board	Section 05 51 00
.5	Steel Doors and Frames	Section 08 11 13
.6	Acrylic Stucco Finish	Section 09 25 13
.7	Acoustic Ceilings	Section 09 51 00
.8	Painting	Section 09 92 00

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C1396 Standard Specification for Gypsum Board
 - .2 ASTM C840 Standard Specification for Application and Finishing of Gypsum board
 - .3 ASTM C1629 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fibre-Reinforced Cement Panels
- .2 CAN/ULC-S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials
- .3 Gypsum Association
 - .1 GA-214 Recommended Levels of Gypsum Board Finish
 - .2 GA-216 Application and Finishing of Gypsum Panel Products
- .4 The Gypsum Construction Handbook - CGC Inc.

1.3 DELIVERY AND STORAGE

- .1 Handle and store materials carefully to prevent damage. Materials must be delivered to site in their original, unopened packages.
- .2 Obtain approval of proposed locations for stockpiling material. Materials must be stored in an enclosed shelter providing protection from exposure to the elements. Provide any necessary temporary covers, skids and the like.
- .3 Store all panels flat.
- .4 Do not install damaged or deteriorated material but remove from Site.
- .5 Materials as delivered shall bear manufacturer's name, brand name of material and where applicable, ULC designation.

1.4 ENVIRONMENTAL CONDITIONS

- .1 Do not apply gypsum board or joint filler to surfaces that are damp or contain frost.

SECTION 09 29 00 - GYPSUM BOARD

- .2 During gypsum panel application and joint finishing, temperatures within work areas shall be within the range 12°C. to 25°C.
- .3 Provide adequate ventilation to carry off excess moisture.

1.5 RELATIONS WITH OTHER TRADES

- .1 Co-ordinate with mechanical and electrical Trades to ensure that all services are installed prior to application of wall board.
- .2 Coordinate with mechanical and electrical trades for locations of access panels. Install access doors and panels supplied by those trades.
- .3 Co-ordinate with rough carpentry division to ensure wood blocking is installed where required to provide backing for equipment, millwork, etc.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 All materials to conform to ASTM C1396 unless specified otherwise. Except where noted otherwise, products listed herein are produced by Canadian Gypsum Company (CGC). Equivalent products from Georgia Pacific (GP) and Certainteed will be accepted, subject to acceptance of equivalency by the Consultant.
- .2 Gypsum panels:
 - .1 Typical panels to be 16mm thick abuse resistant and mould resistant, to ASTM C1629.
 - .2 CGC Sheetrock Mold Tough Abuse Resistant Firecode Core gypsum panels or GP ToughRock Fireguard X Mold-Guard Abuse Resistant gypsum board.
- .3 Rated Gypsum panels:
 - .1 to ASTM C1629. Abuse resistant, mould resistant, Type X-Fire Rated
 - .2 CGC Sheetrock Mold Tough Abuse Resistant Firecode Core gypsum panels or GP ToughRock Fireguard X Mold-Guard Abuse-Resistant gypsum board.
 - .3 Minimum thickness to be 16mm.
- .4 High Impact Panels:
 - .1 to ASTM C1629. Impact resistant, mould resistant wallboard
 - .2 CGC "Sheetrock Mold Tough VHI Firecode Core" gypsum board, or GP DensArmor Plus Impact-Resistant interior panels.
 - .3 Minimum thickness to be 16mm.
 - .4 All framed partition walls within 3m of a floor area shall be constructed using high impact wallboard.
- .5 Shaft liner
 - .1 Mould and moisture resistant panels
 - .2 to ULC tested assembly
 - .3 CGC Sheetrock Enhanced Gypsum Liner Panels; 25mm

- .6 Tile Backer board: CGC Durock Cement Board Next Gen
- .7 Cement board: CGC Durock Cement Board Next Gen
- .8 Exterior soffit board: cement board, as specified above
- .9 Exterior Sheathing: 16 mm, Type X, CGC "Securock" glass-mat exterior sheathing, DensGlass by Georgia Pacific, or GlasRoc Sheathing by CertainTeed Gypsum Canada Inc.
- .10 Metal Studs and Channels:
 - .1 galvanized steel, as manufactured by Bailey Metal Products or approved alternate; to ASTM C645.
 - .2 minimum 0.836 mm (20 ga) steel framing required at all partitions, and where impact-resistant panels are to be applied.
 - .3 minimum 0.455mm (25 ga) required for all other framing.
- .11 Metal Furring Channels:
 - .1 sheet galvanized steel channel and accessories as manufactured by Bailey Metal Products, or approved alternate; to ASTM C645.
 - .2 minimum 0.836 mm, design thickness, (20 ga) steel framing required at walls, and where impact-resistant panels are to be applied.
 - .3 minimum 0.455mm (25 ga) required for all other framing.
- .12 Cold Rolled Carrying Channel: 38mm x 15mm zinc coated channel weighing min 0.707 kg per m.
- .13 Corner Bead and Casing Bead: 28 ga. galvanized steel with perforated flanges; one piece per location.
- .14 Control Joint: CGC No. 093.
- .15 Hanger wire: minimum 3.77mm (9ga) galvanized steel wire.
- .16 Tie Wire: minimum 1.5mm (16 ga) galvanized soft annealed steel.
- .17 Screws: CGC Brand Screws (or approved equal) of type recommended by the board manufacturer.
- .18 Thermal Break: Permanent adhesive faced rubberized cork, 3 mm thick by width of stud on channel to be used between masonry in exterior wall and metal furring channels.
- .19 Joint Treatment Material:
 - .1 Joint compound, topping compound, laminating compound; to ASTM C474 and C475.
 - .2 Use material recommended by board and tape manufacturer for the proposed use.
 - .3 CGC/Synko Setting-Type joint compound, for use with CGC joint tape.

SECTION 09 29 00 - GYPSUM BOARD

- .20 Reinforcing Tape:
 - .1 Paper or fibreglass mesh tape, as recommended by the panel manufacturer for the panel type.
- .21 Finish materials
 - .1 use level 5 finisher; CGC Sheetrock Tuff-HideT Primer-Surfacer.
- .22 Acoustic sealant: Quietseal Pro as manufactured by Quietrock, or equivalent as manufactured by CGC, Tremco or Presstite Division of Interchemical Corporation for acoustic partitions.
- .23 Acoustic Insulation: As specified in section 07 21 00.
- .24 Vapour Barrier: As specified in Section 07 26 00
- .25 Ceiling Anchors: Self drilling tie wire anchors, Phillips "Red Head" T-32 or approved equal.
- .26 Drywall Reveals: Fry Reglet reveal moulding DRM-625-75, giving 5/8" x 5/8" reveal, aluminum alloy 606 375 with chemical conversion coating.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Provide plumb, straight, level, rigid, and secure installation. Failing to achieve this result shall be cause for rejection and reinstallation of this work.
- .2 Conform to The Gypsum Construction Handbook, ASTM C840, and these specifications. The most stringent requirements shall apply.
- .3 Where walls run parallel and under steel joists, the joists shall be enclosed both sides with gypsum board to provide sound barrier between rooms. Fill with minimum 100 mm acoustic batt insulation.

3.2 CEILING SUSPENSION

- .1 Do not regard grillage system indicated on drawings as exact or complete. The Specification for metal framing contained in CGC Gypsum Construction Handbook and ASTM C840 shall govern installation conditions not covered by this Specification. The more stringent specifications shall apply.

.2 Hangers

- .1 Install hangers for suspended wallboard ceilings to support the grillage independent of walls, columns, pipes, ducts and the like. Erect plumb and securely anchor to the structure. Submit details of proposed method to the Consultant for approval. If so requested, test hangers to prove that anchorage is adequate to support the proposed loading. Erect hangers plumb and securely anchor to structural steel or support channels fastened to structural steel (DO NOT FASTEN TO STEEL DECK).
- .2 Space hangers at 1200mm maximum o.c. along the carrying channels and not more than 150mm from ends (or as required to conform with fire tested assemblies where applicable).

.3 Carrying Channels

- .1 Space channels at 1200mm maximum o.c. (or as required to conform with fire tested assemblies where applicable).
- .2 Run channels transversely to structural framing members.
- .3 Where splices are necessary, lap members at least 200mm and wire each end with two laps; avoid clustering or lining up splices.
- .4 Attach to hangers by bending hanger under runner and securely wire in place with a saddle tie.
- .5 Provide 25mm clearance between channels and abutting walls and partitions.

.4 Cross Furring

- .1 Install drywall screw channels transversely across runner channels, joists or other supports.
- .2 Space drywall screw channels at 600mm o.c. and not more than 150mm from perimeter walls. Provide 25mm clearance between channels and abutting walls and partitions. Use closer spacing if so noted on drawings.
- .3 Secure drywall screw channels to each support with approved clip or attachment; splice joints by messing minimum 200mm and tying channels together with double strand 16 gauge tie wire.
- .4 Level drywall screw channels to a maximum tolerance of 4mm over 3600mm.
- .5 Drywall shall not be fixed directly to open web steel joists and the like. Provide cross furring as specified.

SECTION 09 29 00 - GYPSUM BOARD**.5 Openings**

- .1 Frame openings with suitable channels; check clearances with respective Trades. Provide support for edges of boards at all cut-outs and openings in ceilings.
- .2 Provide all additional hangers and supports for fixtures as required.
- .3 Provide additional hangers and framing for enclosure of radiant heating panels.

.6 Bulkheads

- .1 Furr out bulkheads in areas indicated and as required to conceal mechanical, electrical or other services in rooms where drywall finishes are scheduled, and elsewhere if called for on drawings.
- .2 Use methods and materials as previously specified in this section. Drywall panels at bulkheads shall be as specified for walls.

3.3 STEEL STUD SYSTEM (PARTITION) INSTALLATION

- .1 Conform to the guidelines for metal framing contained in The Gypsum Construction Handbook, CSA A.82.31, and these specifications. The most stringent requirements shall apply.
- .2 Metal framing for partitions and wall furring shall be minimum 20 gauge.
- .3 Attach metal runners at floor and ceiling to structural elements with suitable fasteners located 50mm from each end and spaced 600 mm. o.c. with toggle or molly bolts spaced 400mm o.c.
- .4 Position studs vertically, engaging floor and ceiling runners, and spaced 400mm o.c., unless otherwise noted on drawings. When necessary, splice studs with 200mm nested lap and one positive attachment per stud flange. Place studs in direct contact with door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls install rubberized cork strip between studs and wall surfaces to provide thermal break.
- .5 Anchor studs for shelf-walls and those adjacent to door and window frames, partition intersections and corners to ceiling and floor runner flanges with an approved crimping tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bent at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.
- .6 Stiffen partitions exceeding 3m long or 2.7m high with 19mm. cold rolled channels. Fix horizontally and provide the number of rows necessary to ensure a rigid installation. Provide other partition reinforcing necessary to support wall hung components, cupboards, closets and the like. Use 2 studs at jambs of openings and corners.
- .7 Where horizontal runs of service lines are to be installed within the partition, erect studs with web openings aligned.

- .8 Provide reinforcing and necessary stiffeners to support hollow metal frames and screens. Reinforcing to be capable of supporting screens rigidly and solid without deflection.

3.4 CHASE WALL INSTALLATION

- .1 Align two parallel rows of floor and ceiling runners spaced apart as indicated. Attach to concrete slabs with concrete stub nails or power driven anchors 600 mm o.c. Attach to suspended ceilings with toggle or molly bolts 400mm o.c. Attach to wood framing with suitable fasteners 600mm o.c.
- .2 Align metal studs vertically in runners, 200mm o.c. with flanges in the same direction and with studs on opposite sides of chase directly across from each other. Anchor studs to floor and ceiling runner flanges with an approved metal crimping tool.
- .3 Cut cross bracing to be placed between rows of studs from gypsum panels, 400mm high by chase wall width. Space braces at quarter points not to exceed 600mm o.c. vertically and attach to stud webs with six 25mm screws 200mm o.c. maximum on each side.
- .4 Bracing with 64mm metal studs may be used in place of gypsum panels. Anchor web at each end of metal brace to stud web with two 10mm pan head screws. When chase wall studs are not opposite, install metal stud cross braces 400mm o.c. horizontally and securely anchor each end to a continuous horizontal 64mm runner screw-attached to chase wall studs with the cavity.
- .5 Adapt cross bracing as necessary to avoid interference with service.

3.5 WALL FURRING INSTALLATION

- .1 Metal framing for wall furring shall be minimum 20 gauge.
- .2 Direct Furring Channel Attachment - Attach metal furring channels, vertically or horizontally spaced 400mm o.c. to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 600mm o.c. on opposite flanges. Nest channels 200mm at splices and anchor with two fasteners in each wing. Where furring channel is installed directly to exterior wall, install thermal break strip between furring channel and wall. For horizontally placed channels attach maximum 100mm from floor and ceiling.
- .3 Bracketed Furring Channel Attachment
 - .1 Attach adjustable wall furring brackets with serrated edges up, 900mm o.c. horizontally, 1200mm o.c. vertically, within 100mm of columns or other abutting construction, within 150mm of floor and ceiling, and as required above and below openings. Use 50mm cut nails in mortar joints of brick or clay tile or concrete block, or in field of lightweight aggregate blocks; use 16mm concrete stub nails or power driven nails or other suitable fasteners in monolithic concrete. Place fastener in top hole of bracket.
 - .2 Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double strand 16 ga. or triple strand 18 ga. wire at each junction with cold rolled channel.

SECTION 09 29 00 - GYPSUM BOARD

- .4 Free Standing Furring - In locations where wall furring is indicated as self-supporting, use steel studs and furring channels installed to provide a rigid frame to receive wall board.

3.6 APPLICATION OF GYPSUM BOARD

- .1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.
- .2 Apply all gypsum board parallel to framing. Position all ends over studs. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together.
- .3 Stagger joints on opposite sides of partition.
- .4 Apply single, double or triple layers of gypsum board to metal furring as indicated using screw fasteners.
- .5 Maximum screw spacing for single-ply gypsum board and face ply of 2-ply gypsum board to be 300mm o.c.
- .6 Maximum spacing of screws for base-ply of 2-ply gypsum board over steel framing to be 300mm o.c. along edges of the gypsum board and 600mm o.c. into stud or furring channel in the field of the gypsum board.
- .7 Use cement board as backer board wherever tile is to be installed to walls of shower partitions.

3.7 CONSTRUCTION OF FIRE RATED PARTITIONS

- .1 Where fire rated construction is required, the thickness and number of layers of board shall be governed by rating required and material used in approved assemblies.
- .2 Provide 1 hour rated beam enclosures, where required, to ULC design.

3.8 CONSTRUCTION OF SUSPENDED AND FURRED CEILINGS

- .1 Apply gypsum panels of maximum practical length with long dimension at right angles to drywall furring channels. Position end joints over furring channel web and staggered in adjacent rows.
- .2 Closely fit together, ends and edges but not forced together.
- .3 Fasten panels to drywall furring channels with screws spaced a maximum of 300mm o.c. in field of panels and along abutting ends and edges.
- .4 Provide control joints in ceilings as noted but maximum 7500 mm o.c. each way or at change in direction.
- .5 Provide framing and drywall finish in stairwells, where required to enclose underside of stairs and landings.
- .6 Where noted on plans, provide bulkheads with steel framing and drywall finish.

3.9 WALL FURRING

- .1 Apply gypsum panels parallel to framing. Position all edges over drywall furring channels with joints staggered in successive courses.
- .2 Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together.
- .3 Fasten panels to channels with screws spaced a maximum 300mm oc.

3.10 APPLICATION OF ACCESSORIES

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Joints shall be made tight, accurately aligned and rigidly secured.
- .2 Reinforce all vertical and horizontal exterior corners with cornerbead fastened with screws 200mm O.C. on both flanges along entire length of bead.
- .3 Where assembly terminates against masonry or other dissimilar material, apply ledge trim over panel edge and fasten with screws or staples spaced 300 mm. oc.
- .4 Power drive screws at least 9mm. from edges or ends of panel to provide uniform dimple 0.8mm deep.
- .5 Where recessed reglets are noted on drawings, built into drywall assembly to provide edges flush with drywall.

3.11 TAPING AND FILLING

- .1 Finish in accordance with GA-214, as follows:
 - .1 Exposed gypsum board to Level 5 finish, suitable for finish painting with semi-gloss and gloss coatings. Use full skim coat of joint compound over entire surface to achieve smooth and uniform appearance.
 - .2 Concealed gypsum board to minimum Level 1 finish. Where a fire-resistance rating is required, finishing level must conform to ULC rated assembly design.
- .2 Finish face panel joints and internal angles with joint system consisting of self-adhering cross-fibre fibreglass joint tape and joint compound installed according to manufacturer's directions and feathered out into panel faces. Note: If self-adhering joint tape is not used, taping compound will be required.
- .3 Be sure drywall surface is dry and clean.
- .4 Centre and apply drywall tape directly over joint, pressing firmly to ensure even adherence to surface. Eliminate wrinkles by pressing entire length of tape with drywall knife. Avoid overlapping tape at intersections. Cut tape with drywall knife.

SECTION 09 29 00 - GYPSUM BOARD

- .5 Cover taped joint with a layer of setting-type joint compound, forcing compound through the tape with a drywall knife or trowel to completely fill and level the joint. Allow joint to dry, and sand lightly. Apply second coat of setting-type or drying-type joint compound, feathering approximately 50mm beyond first coat. Let dry and sand lightly as required.
- .6 To finish inside corners, bend tape with to form a "U" shape. Apply tape along one side only. Press tape into corner for approximately 30mm, then apply the other side. Work downward, alternating sides in this manner until tape is pressed firmly in place. Apply setting-type joint compound as specified above, first on one side for the length of the corner and then repeating the process on the second side.
- .7 Finish fastener heads, corner bead and trim as required with two to three coats of joint compound, feathered out onto panel faces and sanded to a smooth surface.
- .8 Provide skim coat over entire face of boards to ensure smooth surface for painting.
- .9 Fill screw head depressions to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.
- .10 Sand dried taping compound lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .11 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.
- .12 Painting shall be done in accordance with Section 09 90 00.

3.12 EXTERIOR SOFFITS

- .1 Frame all exterior soffits with 20 ga steel stud frames, anchored and braced to masonry walls and/or floor slabs.
- .2 At new exterior soffits supply and install 1 layer of 16mm cement board with 16mm extruded aluminum reveal around the entire perimeter of the soffit. Apply board to metal furring channels at 610mm o.c. with 25mm Hi-Lo screws, type S.
- .3 Stucco finish for soffits is specified in Section 09 25 00.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Substrate preparation
- .2 Grouting control joints in tiling substrate
- .3 Waterproofing membrane Crack-Isolation membrane system (CIM)
- .4 Cement mortar-bed, screed and levelling coats
- .5 Thin-Set Mortar Bond Coat
- .6 Ceramic Wall Tiling
- .7 Porcelain Floor Tiling, including base, trims and fittings
- .8 Installation Systems, adhesives, mortars and grouts
- .9 Sealing tiling movement joints and accessory contours
- .10 Sealing penetrations through walls and floors
- .11 All tiling work indicated on drawings and schedules.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-----------------------|------------------|
| .1 | Concrete | Section 03 30 00 |
| .2 | Concrete Unit Masonry | Section 04 22 00 |
| .3 | Flooring Restoration | Section 09 01 61 |
| .4 | Gypsum Board | Section 09 29 00 |
| .5 | Toilet Accessories | Section 10 28 13 |

1.3 REFERENCES

- .1 International Organization for Standardization
 - .1 ISO 13006 Ceramic tiles- Definitions, Classification, Characteristics and Marking
 - .2 ISO 23599 Assistive Products for Blind and Vision-Impaired Persons - Tactile Walking Surface Indicators
- .2 American National Standards Institute
 - .1 ANSI A108/A118/A136.1 American National Specifications for the Installation of Ceramic Tile (Compilation)
 - .2 ANSI A137.1 Specifications for Ceramic Tile
- .3 ASTM International
 - .1 ASTM C 50 Standard Specification for Portland Cement.
 - .2 ASTM C 847 Standard Specification for Metal Lath.
- .4 Canadian General Standards Board
 - .1 CAN/CGSB-75.1M Tile, Ceramic
 - .2 CGSB 71-GP-22M Adhesive, Organic, for Installation of Ceramic Wall Tile
 - .3 CGSB 71-GP-30M Adhesive, Epoxy and Modified Mortar Systems, for Installation of Quarry Tiles
- .5 Canadian Standards Association
 - .1 CAN/CSA A-3000 Cementitious Materials Compendium

SECTION 09 30 00 - CERAMIC TILING

- .6 Terrazzo, Tile and Marble Association of Canada (TTMAC):
 - .1 Specification Guide 09 30 00/ Tile Installation Manual 2012-2014
 - .2 TTMAC Hard Surface Maintenance Guide

1.4 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00 Submittal Procedures
- .2 Submit manufacturer's product data sheets on each product to be used, including:
 - .1 Storage and handling instructions
 - .2 Preparation instructions
 - .3 Installation instructions and recommendations
- .3 Submit 4 random samples of each colour of ceramic tile to be used on this project; clearly identify with manufacturer's name, colour number and project number. Do not proceed with work until samples have been approved by Consultant.
- .4 Submit pattern of control and expansion joints to Consultant, for approval.
- .5 Edging and Finishing profiles: Submit sample of each type and colour.
- .6 Install a 1200 x 1200mm mock-up panel complete with grout finish for Consultants approval to beginning of work.
- .7 Closeout Submittals:
 - .1 Submit three (3) copies of TTMAC Hard Surface Maintenance Guide, for inclusion in maintenance manuals.
 - .2 Provide document listing specific warnings of any maintenance products or practises that could possible damage the finished work.
- .8 Spare Materials: Provide 50 spare pieces of each floor tile and 3.0 x 3.0m of wall tile. Tiles shall be boxed, labelled, and stored where directed by the Owner.

1.5 PROTECTION

- .1 Protect Work of this Section against damage by other trades for minimum 72 hours after application by prohibiting passage of traffic over tile.

1.6 QUALIFICATIONS

- .1 Installer to have membership in good standing with the TTMAC; must have 10 years experience in the Work of this Section. Employ skilled mechanics trained and experienced in tile work. If requested, submit references detailing experience in at least three projects of similar scope.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials in manufacturer's unopened containers, fully identified with name, brand, type, and grade.

- .2 Protect materials from contamination, dampness, freezing, or overheating in accordance with manufacturer's instructions.
- .3 Broken, cracked, chipped, stained, or damaged tile will be rejected, whether built-in or not.
- .4 Protect mortar and grout materials against moisture, soiling, or staining.
- .5 Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- .1 Comply with manufacturer's requirements for environmental conditions before, during, and after installation.
- .2 Do not begin installation until building is completely enclosed and HVAC system is operating and maintaining temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of 2 weeks.
- .3 Maintain continuous and uniform building temperatures of not less than 12°C or more than 38°C during installation and for at least 7 days after completion of installation.
- .4 Ventilate spaces receiving tile in accordance with material manufacturer's instructions.

PART 2 - PRODUCTS

2.1 TILE MATERIALS

- .1 Floor Tile:
 - .1 Basaltina series by Centura Tile, 300 x 600mm, matt finish
 - .2 Acceptable alternate: LAB21 series by Olympia Tile.
 - .3 Allow for two colours per room.
- .2 Ceramic Base: Wall base to match floor tile, with bullnose top, 100mm high. Cut tile will not be accepted as wall base.
- .3 Ceramic Wall Tile:
 - .1 Colour & Dimensions glazed wall tile by Dal-Tile Corp.; 100mm x 600mm, bright finish.
 - .2 Provide bullnosed trim where edge of tile will be exposed in the installation.
 - .3 Allow for two colours per room.
- .4 Each type of ceramic tile must all be from the same production batch to ensure consistent colour and texture quality. Any obvious change in tile quality will result in rejection of all tile of the affected type.

SECTION 09 30 00 - CERAMIC TILING**2.2 INSTALLATION SYSTEM MATERIALS**

- .1 Installation system materials and sealers to be the products of one manufacturer, who shall warrant the system against failure.
- .2 Thin-set Mortar:
 - .1 At tile sizes over 305mm in any dimension:
 - .1 Non-slump, polymer-modified premium large format tile mortar, conforming to ANSI-A118.4 and A118.11, ISO 13077 class C2TES1P1; Ultraflex LFT by Mapei Canada Inc., Laticrete 4-XLT by Laticrete International Inc., TEC Ultimate Large Tile Mortar by H.B. Fuller Construction Products Inc., or Ardex X77 by Ardex Engineered Cements.
 - .2 At tile sizes 305 x 305mm and smaller:
 - .1 single component, polymer-modified premium tile mortar, conforming to ANSI-A118.4 and A118.11, ISO 13077 class C2ES; Ultraflex 3 by Mapei Canada Inc., Laticrete 254 Platinum by Laticrete International Inc., TEC 3in1 by H.B. Fuller Construction Products Inc., or Ardex X5 by Ardex Engineered Cements.
- .3 Dry-Set Setting Mortar:
 - .1 Premium floor and wall dry-set mortar, complying with ANSI A118.1 and ISO 13007 C1; Mapei "Kerabond", or Ardex X77 Microtec.
 - .2 For installations over young concrete.
- .4 Epoxy Grout:
 - .1 100% solids epoxy grout, water cleanable, stain resistant, Mapei Kerapoxy IEG CQ or TEC AccuColor EFX by H.B. Fuller.
 - .2 Required at all floor tile in all Vestibules.
 - .3 Colour to be selected by the Consultant.
- .5 Cementitious Grout:
 - .1 Conforming to ANSI A118.6, polymer-modified grout, "Ultracolor Plus" with "BioBlock", by Mapei Canada Inc., 1500 Sanded Grout with Microban, by Laticrete, TEC Power Grout by H.B. Fuller, or Ardex FL. Grout to be fast setting, polymer modified cementitious grout.
 - .2 With grout additives as specified below.
 - .3 Colour to be selected by the Consultant.
 - .4 Use epoxy grout at floor tile in Vestibules.
- .6 Grout Additives: To be supplied by grout supplier, Plasti-joint by Mapei or 1776 Grout Enhancer by Laticrete, or approved equal, for cementitious grout.
- .7 Wall Mastic: Conforming to ANSI-136.1 Type 1. Type 1 mastic by Mapei or Latamastic by Laticrete, or Ardex D 14.
- .8 Dry Cure Grout: L & M Dry Cure, by D.A. White & Co. Ltd., or Dry-Mix Blended by Gum-It Products Co. Ltd., or Joint Filler by H.B. Fuller or Flextile Wall Grout. Coloured acid resistant grout. Grout colour to match tile.

- .9 Levelling coat: As specified in Section 09 01 61. Confirm that levelling coat is compatible with mortar being used, and approved by the manufacturer for the specific application.
- .10 Sealants: Conform to Section 07 92 00.

2.3 ACCESSORIES

- .1 Accessory products must be compatible with all other products used in tile installation system. Confirm compatibility with product manufacturers.
- .2 Anti-Fracture Membrane:
 - .1 Laticrete two component anti-fracture membrane "Blue 92", or Mapei Mapeguard 2 with Mapei SM Primer , TEC Flex-Guard by H.B. Fuller, or Ardex 8 + 9.
- .3 Waterproofing:
 - .1 seamless, load-bearing 2 component, trowel-applied Acrylic/Cement mortar and fiber-mesh reinforcement waterproofing system, to ANSI A118.10
 - .2 Laticrete 9235 waterproofing membrane, Mapei "Mapelastic 315", or Ardex 8 + 9 with Ardex SK Mesh.
- .4 Junction Strips:
 - .1 Schluter Systems products, for junctions with other floor coverings.
 - .2 Finish: Satin finish anodized aluminum
 - .3 Profiles as follows:
 - .1 Reno-TK: Sloped transition to 6mm flooring; i.e. Tile/Carpet
 - .2 Reno-V: Sloped transition to low flooring ; i.e. Tile/VCT
 - .3 Schiene: Tile edge at surface of equal height; i.e. Tile/Sports Flooring
 - .4 Deco: Transition at tile and hard surface of equal height; ie Tile/Wood Floor
 - .5 Reno-ramp: Ramped transition at Tile/Concrete
- .5 Control Joints: Schluter Systems "Dilex-AKWS" movement joint, 6mm wide, with aluminum anchors perforated for bonding into mortar and PVC movement material forming joint surface. Colour to be selected by Consultant, to match grout as closely as possible.
- .6 Joint Sealants: Conform to Section 07 92 00.
- .7 Sealer: to CAN/CGSB-25-20, as recommended by tile manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION AND EXAMINATION

- .1 Coordinate locations and depths of any slab depressions required for the work of this section. If any discrepancies exist between the drawings and the recommended installation methods of the TTMAC, the manufacturers, or these specifications, notify the Consultant immediately, in writing.

SECTION 09 30 00 - CERAMIC TILING

- .2 Examine surfaces prepared to receive installation of tiling. If conditions are not acceptable, report to Consultant, in writing. Commencement of installation of any part of the Work of this section will be construed as acceptance of existing conditions.
- .3 Ensure concrete substrate is fully cured prior to commencing tile installation; wait a minimum of 60 days after placement of concrete floor slab.
- .4 Substrate must be structurally sound, solid, stable, level, plumb and true to a tolerance in plane of 6 mm in 3000 mm.
- .5 Substrate shall be dry, clean and free of dust, oil, grease, paint, tar, wax, curing agent, primer, sealer, form release agent or any deleterious substances which could inhibit adhesion.
- .6 Coordinate with forces performing flooring restoration work specified in Section 09 01 61. Ensure substrate surfaces are properly prepared for installation systems to be used, in accordance with material manufacturer's instructions.
- .7 Ensure compatibility of substrate materials with materials supplied under this Section.
- .8 Mechanically sand or scarify the substrate as required to completely remove all paint, adhesives, sealers, loosely bonded topping, loose particles and contaminants. Surface etching or contaminant removal by chemical means is not permitted.
- .9 Review setting out point with consultant for each location; verify patterns and edge conditions.
- .10 Verify that substrate expansion joints have been installed properly.

3.2 INSTALLATION

- .1 Regard recommendations, installation methods and materials specified and illustrated in Terrazzo, Tile and Marble Association Manual, latest issue, and applicable manufacturer's instructions as minimum acceptable standards. Provide additional work and materials as required to meet the contract specifications and the drawing details.
- .2 Lay tile to pattern indicated on drawings. Unless otherwise indicated, arrange pattern so that a full tile or joint is centred on each wall and that no tile less than ½ width is used. Do not interrupt tile pattern through openings.
- .3 Install tactile attention indicator in conformance with OBC, as follows:
 - .1 at top of the stairs, 610mm band by width of stairs, one tread width away from the edge of the top stair, and
 - .2 minimum 300mm band across leading edge of landings at doorway opening onto stairs.
- .4 Install floor tile by thin-set method, to TTMAC Detail 311F;
 - .1 use "detail A" with crack isolation membrane, generally.
 - .2 use "detail C1" over cracked existing concrete
- .5 Where existing slab on grade is chipped out to accommodate new ceramic floor tile install floor tile by mortar bed method, to TTMAC detail 310F-A.

- .6 Install tile on masonry walls by thin-set method, to TTMAC detail 303W.
- .7 Do not cover expansion and control joints in substrate with mortar or tiles.
- .8 Apply anti-fracture membrane over substrate before applying thin-set mortar.
- .9 Before commencing installation, wipe all dust from back of tile with a damp sponge.
- .10 Use tile setting method specified hereinafter. All tile must be fully bedded using suitable notched trowels to ensure full, even bedding.
- .11 Apply mortar using notched trowel, of type recommended by mortar manufacturer for specific installation. Do not spread more material than can be covered before it begins to skin over.
- .12 Set tiles before skinning occurs. Back butter each tile immediately before laying, to achieve full mortar contact.
- .13 Set tiles firmly over wet mortar; shifting tile in the direction of the mortar ridges to ensure full mortar contact. Beat in tile to flatten ridges into a continuous bed. Between 25% and 33% of the tile is to be imbedded in the mortar. Adjust tile for correct alignment.
- .14 Make joints of tiles 3mm in width. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Do not use gauges, string or plastic spacers. Make joints watertight, without voids, cracks, excess mortar, or excess grout. Provide minimum 85% mortar coverage.
- .15 Using a damp sponge, clean all joints and wipe all mortar smudges from the face of the tile before mortar hardens.
- .16 Keep expansion joints free of adhesive or grout.
- .17 Place tile snugly around piping, fixtures and other items built in or passing through tile work. Form external angles with round edge tile extending over edge of square edge adjacent tile. Internal angles shall be formed square, carrying 1 flat tile past edge of other.
- .18 Drill holes for fixing accessories of other trades.
- .19 Finish surfaces flat and level or sloped and graded as required.
- .20 Provide stringers, caps, coves, corners, angles and other moulded pieces to suit requirements of job. Ensure that striping and joints are in alignment.
- .21 Lay out borders and defined lines, wherever they occur, prior to setting of adjacent tile. Keep inner edges of borders against fields or wall panels straight.
- .22 Cut tiles to conform to irregularities in wall lines and vertical planes along outer edges. Smooth cut edges with carborundum block or by other means to provide clean straight edges.
- .23 Install wall base free of sharp corners or exposed edges. Form internal angles square and external angles bullnosed.

SECTION 09 30 00 - CERAMIC TILING

- .24 Wait at least 24 hours after tile installation before grouting. Grout joints, leave to set for 45 minutes, then rub with "scrubby" brush to break surface, make one pass with clean sponge to leave grout joint flush with tile.
- .25 Install control joints at a maximum spacing of 4m in both directions in large rooms, one direction in corridors. Conform to shop drawing showing pattern of control and expansion joints, as approved by the Consultant.
- .26 Install thresholds and edge trim at junctions with other floor finishes, at doorways, and where indicated on drawings.
- .27 Repoint joints after cleaning to eliminate imperfections. Avoid scratching tile surfaces.
- .28 Finished tile to be clean and free of tiles which are pitted, chipped, cracked or scratched.

3.3 CLEANING AND PROTECTION

- .1 Clean tile work progressively as work proceeds. Do not allow mortar to stain absorbent tile. Do not use acids for cleaning.
- .2 Seal tile in accordance with TTMAC recommendations using TTMAC certified products only.
- .3 Conform to Section 07 92 00 for Joint Sealants.
- .4 Protect finished areas from traffic until setting materials have cured. Protect grouted areas from foot traffic for 72 hours after completion of grouting.
- .5 Provide protective covering in traffic areas until building is ready for occupancy.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|----------------------|------------------|
| .1 | Gypsum Board | Section 09 29 00 |
| .2 | Mechanical Equipment | Divisions 21, 23 |
| .3 | Electrical Equipment | Divisions 26, 27 |

1.2 CEILING SYSTEMS

- .1 This Specification includes the ceiling systems listed below, noted in schedules and shown on reflected ceiling plans.
- .2 Ceiling systems shall be 610mm x 1220mm lay in exposed Tee system, rated. Rated ceiling systems to conform to U.L.C. detail R210.

1.3 REFERENCE STANDARDS

- | | | |
|----|---------------|--|
| .1 | ASTM C635 | Specifications for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings |
| .2 | ASTM C636 | Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels. |
| .3 | CAN/CGSB 92.1 | Sound Absorptive Prefabricated Acoustical Units |

1.4 DESIGN

- .1 N.R.C. Range: Unless otherwise noted under description of ceiling system the N.R.C. Range shall be 60-65 (Table 1 of CAN/CGSB 92.1).
- .2 Ceiling S.T.C.: Unless otherwise noted under description of ceiling system the S.T.C. rating shall be 35 or better.
- .3 Light Reflectance: Unless otherwise noted under description of ceiling system, panels shall have a light reflectance co-efficient designation of L.R.1 (0.75 minimum). Table 3 of CAN/CGSB 92.1 refers.
- .4 Support of HVAC and Electrical Equipment:
 - .1 Provide additional hangers as required for support of light fixtures and radiant panels, mechanical diffusers, sound diffusers, etc.
 - .2 Provide wider tee and wall moulding where ceiling grid supports radiant ceiling panels. Note that radiant panels weight a minimum of 2.5 lb/sq. ft.

1.5 SHOP DRAWINGS

- .1 Reflected ceiling plans indicate proposed layout but this shall not relieve Contractor of responsibility for co-ordination of the work and provision of Shop Drawings where field conditions call for variation from proposed layout.

SECTION 09 51 00 - ACOUSTIC CEILINGS

- .2 Accurately locate lighting fixtures, ventilating grilles, sprinkler heads, exit lights and other ceiling fittings.

- .3 Conform to Section 01 33 23.

1.6 SAMPLES

- .1 Upon award of the Contract submit full size sample panels proposed for installation in the project. All panels subsequently used on the job shall match the approved sample.
- .2 Submit samples of suspension system members for approval prior to commencement of installation.

1.7 DELIVERY AND STORAGE

- .1 Transport, handle and store material in manner to prevent warp, twist and damage to tile and board edges and surfaces in accordance with the manufacturer's recommendations.
- .2 Any warped and/or damaged boards, tile and trim shall be rejected and be replaced by new, straight, undamaged and acceptable materials at no cost to the Owner.
- .3 Store material in warm, dry place away from water and the elements. Protect against undue loading stresses and shock.
- .4 All packaged material shall be delivered in original manufacturers' wrappers and containers with labels and seals intact.

1.8 PROTECTION

- .1 Exercise care in the execution of work under this Section to prevent damage to finished surfaces and adjacent work, and mechanical and electrical installations.

1.9 EXTRA PANELS

- .1 Provide 2% typical acoustic panels of each type specified for use in maintenance work. Obtain receipt from the Consultant or Owner's representative on site.
- .2 Do not use panels supplied to Owner for maintenance work to make good any damaged or removed tile required by Contract.

1.10 SPECIAL CLEANING

- .1 Clean, repair or replace dirty, discoloured or defective units or exposed suspension members to Consultant's satisfaction.

1.11 ENVIRONMENT

- .1 Commence installation after building enclosed and dust- generating activities completed.
- .2 Permit wet work to dry prior to commencement of installation.

- .3 Maintain uniform minimum temperature of 15 deg. C. and humidity of 20% to 40% prior to, during and after installation.

1.12 WARRANTY

- .1 The Warranty stipulated in the General Conditions of the Contract shall be deemed to include the following definition in reference to Work specified in this Section. The following will be considered defects without being limited thereto:
 - .1 Failure of the suspended ceiling to remain water level.
 - .2 Lifting or sagging of tile and board between supports.
 - .3 Staining and discolouration of factory finishes.
 - .4 Development of corrosion of galvanized ferrous metal.
 - .5 Development of cracks, splits and other surface deterioration in acoustic panels.
 - .6 Failure of hanging wire anchorage.
- .2 The warranty period shall be **two (2) years**, commencing on the date of Substantial Performance of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS - LAY-IN SYSTEM

- .1 Acoustic Ceiling Panels
 - .1 LAT 1: Classrooms, corridors, etc.
610mm x 1220mm, min. NRC of .70, CAC min. 40, fire guard; CGC Radar High NRC/CAC panels 22541 or Armstrong School Zone Fine Fissured 1811.
All tile and suspension systems shall be fire rated.
- .2 Suspension
 - .1 Suspension system to be "DX" 24mm wide faced T-bar by CGC. Equivalent grid by Chicago Metallic, or Armstrong will be accepted, contingent on its compatibility with the specified ceiling tiles.
 - .2 Provide rated grid.
 - .3 Exposed interlocking tee grid system, formed out of cold rolled zinc-bond steel 0.54mm thick.
 - .4 Main Tees: 38mm x 25.4mm double web rectangular bulb top with capping plate in precoat baked-on white paint finish and incorporating holes for hangers and slots for connecting pieces, and capable of supporting 12.5 kg per 1200mm. for continuous spans and 6.5 kg per 1200mm span for single span without exceeding a deflection fo 1/360 of the span.

SECTION 09 51 00 - ACOUSTIC CEILINGS

- .5 Standard Cross-Tees: 25.4 x 25.4mm double web, bulb top, capping plate in precoated white baked-on finish, capable of supporting 11.3 kg per 600mm span without exceeding a deflection of 1/360 of span, and with positive interlock with main tees.
- .6 Structural Cross-Tees as main tees, but with crimped ends for lapping bottom flange of main tees and interlocking tack ends to engage slots in main tees.
- .7 Suspension system at radiant panels shall be CGC wide face grid, Type "DXW", 38mm wide, or equivalent by one of the approved grid manufacturers listed above.
- .8 Accessories:
 - .1 Splice plate, clips, screws, etc. as required to complete the installation. All galvanized finish.
- .9 Concealed flat spline: 0.71mm flat steel spline.
- .10 Edge Trim:
 - .1 0.635mm zinc bonded, cold rolled steel mould.
 - .2 Trim shall be minimum 22mm x 22mm angles.
 - .3 Provide 50mm wide shadowline trim at perimeter of corridor ceilings.
 - .4 Provide 50mm wide trim at radiant ceiling panels adjacent to walls.
- .11 Finish to tees and edge trim: flame resistant white baked enamel satin finish to match panel finish, 2 coats on exposed surfaces, 1 coat elsewhere.
- .12 Carrying Channels: 38mm x 19mm cold rolled galv. weighing 1.042 kg per metre.
- .13 Tie Wire: 1.6mm galvanized soft annealed steel
- .14 Hangers: 2.6mm galvanized steel wire.
- .15 Screws: Corrosion resistant, self-tapping Philips truss head, of length and gauge to suit installation.
- .16 Ceiling Hanger Pins (for fixing to metal): capacitor discharge ceiling hanger pins, by Continental Studwelding Ltd., or approved equivalent, of type approved by Consultant.

PART 3 - EXECUTION**3.1 INSTALLATION - GENERAL**

- .1 Employ mechanics skilled in this Trade and install work in strict accordance with the system manufacturer's printed directions to produce a first class, true finish, free from dropping, warpage, soiled or damaged tile.

- .2 Make provisions for thermal movement.
- .3 Install hanger inserts in a manner approved by Consultant.
- .4 Locate hangers directly over Main Tees and as close to intersections as possible. Secure hangers firmly to concrete inserts, steel joists and beams, bracing, etc. Do not install hangers to roof deck, provide separate grid off joists if required.
- .5 Erect ceiling grid plumb and square with accurately fitted locked-in joints in true alignment, secure and rigid and with provision for thermal movement. Water level ceiling to tolerance of 1mm in 1m and maximum deviation of 4mm. from mean level.
- .6 Frame around recesses fixtures, diffusers, grilles, radiant panels, and the like and provide heavier section hangers and supports as necessary to support same. Provide hanger within 150mm of each fixture corner.
- .7 Consult with Electrical and Mechanical Trades for requirements and provide access to valves and switches. Provide wide face tees and trim at radiant ceiling panels.
- .8 Ensure that all hangers and carrying members are designed and spaced to support entire ceiling system including recessed lighting fixtures. Note, weight of fixtures is approximately 9-13.5 kg.
- .9 Install panels only after all mechanical and electrical equipment, conduits, piping, telephone distribution, etc. are in place.
- .10 Typical ceiling panels shall be type LAT1.

3.2 INSTALLATION OF LAY-IN SUSPENSION SYSTEM

- .1 Generally hangers shall be spaced at not more than 1200mm o.c. directly above main runner tees, except at fixtures, where they shall be 600mm o.c. or closer as required to adequately support fixtures. Locate hangers as close as possible to tee junctions. Locate first hanger within 300mm of perimeter wall.
- .2 Install main tee runners continuous at 1200mm o.c. with interlocking structural cross-tees each side of fixtures at right angles to main tees. Install standard cross-tees generally at 90 degrees to main tees and as required to achieve pattern shown on reflected ceiling plans. Secure joints by web of tees; snaplock into place forming rigid connections. Main tees shall be as long as possible with butt ends joined by means of splice plates locked into webs.
- .3 Frame up around light fixtures, grilles, diffusers, speakers, openings, etc. as required.
- .4 Secure edge mouldings to walls, bulkheads and other vertical surfaces at perimeter edges of acoustic ceilings. Note special mouldings required.
- .5 Securely fix hangers to tees by bending ends 90 degrees at the correct height and inserting through holes in top of main tees, then wiring around open side at least 3 turns twisting ends together. Flats shall be bolted to tees. Secure to concrete inserts in similar manner.

SECTION 09 51 00 - ACOUSTIC CEILINGS**3.3 LAY-IN PANEL INSTALLATION**

- .1 End panels shall not be less than half full size and installation in each area shall be symmetrical, with end tiles and abutting opposite vertical wall surface to be of the same width. Do all necessary cutting and fitting neatly and accurately to suit grid openings and accommodate fixtures, grilles, detectors, speakers and the like located on the ceiling panels.
- .2 Lay directionally patterned acoustic panels in one direction, parallel to the longest direction of the grid concerned.
- .3 Place panels between tees so that edges bear evenly on flanges.
- .4 Conform with reflected ceiling plans.
- .5 Provide fire rated enclosures as required around light fixtures and mechanical equipment in fire rated ceilings, according to applicable ULC Design Criteria.
- .6 Where mechanical equipment is located above the ceiling, panels shall be suitably and inconspicuously marked by the use of small colour-coded stickers. Mechanical equipment to be located shall include valves, dampers, heat exchangers, heat pumps, VAV boxes, electrical disconnects, as applicable, and other such equipment not visible from below.

3.4 CLEANING

- .1 Upon completion, clean acoustic tile of all finger marks and other defacements.
- .2 Remove all accumulated rubbish and excess materials from the site.
- .3 Clean acoustic tile and replace any damaged tiles immediately before occupation of building by Owner.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Remove all aluminum, wood and rubber bases and replace with new rubber bases in Cafetorium and Stage.
- .2 Sand and refinish hardwood flooring system throughout the Cafetorium and Stage.
- .3 The completed work shall provide the existing floors with an updated finish including all sanding, sealers, and finishes.
- .4 Coordinate work schedule with Contractor.

1.2 WARRANTY

- .1 Extend the warranty of work for this Section for a period of three (3) years from date of Substantial Performance.

1.3 QUALIFICATIONS

- .1 The work of this Section to be done by a contractor who has working knowledge of this work for a period of five years and is an approved applicator of the floor finish system.

PART 2 - PRODUCTS

2.1 PRODUCTS

- .1 BONA Supersport sealer.
- .2 BONA Supersport finish.
- .3 Perimeter Base: Rubber vent cove 76mm x 99mm ventilating type. Colour to be black. Provide sample for review by Consultant prior to ordering.
- .4 Aluminum Thresholds: 125 mm wide bevelled edge threshold custom cut to suit door frame profiles.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Mobilize all labour, equipment, and products necessary to carry out the work of this contract.
- .2 Supply, install, and maintain throughout the course of the work, all necessary temporary protective barriers and signage. Before commencing work, identify all paths for dust or odours generated by the work that may penetrate interior spaces. These shall include make-up air intakes, ventilation / exhaust openings for doors, windows, and pipe or cable penetrations.

SECTION 09 64 15 WOOD FLOOR REFINISHING

Take measures such as enclosing, Sealing and/or providing sustained negative pressure to prevent dust, fume or odour ingress. If required, coordinate temporary shut-down of mechanical equipment. Keep all adjacent doors closed to seal outside areas from dust etc. Thoroughly clean all walls, ceilings, lights, adjacent storage, equipment and other areas as required upon completion of work.

- .3 Upon completion of work, demobilize all equipment, and clean site of debris, dirt, laitance, and staining caused by the work. Should the Contractor fail to comply, the Board will arrange for the clean-up and the cost of the clean-up will be deducted from the Contractor's invoice. Any undue damages caused by the Contractor shall be repaired or replaced without cost to the Owner. Damages shall be made good with new materials as required to match the existing work in quality and workmanship to the approval of the Board at no extra cost.
- .4 Provide electrical hook-up / pig-tail installations as required to accommodate sanding equipment. Ensure dehumidification and ventilation meets required standards.

3.2 EXAMINATION OF SURFACES

- .1 Sand floor to bare wood finish with hand sanders and machine sanders to ensure all edges, corner and surfaces consist of a smooth even finish. Utilize 3 cut minimum operation after finish is removed. Cut with No. 30, 60 and 100 grit sandpaper.
- .2 Sweep and vacuum floor clean before applying sealer.
- .3 Report to Consultant any existing unacceptable conditions. Do not commence work until conditions are rectified. The Contractor shall ensure that all conditions are suitable for application of sealer and finishes prior to commencing work.

3.3 FINISHING

- .1 Apply 2 coats of Bona Supersport Sealer and 2 coats of Bona Supersport Finish.
- .2 Apply each coat within 18 hours of each other to obtain maximum intercoat adhesion.

3.4 BASE INSTALLATION

- .1 Install cove base using pre-moulded outside corners, mitering inside corners and anchoring to walls with base cement or screws and anchors.

3.5 CLEANING AND CURING

- .1 Allow a minimum of seven (7) days curing after completion of finishing prior to allowing access to the area. Review area prior to allowing access to Cafetorium and Stage.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Concrete Floors	Section 03 30 00
.2	Porcelain tile	Section 09 30 16
.3	Resilient Sheet Flooring	Section 09 65 16
.4	Terrazzo	Section 09 66 13

1.2 REFERENCE STANDARDS

.1 ASTM Standards

.1	F 141	Resilient Floor Coverings
.2	F 150	Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
.3	F 386	Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
.4	F 511	Quality of Cut (Joint Tightness) of Resilient Floor Tile
.5	F 710	Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
.6	F 1066	Specification for Vinyl Composition Floor Tile.
.7	F 1304	Deflection of Resilient Floor Tile
.8	F 1344	Specification for Rubber Floor Tile
.9	F 1861	Specification for Resilient Wall Base
.10	F 2055	Size and Squareness of Resilient Floor Tile by Dial Gage Method
.11	F 2169	Specification for Resilient Stair Treads
.12	F 2195	Specification for Linoleum Floor Tile
.13	E 662	Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
.14	E 1907	Methods of Evaluating Moisture Conditions of Concrete Floors to Receive Resilient Floor Coverings
.15	F 970	Standard Test Method for Static Load Limit

.2 ULC

.1	CAN/ULC-S102.2	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies
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.3 Resilient Floor Covering Institute (RFCI)

.1	IP #1	Recommended Installation Practice for Homogeneous Sheet Flooring, Fully-Adhered
.2	IP #2	Recommended Installation Practice for Vinyl Composition Tile (VCT)
.3		Recommended Work Practices for Removal of Resilient Floor Coverings

.4 EOS/ESD Association, Inc.

.1	ANSI/ESD STM7.1	ESD Association Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items - Floor Materials - Resistive Characterization of Materials - Floor Materials
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SECTION 09 65 00 - RESILIENT FLOORING

- .2 ANSI/ESD STM 97.1 ESD Association Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items – Floor Materials and Footwear – Resistance Measurement in Combination with a Person
- .3 ANSI/ESD STM 97.2 This document establishes test methods for the measurement of the voltage on a person in combination with floor materials and static control footwear, shoes or other devices
- .4 ESD TR 7.0-01 ESD Association Technical Report for the Protection of Electrostatic Discharge Susceptible Items – Static Protective Floor Materials
- .5 **International Organisation for Standardization (ISO)**
 - .1 ISO 23599 Assistive Products for Blind and Vision-Impaired Persons – Tactile Walking Surface Indicators.

1.3 SUBMITTALS

- .1 Submit samples as per Section 01 33 23. Submit manufacturer's samples of actual sections of tile and accessories; include manufacturer's full range of colour and patterns available.
- .2 Samples for Verification Prior to Installation: Submit full size samples of all types, colours, and patterns selected, indicating full range of patterning and colour variations.
- .3 Coordinate with supplier of custom marbleized rubber flooring and stair tread/risers and Consultant to arrange for colour selections and provision of "strike-off" sample well in advance of material order date (8-10 weeks before materials are required).
- .4 Submit manufacturer's printed installation instructions and maintenance manuals for each material specified.

1.4 EXTRA MATERIALS

- .1 At completion of this Work hand over to Owner minimum 2% of each type and colour of flooring installed.
- .2 Material to be in wrapped packages or fully labelled as to product and colour.

1.5 WARRANTY

- .1 Submit manufacturer's warranty warranting material and performance for a period of **five (5) years** following the date of Substantial Performance of the Work.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Adhesives:
 - .1 Solvent-free white acrylic, as recommended by manufacturers of vinyl composite tile, rubber flooring, and base.

- .2 VCT adhesive: Mapei Ultrabond ECO 711, Roberts Consolidated Premium VCT Adhesive 2057, or Flextile Flextech 710.
- .3 Resilient plank adhesive: Mapei Ultrabond G19 or equal recommended by the flooring manufacturer.
- .2 Vinyl Composition Tile (VCT):
 - .1 Conforming to CSA A126.1. Vinyl composition tile, asbestos free, 305mm x 305mm x 3.2mm.
 - .2 Standard Excelon Imperial Texture by Armstrong Flooring Inc., or Azrock VCT by Johnsonite.
 - .3 Colours to be selected by Consultant Allow for 2 colours per room and 3 colours in corridors, to later pattern.
- .3 LVT Resilient Plank Flooring:
 - .1 Flexible PVC plank flooring, min. 2.5mm thick with minimum 0.55mm clear PVC wear layer, no-wax finish, wood pattern; Expona Commercial Wood PUR by Polyflor, 152mm x 1219mm planks, or Allura Wood Authentic LVT HQ by Forbo, 152 x 1000mm planks.]
- .4 Base:
 - .1 111mm x 3mm thick, "Tightlock" [102mm x 3mm thick "Traditional" rubber cove base by Johnsonite. Colour as selected at a later date by the Consultant.
- .5 Sealer: Type approved by flooring manufacturer.
- .6 Wax: Type approved by flooring manufacturer.
- .7 Metal Edge Trim: Aluminum or brass alloy with lip of edge strip extending under and with shoulder finishing flush with top of resilient floor.

PART 3 - EXECUTION

3.1 EXAMINATION AND TESTING

- .1 Check floor surfaces for evidence of carbonation, dusting, excessive moisture or other defects affecting bond of adhesive. Ascertain nature of curing and/or sealing compound used on concrete and its compatibility with flooring adhesive. Take all required remedial measures. Remove compounds if necessary to ensure that adhesive bonds to concrete.
- .2 Test concrete slab, using anhydrous calcium chloride test, in conformance with ASTM F1869. Do not proceed until moisture vapour emission rate is equal or less than 2.44kg/100m²/24hours (3lbs/1000sq.ft./24hours).

SECTION 09 65 00 - RESILIENT FLOORING

- .3 Confirm pH level of concrete is acceptable to manufacturers of adhesive and tile. Generally, pH level is to be 9 or less.
- .4 Perform bond testing to confirm compatibility between concrete slab and adhesives.
- .5 Take readings of room temperature and relative humidity (RH) before, during, and after installation. Environmental conditions shall conform to these specifications and the requirements of the material manufacturers.
- .6 Provide test results to manufacturers of products proposed for use, and obtain approval of conditions before commencing installation.

3.2 INSTALLATION - GENERAL

- .1 Do not start installation of resilient flooring until all other trades have completed their work and just prior to completion of building.
- .2 The permanent HVAC system must be in operation before installing VCT.
- .3 Keep all tile and accessories at the job site at room temperature (min. 18°C. and max. 29°C.) for at least 48 hours before installation, during the work, and for minimum 48 hours after completion of installation.
- .4 Ensure that interior air relative humidity (RH) is within limits recommended by the product manufacturers, as excessively high or low RH will affect curing of floor patching and levelling materials.
- .5 Obtain approval from manufacturers for all adhesives, caulking, patching and levelling agents, installation methods, and environmental conditions, before proceeding with the work of this section.
- .6 Ensure flooring materials are clean of any contaminants which would interfere with proper bonding.

3.3 PREPARATION

- .1 On concrete floors, level depressions and cracks with nonshrinking latex joint filler. Patching and levelling products must be compatible with adhesives; obtain approval from manufacturer of adhesive. Do not use products containing gypsum.
- .2 Report large cracks to Consultant. Do not proceed until remedied. Prime surface with approved primer.
- .3 Thoroughly clean concrete floors of any substances deleterious to bond of adhesive.
- .4 Close off areas where tile work is in progress to prevent deposit of dust or grit on slabs where tile is being laid.

3.4 APPLICATION - RESILIENT TILE AND PLANK FLOORING

- .1 Apply adhesive uniformly with an approved notch-tooth spreader at the recommended rate. Do not spread more adhesive than can be covered before initial set takes place. Use waterproof adhesive throughout. Wipe up excess adhesive as work progresses.
- .2 Install flooring in conform to floor patterns on drawings, where applicable.
- .3 Unless otherwise indicated on drawings, lay out each area to be tiled symmetrically from its axis. Adjust starting line so width of border tile shall be at least one half tile. Distribute tiles having varying tones or texture evenly over entire floor area to avoid patches or streaks, and to produce homogeneous blend. Reject tiles having undue variations in colour, shade and texture. Make tile joints flush, uniform, in straight lines and as inconspicuous as possible.
- .4 Lay out tiles so that joints are parallel to axis of room are continuous. All joints to be staggered.
- .5 Layout plank flooring in a similar manner to tile flooring. Establish centre of room and adjust layout to ensure that no plank sections at perimeter of room will be less than 150mm in length. Stagger planks for a random appearance, while ensuring joints are offset at least 150mm from adjacent joints.
- .6 Cut flooring around excessively heavy or fixed objects. Lay tile and plank flooring so that it is flush with adjacent floor surfaces.
- .7 Roll tile with 68 kg roller immediately after laying. In areas inaccessible to large roller, use a small hand roller.
- .8 Install metal edge strips at unprotected edges of resilient flooring.

3.5 CLEANING

- .1 Remove surplus adhesive from face of tiles as work progresses.
- .2 Upon completion of work remove all markings and heel scuffs. Broom clean.
- .3 Prior to occupation by Owner, broom clean all resilient floors and remove all noticeable stains and marks.

SECTION 09 65 00 - RESILIENT FLOORING

- .4 All wet mopping and waxing will be done by the school custodial staff.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Supply and installation of resilient sheet flooring where indicated on Room Finish Schedule.

1.2 RELATED WORK

- | | | |
|----|----------------------------------|------------------|
| .1 | Demolition and Alterations | Section 02 40 00 |
| .2 | Cast-In-Place Concrete | Section 03 30 00 |
| .3 | Concrete finishing | Section 03 30 00 |
| .4 | Resilient tile flooring and base | Section 09 65 00 |

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
 - .2 ASTM E648 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
 - .3 ASTM E 1907 Methods of Evaluating Moisture Conditions of Concrete Floors to Receive Resilient Floor Coverings
 - .4 ASTM F141 Resilient Floor Coverings
 - .5 ASTM F386 Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
 - .6 ASTM F387 Standard Test Method for Measuring Thickness of Resilient Floor Covering With Foam Layer
 - .7 ASTM F693 Standard Practice for Sealing Seams of Resilient Sheet Flooring Products by Use of Liquid Seam Sealers
 - .8 ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .9 ASTM F970 Standard Test Method for Static Load Limit
 - .10 ASTM F1303 Specification for Sheet Vinyl Floor Covering with Backing
 - .11 ASTM F1482 Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
 - .12 ASTM F1516 Standard Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended)
 - .13 ASTM F1700 Specification for Solid Vinyl Floor Tile
 - .14 ASTM F1913 Specification for Vinyl Sheet Floor Covering Without Backing
 - .15 ASTM F2034 Specification for Sheet Linoleum Floor Covering
 - .16 ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- .2 Resilient Floor Covering Institute (RFCI)
 - .1 IP #1 Recommended Installation Practice for Homogeneous Sheet Flooring, Fully-Adhered
 - .2 Recommended Work Practices for Removal of Resilient Floor Coverings
 - .3 Moisture and Resilient Floor Covering

SECTION 09 65 16 - RESILIENT SHEET FLOORING

- .3 American Concrete Institute (ACI)
 - .1 ACI 302.2R Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
- .4 German Institute for Standardization (DIN)
 - .1 DIN 51130 Testing of floor coverings - Determination of the anti-slip property - Workrooms and fields of activities with slip danger - Walking method - Ramp test
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102.2 Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 23.
- .2 Submit plan diagrams indicating seam locations and roll directions. Use mitred seam layouts when changing directions at 90 degrees.
- .3 Submit manufacturers current printed product literature and installation instructions.
- .4 Submit samples of each type of flooring product specified, and weld rods, for colour selections.
- .5 Submit, for verification, duplicate 300mm x 300mm samples of selected sheet material, in each colour selected, in accordance with Section 01 33 23.
- .6 Submit information on adhesives proposed for use. Include certification from the flooring and base manufacturers that the adhesives are acceptable for the installation. Confirm products are low VOC emitting.
- .7 Provide maintenance instructions in Maintenance Manual. Instructions to include adequate warning of maintenance practices or materials detrimental to flooring. Provide printed and digital copies; refer to Section 01 78 00 for maintenance manual requirements.

1.5 QUALITY ASSURANCE

- .1 Installer must be approved by manufacturer and must have minimum three (3) years documented experience in installing resilient sheet flooring.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in manufacturer's original, unopened packaging, with labels intact.
- .2 Store materials in dry, protected area. Stand rolls end and secure to prevent falling. Maintain temperature and conditions as recommended by manufacturer.

1.7 **WARRANTY**

- .1 Warrant the installation for a period of **five (5) years** following the date of Substantial Performance of the Work.
- .2 Submit manufacturer's warranties for flooring materials, warranting material and performance for a period of not less than **five (5) years** following the date of Substantial Performance of the Work; and for a greater period where noted in specific product literature.

1.8 **EXTRA MATERIALS**

- .1 At completion of this Work hand over to Owner 2% minimum of each type and colour of flooring installed.
- .2 Material to be in wrapped packages, fully labelled as to product and colour.
- .3 Store extra materials in the school, where directed by Consultant. Obtain receipt from Custodian and forward to Consultant.

PART 2 - PRODUCTS

2.1 **MATERIALS**

- .1 Resilient Sheet Flooring (RSF):
 - .1 Type RSF1:
 - .1 No-wax, homogenous vinyl sheet floor covering; iQ Optima by Johnsonite, 'Medintech' by Armstrong Flooring Inc., Biospec MD by Mannington, or Grabo Fortis by Graboplast; Floorscore certified for low VOC; must be suitable for heat welding and coving.
 - .2 2000mm roll width by 2.0mm thickness.
 - .3 Colours to later selection by the Consultant from manufacturer's standard range. Allow for one field colour and one accent colour.
 - .2 Rubber Base: As specified in Section 09 65 00.
 - .3 Seam Welding: vinyl welding rod of type recommended by sheet flooring manufacturer.
 - .4 Metal Edge Trim: Stainless steel, with lip extending under floor finish and with shoulder finishing flush with top of adjacent floor finish.
 - .5 Primers and Adhesives: as recommended by seamless floor manufacturer for specific installation, and which will produce good and permanent waterproof bond between sub-floor and flooring, and between wall surfaces and cove base.
 - .6 Patching and Levelling Compounds: Latex-modified, moisture-resistant, Portland cement based products as specified in Section 09 01 61.

SECTION 09 65 16 - RESILIENT SHEET FLOORING**PART 3 - EXECUTION****3.1 EXAMINATION AND TESTING**

- .1 Examine sub-floor to ensure conditions are acceptable for product installation. Commencement of installation will be considered to signify acceptance of existing conditions.
- .2 Check floor surfaces for evidence of carbonation, dusting, excessive moisture or other defects affecting bond of adhesive. Ascertain nature of curing and/or sealing compound used on concrete and its compatibility with flooring adhesive. Take all required remedial measures. Remove compounds if necessary to ensure that adhesive bonds to concrete.
- .3 Test to verify concrete substrate is dry in accordance with NFCA/RFCI Standard Slab Moisture Test Method. Moisture condition not to exceed $1.4\text{kg H}_2\text{O}/24\text{hr}/93\text{m}^2$.
- .4 Perform alkali tests on substrate. Neutralize concrete if pH level exceeds pH 10.
- .5 Provide test results to manufacturers of products proposed for use, and obtain approval of conditions before commencing installation.

3.2 INSTALLATION - GENERAL

- .1 Do not start installation of flooring until all other trades have completed their work and just prior to completion of building.
- .2 Maintain temperature of room and sub-floor between 14°C and 26°C from 48 hours before installation until 24 hours after installation. Ensure both temperature and relative humidity are within acceptable ranges of the material manufacturers.

3.3 PREPARATION

- .1 On concrete floors, level depressions and cracks with nonshrinking latex joint filler. Report large cracks to Consultant. Do not proceed until remedied. Prime surface with approved primer.
- .2 Obtain approval from manufacturers for all adhesives, caulking, patching and levelling agents, and installation methods, before proceeding with the work of this section.
- .3 Thoroughly clean concrete floors of any substances deleterious to bond of adhesive.
- .4 Close off areas where flooring work is in progress to prevent deposit of dust or grit on slabs where flooring is being laid.

3.4 APPLICATION

- .1 Apply resilient sheet flooring in strict accordance with manufacturer's printed instructions.
- .2 Apply adhesive uniformly with an approved notch-tooth spreader at the recommended rate. Do not spread more adhesive than can be covered before initial set takes place. Use waterproof adhesive throughout.

- .3 Lay flooring with seams parallel to building lines to produce minimum number of seams.
- .4 Run sheets parallel to width of rooms. Double cut sheet joints and continuously seal.
- .5 Roll flooring, as work progresses to ensure full adhesion.
- .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .7 Install metal edge strips at unprotected edges of flooring.
- .8 Fit flooring around drains and mechanically fasten to drain outlet. Provide permanent waterproof installation.
- .9 Install all seams using heat welded method in complete accordance with material manufacturers recommendations and materials.

3.5 CLEAN AND PROTECT

- .1 Remove surplus adhesive from seamless flooring as work progresses.
- .2 Upon completion of work remove all markings and heel scuffs.
- .3 Clean according to manufacturer's directions.
- .4 Cover completed installation with plastic sheeting and plywood. Protect surface from damage by other trades installing equipment, etc.
- .5 Remove protective cover and broom clean immediately prior to occupation by Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Demolition	Section 02 40 00
.2	Concrete	Section 03 30 00
.3	Ceramic Tiling	Section 09 30 16
.4	Rubber base	Section 09 65 00

1.2 SCOPE OF WORK

- .1 Repair and alterations to terrazzo flooring in existing corridors where floors are cut to accommodate new services, where lockers and concrete base are removed, at new door frame locations and elsewhere as required due to renovation work.
- .2 Provide terrazzo floor finish to match existing in colour and patterning. Installation details shall match existing. Existing drawings available indicate a 45mm depth of terrazzo; assumed to consist of 16mm terrazzo topping on 29mm underbed. Refer to existing drawings provided as supplementary information.
- .3 Work included:
 - .1 inspection of surfaces and conditions
 - .2 divider strips to match existing
 - .3 primer
 - .4 Portland cement terrazzo mixes
 - .5 installation of flooring
 - .6 surfacing and grouting
 - .7 cleaning and sealing

1.3 REFERENCES

- .1 Do terrazzo work in accordance with 09 66 00 Terrazzo Specification Guide, produced by Terrazzo Tile and Marble Association of Canada (TTMAC).
- .2 Conform to the following standards:
 - .1 CAN/CSA-A5 Portland Cement
 - .2 CSA A194.1 Terrazzo Aggregate
 - .3 ASTM C-144 Standard Specification for Aggregate for Masonry Mortar
 - .4 ASTM A821M Standard Specification for Steel Wire, Hand Drawn for Prestressing Concrete Tanks
 - .5 ASTM A185M Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
 - .6 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction
 - .7 CAN/CGSB-25.20 Surface Sealer For Floors
 - .8 CAN/CGSB-2.107 General Purpose Built Liquid Detergent
 - .9 CAN/CGSB-25.21 Detergent Resistant Floor Polish
 - .10 TTMAC 09 66 00 Terrazzo Specification Guide

SECTION 09 66 13 - TERRAZZO FLOORING**1.4 QUALITY ASSURANCE**

- .1 Installer shall be a member in good standing of the TTMAC, with a minimum of 5 years experience in similar work. Installer must employ skilled mechanics trained and experienced in terrazzo work.
- .2 Supplier shall be a member in good standing of the TTMAC, providing materials which meet the minimum standards of the TTMAC.

1.5 SUBMITTALS

- .1 Submit three (3) samples 152mm x 152mm of each colour and type of terrazzo for approval by the Consultant. Submit samples (305mm in length) of all specified divider strips and control joints.
- .2 Show shop drawings showing locations of all joints. Provide details where new terrazzo flooring meets existing, and where it meets other floor finishes. Indicate depth of and area of depressed concrete slab required. Note all colours on drawings.
- .3 Submit three (3) copies of the latest edition of the TTMAC Hard Surface Maintenance Guide, to be included in the Maintenance Manuals specified in Section 01 78 00. Include specific warnings of any practices which could damage the materials or decrease slip resistance of the surface.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle products in a manner to avoid damage. Store materials in a clean, dry heated location furnished by others.
- .2 Material must be conditioned to ambient temperatures for a period of 24 hours prior to installation.

1.7 PROJECT CONDITIONS

- .1 Examine areas where the work of this section is to be located.
- .2 Ensure that concrete slab is properly cured, is at proper level to receive terrazzo, and is clean, smooth and free of curing compounds. Slab temperature must not be less than 12°C.
- .3 Do not place terrazzo until unacceptable conditions have been corrected.
- .4 Protect work during installation and protect finished corners exposed to construction operations and traffic.

1.8 WARRANTY

- .1 All terrazzo work, shall be warranted for one year from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 MATERIALS

- | | | |
|-----|--------------------------------|---|
| .1 | Cement: | Portland cement to CAN CSA-A5, with colouring to suit selected sample |
| .2 | Sand: | Sharp, screened sand: ASTM C-144 |
| .3 | Water: | Clean water, free from oil, acids, alkali or organic matter |
| .4 | Aggregate: | Marble, granite, onyx, plastic or glass chips; clean and sound ; colours to match existing. |
| .5 | Colour pigments: | Non fading mineral pigments |
| .6 | Slip resistant material: | No. 36 grit aluminum oxide |
| .7 | Slip resistant channel strips: | Brass or zinc 10mm x 10mm, 20 gauge dove-tailed shaped channels with anchor tapes; colour to contrast adjacent materials |
| .8 | Reinforcing mesh: | 50 x 50mm mesh size, fabricated from 1.6mm thick galvanized wire/fabric welded mesh. ASTM A821/ASTM A185 |
| .9 | Divider Strips: | 25mm to 32mm deep with anchorage devices, except where specified otherwise, 14 gauge zinc, as indicated in applicable TTMAC details. To match existing in appearance. |
| .10 | Cleavage Plane: | 4 mil thick polyethylene film, to CAN/CGSB-51.34 |
| .11 | Crack Suppression Membrane: | As specified, install as per manufacturer's recommendations |
| .12 | Epoxy bonding agent: | Two part liquid epoxy resin adhesive |
| .13 | Sealers: | Conforming to CAN/CGSB-25.20 |
| .14 | Floor Finish: | Conforming to CAN/CGSB-25.21 |

2.2 MIXES/PROPORTIONS - AT POURED-IN-PLACE CONCRETE

- | | | |
|----|---------------|--|
| .1 | Underbed: | |
| .1 | | One part Portland cement to four parts sand by volume. |
| .2 | | Wet and mix thoroughly to a low slump to provide workability. Adjust water volume depending on moisture content of sand to obtain consistency and workability. |
| .2 | Scratch Coat: | |
| .1 | | One part Portland cement, 4 parts sand and latex additive if required. |
| .2 | | Adjust water volume depending on moisture content of sand to obtain consistency and workability. |

SECTION 09 66 13 - TERRAZZO FLOORING

- .3 Slurry Bond Coat: Mix Portland cement and water to a creamy paste consistency. Add latex additive to increase bond.
- .4 Terrazzo topping to consist of 2 parts cement to three parts aggregate. Chip size ratio 70% No. 2 and 30% No. 1, unless otherwise required to match existing.
- .5 Epoxy Bonded Terrazzo Topping: Same mix as standard terrazzo topping with a specified epoxy bonding agent.
- .6 When mixed with water the underbed shall be of such a consistency and workability that will allow maximum compaction during tamping of the underbed, and achieve a minimum compressive strength of 15 Mpa (2000 psi) after 28 days. A stronger mix can be achieved by adding a latex additive to the water.

PART 3 - EXECUTION**3.1 INSPECTION**

- .1 Verify existing conditions are ready to receive work.
- .2 Verify substrate surfaces are clean, dimensionally stable, cured and free of contaminants, including sealers and curing compounds.
- .3 Verify that concrete has been allowed to cure for a minimum of 28 days.
- .4 Notify Consultant in writing of unacceptable substrate conditions. Beginning of installation implies acceptance of existing conditions.

3.2 PREPARATION

- .1 Substrate is to be depressed to accommodate the terrazzo system, depressions from the finished floor level to be 45 - 50mm, or as required to match existing conditions, for a bonded terrazzo floor.
- .2 Concrete substrate shall be sound, with steel trowel finish, free from cracks, contaminants, sealers, curing compounds, and laitance. Surface variation of concrete is not to exceed 2mm in 305mm or 6mm in 3040mm. Provide levelling coat over concrete as required to attain required level.

3.3 INSTALLATION - GENERAL

- .1 Demolition: Chip out existing terrazzo and underbed to nearest control joint location and prepare for new terrazzo to match existing.
- .2 Install terrazzo flooring in conformance with TTMAC details for Portland Cement Terrazzo Epoxy Bonded to Concrete Slab, Thin-Set Method, similar to existing conditions.

- .3 Underbed: Install underbed over substrate and screed to required levels. The levels should allow for the thickness of the terrazzo topping in order to provide a flat and continuous transition between terrazzo and adjacent flooring. Permit underbed to cure for a minimum 48 hours prior to installation of terrazzo topping.
- .4 Divider strips: Install divider strips in underbed while still in plastic state. Set strips true and level to required pattern. Terrazzo panels created by the installation of divider strips should be no greater than 1200mm in any direction. Structural or movement joints must be addressed by mechanical devices. Divider strips are not intended to replace or to be used as structural expansion joints.
- .5 Provide control joints in terrazzo over cold joints in concrete slab. The divider strips required for these control joints shall be in addition to those required to replicate the pattern of the existing floor.

3.4 INSTALLATION OF TERRAZZO TOPPINGS

- .1 Standard terrazzo topping:
 - .1 Allow underbed to cure for 48 hours, sweep or vacuum underbed, saturate with water and remove excess.
 - .2 Apply a cement slurry bond coat and immediately follow with application of terrazzo topping mix.
 - .3 Wet terrazzo topping mixture, mix thoroughly and spread with trowel level to top of strips. Sprinkle topping with dry aggregate chips. Roll with heavy rollers to compact topping until excess cement and water has been extracted. Hand trowel topping surface flush with top of divider strips to close all voids and pin holes.
 - .4 Control cure a minimum of 48 hours.
 - .5 After floor has sufficiently cured, grind with No. 24 grit abrasive stones or with diamond plugs. Follow initial grind with No. 80 grit of finer stones, to a maximum of 120 grit, remove excess, rinse with clean water and apply grout by hand trowel or machine to fill all voids. Let grout cure for a minimum of 48 hours and re-grind with No. 80 grit of finer stones, to a maximum of 120 grit, until all grout is removed from surface.
 - .6 Let surface dry thoroughly and apply sealer as per manufacturer's recommendations.
- .2 Epoxy Bonded Terrazzo:
 - .1 Clean base slab, remove laitance by shotblasting, sandblasting, grinding, or scarifying.
 - .2 Clean thoroughly.
 - .3 Ensure moisture content in the slab is not to exceed the manufacturer's recommendations.
 - .4 Install divider strips and base bead top strips where required.
 - .5 Mix and install epoxy bonding agent following the specifications of the epoxy manufacturer.
 - .6 Install terrazzo topping as specified above for standard terrazzo, omitting the first two steps (water saturation of concrete slab and slurry bond coats).
- .3 Aggregate chip coverage must show a density in excess of 90% exposure on the finished terrazzo surface.

SECTION 09 66 13 - TERRAZZO FLOORING

3.5 PATCHING

- .1 Remove and replace all defective or damaged work promptly and when directed by the Consultant.

3.6 CLEANING AND SEALING

- .1 Clean and seal terrazzo in accordance with the recommendations of the latest TTMAC Hard Surface Maintenance Guide.

3.7 PROTECTION

- .1 Standard protection includes 1 layer of Kraft paper. Contractor to provide adequate protection to completed terrazzo work. Protect work of other trades. Prohibit traffic during installation and for 48 hours after completion. Protect floor from impact and vibration for a minimum of 48 hours after installation. Protect base from impact, vibration, heave hammering on adjacent and opposite walls.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Demolition and Alterations	Section 02 40 00
.2	Cast-in-Place Concrete	Section 03 30 00
.3	Metal Fabrications	Section 05 52 00
.4	Rough Carpentry	Section 06 10 00
.5	Finish Carpentry	Section 06 20 00
.6	Custom Cabinets	Section 06 41 00
.7	Applied Fireproofing	Section 07 81 00
.8	Hollow Metal Doors and Frames	Section 08 11 00
.9	Gypsum Board System	Section 09 29 00
.10	Shop Priming Specified in various Sections of the Specification.	
.11	Factory applied paint coatings unless otherwise specified.	
.12	Mechanical	Divisions 20, 21, 22, 23, 25
.13	Electrical	Divisions 26, 27, 28

1.2 SCOPE OF WORK

- .1 This Section is intended to cover all repainting of existing surfaces and painting of new surfaces in renovated areas, both interior and exterior. With the exception of painting specifically called for in other Sections of the Specifications, all painting work is included in the scope of this Section of the Specification. Painting of new mechanical to be done as per item 3.6.
- .2 Colours will be specified at a later date by the Consultant, allow for accent walls of primary colour to some areas. Unless otherwise noted on room finish schedule, new painting will match existing colours in renovated areas.
- .3 In locations where drawings and Room Finish Schedule do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that all new work and existing surfaces in areas affected by the Work of this project, including miscellaneous metal work, shall be painted.
- .4 In renovated areas, paint all affected walls in accordance with the paint systems specified. All other walls in the same room are to be cleaned, prepared, and repainted, unless specified otherwise. If finish schedule indicates that new colours will be required, existing walls will require a prime coat and of two coats of finish paint. If more than one colour is present, or called for, in the room, confirm colours with Consultant.
- .5 Work includes:
 - .1 testing of substrates for moisture and alkalinity
 - .2 surface preparation of substrates as required for acceptance of paint, including sanding, cleaning, small crack repair, patching, caulking, and making good surfaces
 - .3 recoatability testing
 - .4 pre-treatments, sealing, and priming of surfaces
 - .5 painting of existing and new surfaces in accordance with specified systems
 - .6 provision of adequate ventilation and safe working conditions
 - .7 clean up and protection

SECTION 09 92 00 - PAINTING & REPAINTING

- .6 Paint all new exterior surfaces which normally require painting, including hollow metal doors, screens, soffits, roof fans and hoods, galvanized steel lintels, ladders, bollards, steel gates and hardware, metal fencing. All new woodwork on exterior must be fully primed before erection or be of pressure treated wood. Paint all altered and repaired exterior surfaces.
- .7 Perform interior painting called for in Room Schedule and Door Schedule and noted on drawings. Paint all new walls, ceilings, bulkheads, tectum, and all surfaces which normally receive a paint finish, whether noted on schedules, or not noted. Walls shall be completely painted before installation of new tackboards, writing boards, millwork, lockers, etc.
- .8 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (other than stainless steel, anodized aluminum and baked enamel) to be painted to match the surfaces on which they occur, unless otherwise directed by Consultant.
- .9 For special painted graphics, colour changes, accent stripes, etc. see drawings.
- .10 Paint exposed drywall and the like in locations where finish is not otherwise specified or noted. Do not paint such surfaces in mechanical shafts, unless specifically noted.
- .11 Paint all new exposed structural steel and mechanical ducts in finished areas. Paint new items to match existing. Where colour change is required schedules, repaint existing structural steel and ducts also.
- .12 Paint all new exposed structure and metal deck, except Water Meter and Electrical Rooms.
- .13 Paint pipes, conduit, ducts and related thermal insulation and all prime painted mechanical and electrical equipment and supports located in mechanical and electrical rooms and in all locations where Drawings call for paint or similar finish on walls and/or ceilings. Paint all mechanical equipment exposed on the roof. Exposed pipes shall be painted to Owner's Colour Coding/Piping schedule to suit use (i.e. hot water, etc.), included below.
- .14 Paint all gas piping, inside and out, whether exposed or concealed. Do not paint other pipe, conduit, ducts, insulation and the like where concealed above ceilings or in service shafts.
- .15 Make good paint finish on shop coated work where damaged.
- .16 Paint visible portions of steel shelf angles, lintels and structural steel.
- .17 Paint edges and all faces of metal doors.
- .18 Paint entirely, including all top and bottom edges, of all wood doors.
- .19 Interior of ducts and diffusers visible from exterior on room side.
- .20 Painting, as referred to herein shall include paint, enamel, stain, varnish and other finishes herein specified and normally applied to the various materials by the painting Subcontractor.

1.3 REFERENCE STANDARDS

- .1 Do painting and finishing work to material manufacturer's instructions and to the most recent edition of the Master Painters Institute (MPI) Maintenance Repainting Manual and Architectural Painting Specification Manual. The most stringent standards shall apply.
- .2 All coatings must conform to Regulation SOR/2009-264, Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations, under the Canadian Environmental Protection Act, 1999, and the VOC limits set therein.

1.4 QUALITY ASSURANCE

- .1 The Painting Subcontractor must be a member in good standing of the Ontario Painting Contractors' Association.
- .2 Painting Subcontractor shall have a minimum of five (5) years documented successful experience with projects of a similar type and scope. When requested to do so by the Consultant, provide references confirming satisfactory performance of work on such projects.
- .3 Painting crew shall be composed of experienced, qualified journeypersons. Apprentices may undertake work only when fully supervised by senior, qualified workers.
- .4 All painting and coating products shall be as listed in the current Approved Product List published by the Master Painter's Institute (MPI).
- .5 Materials, surface preparation and workmanship shall conform to the latest edition of the MPI Maintenance Repainting Manual and Architectural Painting Specifications Manual.
- .6 The Painting Subcontractor shall inspect all surfaces requiring repainting and shall notify the Consultant and Contractor, in writing, of any defects or problems, prior to commencing repainting or after preparation work. Commencement of work will infer acceptance of existing conditions.
- .7 Where special coatings or decorating systems (i.e. textured coatings or non-MPI listed products or systems) are to be used in repainting, provide certification from the paint manufacturer of all surfaces and conditions for application of the specific paint or coating system. Arrange and pay for field inspection by the manufacturer and their approval of their paint or coating system application, at no additional cost to the Owner. Submit manufacturer's inspection reports and approvals to the Consultant.
- .8 Standard of Acceptance:
 - .1 For interior work, surfaces will be viewed using full final lighting in the space. For exterior work, surfaces will be viewed at time of peak sunlight exposure to the subject surface.
 - .2 Walls shall exhibit no defects when viewed from a distance of 1000 mm at a 90° angle.
 - .3 Ceilings and soffits shall exhibit no defects visible from grade at 45° angle to surface.
 - .4 Final coat shall be uniform in colour and sheen across the entire surface area.

1.5 WORK ENVIRONMENT

- .1 Do not apply paint finish in areas where dust is being generated. Apply paint only to dry, clean, properly cured and adequately prepared surfaces.
- .2 Maintain environmental conditions within limits recommended by manufacturer, for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.
 - .1 Do not perform painting or decorating work when the ambient air and substrate temperatures are below 10°C, for both interior and exterior work.
 - .2 Maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.
 - .3 Provide adequate, continuous ventilation during work and for at least one week after completion of painting.
 - .4 Provide supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
 - .5 For exterior work, provide suitable weatherproof enclosure and sufficient heating facilities where required to provide suitable environmental conditions for painting.
 - .6 Do not perform painting or decorating work when the relative humidity is above 85% or when the dew point is less than 3°C variance between the air/surface temperature.
 - .7 Test concrete, masonry, plaster, and wood surfaces for moisture and alkalinity.
 - .1 Do not do painting or decorating work when the maximum moisture content of the substrate exceeds 15% for wood, or 12 % for concrete, masonry, plaster, and gypsum board.
- .3 Work areas shall be well illuminated during painting work. Do not perform work unless a minimum lighting level of 323 Lux (30 foot candles) is provided on surfaces to be painted or repainted.
- .4 Conform to requirements of MPI Maintenance Repainting Manual and Architectural Specification Manual.

1.6 INSPECTION AND ACCEPTANCE OF EXISTING CONDITIONS

- .1 Submit written confirmation of acceptance of existing conditions, to the Consultant, prior to commencing painting work. Painting may not commence without submission of this confirmation.
- .2 Receipt of this confirmation will be considered a prerequisite for certification of payment for this work.

- .3 Examine the conditions of existing surfaces to be repainted and evaluate with respect to MPI's Maintenance Repainting Manual. This includes the following:
 - .1 check thickness and adhesion of existing coatings. Perform adhesion tests on existing surfaces where existing coatings are peeling, flaking, or showing signs of delamination.
 - .2 determine what type of paint products were used previously
 - .3 assess defects in existing coatings
 - .4 Determine the degree of surface degradation. Refer to MPI guidelines for accessing levels of surface degradation.
- .4 Notify the Consultant, in writing, immediately if any existing condition is encountered that will prevent the attainment of satisfactory results in this work.
- .5 Existing paint materials used in the building may not be compatible with new materials specified for the surface types in some cases. This includes surfaces that may be coated with alkyd paints. Additionally, encapsulation of old lead paint may be required. Review hazardous materials report to determine if any lead based paint is known to be present in the building.

1.7 SUBMITTALS

- .1 Samples:
 - .1 Submit triplicate samples consisting of 300mm x 200mm panels of each type of paint finish specified.
 - .2 Panels shall be of same material as that on which sample coatings are to be applied in the field where possible.
 - .3 Identify each sample as to job, name of paint manufacturer, finish, colour, name and number, sheen and gloss units and name of Contractor.
 - .4 Retain one set of approved samples on site until completion of the Work.
- .2 Submit a list of all paint materials for review by Consultant, prior to ordering materials.
- .3 Submit manufacturer's data sheets for each paint product to be used on the project, including:
 - .1 MPI approved product number
 - .2 Product characteristics
 - .3 Surface preparation instructions and recommendations
 - .4 Primer requirements and finish specifications
 - .5 Storage and handling recommendations
 - .6 Application methods
 - .7 Cautions
 - .8 VOC data
- .4 Submit WHMIS Material Safety Data Sheets (MSDS) for all paint/coating materials.
- .5 Submit list of all paint brand names and colour formulas used on the job. This can be a sheet containing copies of the labels added to the paint containers at time of purchase.
- .6 Submit written confirmation of acceptance of existing conditions, as specified above, or an assessment of existing conditions noting all problematic areas.
- .7 When repainting occupied areas, submit work schedule for staging of work for the Consultant's review and Owner's approval, as noted above.

- .8 Submit a receipt for maintenance materials required to be provided to Owner; receipt to be signed by building Custodian.

1.8 STORAGE AND HANDLING

- .1 Store paint and painter's materials in clean, dry, well ventilated locations approved by the Consultant. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- .2 All paint shall be in unopened containers, labelled with:
 - .1 manufacturer's name,
 - .2 product name, product type,
 - .3 instructions for surface preparation and product application,
 - .4 VOC content,
 - .5 compliance with applicable standards,
 - .6 batch date, and
 - .7 colour name and number.
- .3 Provide CO₂ fire extinguisher minimum 9 kg capacity in paint storage area.
- .4 Handle, store, use and dispose of flammable and combustible materials in accordance with the Ontario Fire Code and to requirements of Authorities Having Jurisdiction.
- .5 Do not permit contaminants to enter waterways, sanitary or storm drain systems, or into ground. Adhere to the following procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .6 Dispose of materials in accordance with the requirements of authorities having jurisdiction. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Empty paint cans are to be dry prior to disposal or recycling.

1.9 SIGNS

- .1 Provide legible signs throughout the Work reading "WET PAINT" in prominent positions during painting and while paint is drying.
- .2 Use 75mm high letters on white card or board.

1.10 TEMPORARY COVERS AND PROTECTION

- .1 Protect floors and other surfaces with temporary covers such as dust sheets, polyethelene film or tarpaulins. All to Consultant's approval.

- .2 Mask identification plates occurring on equipment, switch boxes, and fire rating labels, etc. which require painting.
- .3 Protect, remove and replace hardware, accessories, lighting fixtures, and similar items as required except primed for paint door closers which shall be painted. Light switches and electrical communication outlet plates to be removed and reinstalled on completion of paint application.
- .4 Keep oily rags, waste and other similar combustible materials in closed metal containers; take every precaution to avoid spontaneous combustion, remove waste and combustible materials daily.
- .5 Clean surfaces soiled by spillage of paint, paint spattering and the like. If such cleaning operations damage the surface, repair and replace damaged work at no cost to the Owner.

1.11 RETOUCHING

- .1 Do all retouching, etc. to ensure that the building may be handed over to the Owner in perfect condition, free of spatter, finger prints, rust, watermarks, scratches, blemishes of other disfiguration.
- .2 After fully decorating and retouching a room or other area, notify Consultant. After inspection and final approval by Consultant post sign 'DECORATING COMPLETE - NO ADMITTANCE WITHOUT PERMISSION'.

1.12 TEST AREA

- .1 A room or area in the building will be designated by the Consultant as a test area to establish standard of workmanship, texture, gloss and coverage.
- .2 Prior to any painting being started, request a meeting on Site between Consultant, Contractor, and Subcontractor to review conditions, surfaces, anticipated problems and to clarify quality of workmanship acceptable to Consultant.
- .3 Apply finishes to each type of surface within room with correct material, coats, colour, texture and degree of gloss in sample area and have same approved prior to providing Work of this Section.
- .4 Retain test area until after completion of Work. Test area to be minimum standard for the Work.
- .5 Failure to comply with the above will be cause for Consultant to request all Work previously painted to be repainted.

1.13 MAINTENANCE MATERIALS

- .1 Provide one sealed can, one litre capacity, of each product in each colour used in the Work for Owner's use in maintenance Work.
- .2 Container to be new fully labelled with manufacturer's name, type of paint, and colour.

- .3 Store materials where directed by Owner's representative on site. Obtain receipt, signed by building custodian and listing all maintenance materials provided, and submit to Consultant.

1.14 WARRANTY/GUARANTEE

- .1 Furnish a 100% Maintenance Bond, valid for **two (2) years** from date of Substantial Performance, or from date of completion of Work if work is not complete at date of Substantial Performance.
- .2 Subcontractor's Maintenance Bond, shall warrant that the work has been performed in accordance with the standards and requirements of the MPI Maintenance Repainting Manual and Architectural Painting Specification Manual, most recent editions.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint and finishing materials shall be the highest grade, first line quality, low VOC products, included on the MPI Approved Product List under the MPI reference numbers specified herein, and the products of the following manufacturers:
 - .1 Benjamin Moore & Co.
 - .2 Devoe High Performance Coatings
 - .3 Dulux Paints
 - .4 The Sherwin-Williams Company
 - .5 General Paints
 - .6 Sico Paints
 - .7 PPG Canada
 - .8 Para Paints
- .2 Paints, enamels, fillers, primers, varnishes and stains shall be ready mixed products of one of the manufacturers listed. Substitutes will not be allowed. The only exception to this is where a specific product of another manufacturer is specified herein; such products shall be provided as specified. Paint products shall have minimum 40% volume solids.
- .3 All paints shall be ready-mixed and pre-tinted. Thoroughly re-mix all paint in containers prior to and during application to ensure break-up of lumps and uniformity of colour and gloss.
- .4 Thinners, cleaners - type and brand recommended by the paint manufacturer
- .5 Only products manufactured by paint manufacturer stated at time of submission of samples will be allowed on Site unless other materials specifically specified herein or otherwise approved. No painting to be performed until paint manufacturer is identified and acceptance received from the Consultant.
- .6 Where available, paint products shall meet MPI Environmentally Friendly E3 ratings for VOC content.
- .7 All materials and paints shall be free of lead and mercury, shall conform to Canadian Regulations for VOC limits, and shall meet flame spread and smoke developed limits required by code.

- .8 Deliver materials to Site in original unbroken containers bearing brand and maker's name. The presence of any unauthorized material or containers for such, on Site shall be of sufficient cause for rejection of ALL paint materials on Site at that time, and all previous painted work repainted with proper material.

2.2 COLOUR SCHEDULE

- .1 Consultant will provide detailed colour schedule at a later date. Conform to schedule including patterns, colours, and locations for all finishes.
- .2 In each room, the Consultant may select one wall where an accent colour may be applied.
- .3 Refer to room finishing notes for detailed instructions.

PART 3 - EXECUTION

3.1 PREPARATION - GENERAL

- .1 Remove existing hardware and surface fittings, fastenings, plates, mechanical louvers, door and window hardware removable rating / hazard / instruction labels, washroom accessories, light fixture trim, signage, etc., from walls, ceilings, doors and frames, prior to repainting and replace upon completion. Clean all items, wrap carefully, fully labelling each package, and store on site for reinstallation at completion of the work. Do not use solvent or reactive cleaning agents on items which may mar or lose finishes.
- .2 Protect all adjacent interior surfaces, equipment, and furnishings to remain in work areas, including rating and instruction labels on doors, frames, piping, etc., from repainting operations and damage by use of drop cloths, shields, masking, templates, or other suitable methods. Make good any damage caused by failure to provide adequate protection.

3.2 PREPARATION OF SURFACES

- .1 Prepare surfaces in accordance with the following standards and to MPI Maintenance Repainting Manual and Architectural Specification Manual; the most stringent requirements shall apply.
- .2 Existing Surfaces:
 - .1 Refer to the MPI Maintenance Repainting manual for the levels of surface degradation and the corresponding surface preparation requirements and recommended repaint systems. Prepare existing surfaces as recommended for the finish required.
 - .2 Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mould, mildew, mortar, efflorescence, smoke stains, sap, and sealers from existing surfaces to assure sound bonding to tightly adhering old paint.
 - .3 Scape peeling paint off existing masonry surfaces and apply a compatible masonry sealer, approved for use by the paint manufacturer, before applying new coatings.

SECTION 09 92 00 - PAINTING & REPAINTING

- .4 Glossy surfaces must be clean and dull before repainting. Wash with abrasive cleanser, or, wash thoroughly and dull by sanding. Use full coat of bonding primer below finish coats.
- .5 Where smoke and water stains cannot be adequately removed by cleaning, provide stain blocking primer over affected areas.
- .6 Spot prime any existing bare areas with an appropriate primer.
- .3 New Surfaces:
 - .1 Prepare wood surfaces to CGSB 85-GP-IM. Use CAN/CGSB 1.126 vinyl sealer over knots and resinous areas. Use CGSB 1-GP -103M wood paste filler for nail holes. Tint filler to match.
 - .2 Touch up damaged spots of shop paint primer on steel with CAN/CGSB 1.40M to CGSB 85-GP-14M.
 - .3 Prepare galvanized steel and zinc coated surfaces to CGSB 85-GP-16M. This includes wiped coated steel surfaces.
 - .4 Prepare masonry and concrete surfaces to CGSB 85-GP-31M.
 - .5 Test coat concrete surfaces to ensure adhesion of primer prior to proceeding with painting. If concrete contains fly ash, a solvent based primer will be required.
 - .6 Prepare wallboard surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound for stained woodwork.
 - .7 Prepare concrete floors to CGSB 85-GP-32M.
 - .8 Prepare copper piping and accessories to CGSB 85-GP-20M.
 - .9 Apply prime coat on wood scheduled for paint finish before installation.
 - .10 Back prime wood scheduled for transparent finish. Do not prime surfaces scheduled for transparent finish.
- .4 Coat test areas to confirm adhesion of all coatings over pipe insulations and plastics prior to proceeding with painting.
- .5 NOTE: ABOVE NOTED SURFACES MAY NOT ALL BE APPLICABLE TO THIS PROJECT.

3.3 RECOATABILITY TESTING

- .1 Perform a minimum of ten (10) recoatability tests at existing surfaces to be repainted as outlined below. Testing of interior surfaces must be performed in the presence of the Consultant.

- .2 Check for compatibility between existing and new coatings by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow surface to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, complete removal is required.
- .3 Clean and prepare test areas of the surface to be repainted. Areas selected shall be areas of the surfaces most vulnerable to weathering and/or wearing.
- .4 Repeat the recoatability testing until satisfactory results are obtained.

3.4 FINISHING SYSTEMS

- .1 Finishing systems specified below are based on the repainting and new painting systems included in the MPI manuals. Painting in renovated areas consists of repainting of existing surfaces and painting of new surfaces.
 - .1 RIN and REX formulas are found in the Maintenance Repainting Manual and apply to repainting work.
 - .2 INT and EXT formulas are found in the Architectural Painting Specification Manual and apply to new painting work.
 - .3 Finishing systems are to be modified where indicated below.
 - .4 Finishes must be low VOC products; use paint products meeting MPI Environmentally Friendly E3 ratings, where such products are available in Ontario.
 - .5 All finishing systems shall be Premium Grade.
- .2 Existing surfaces to be repainted are to be primed in accordance with MPI Maintenance Repainting Manual recommendations for the degree of surface degradation, as follows:
 - .1 DSD-1: Touch-up
 - .2 DSD-2: Spot prime
 - .3 DSD-3: Full prime coat
 - .4 DSD-4: After repair by others, full prime coat
- .3 Bonding Primer:
 - .1 Where existing surfaces are coated with different coating types than they are specified to receive, including old alkyd paints, glazed coatings, epoxies, etc., or where surfaces are inherently slick or glossy, use a full prime coat of bonding primer before applying new finish coats.
 - .2 All existing metal doors, frames and screens are to receive a full coat of bonding primer before repainting.
 - .3 Bonding primer shall be MPI #17 X-Green, or MPI #17 within VOC range E3, selected as appropriate for the substrate and new coating.

.4 Interior Work:

.1 Drywall and Plaster:

.1 Walls: High Performance Architectural Latex, semi-gloss finish

.1 RIN 9.2B - G5, for repainting work:

- .1 Bonding primer: MPI #17 X-Green
- .2 Where bonding primer is not required, prime as required by DSD level
- .3 2 coats HIPAC Latex; MPI #141, VOC Range E3

.2 INT 9.2B - G5, for new painting work:

- .1 1 coat Latex Primer Sealer; MPI #50, VOC Range E3
- .2 2 coats HIPAC Latex; MPI #141, VOC Range E3

.2 Ceilings: Latex (over latex sealer), flat finish

.1 RIN 9.2A - G1, for repainting work:

- .1 Bonding primer: MPI #17 X-Green
- .2 Where bonding primer is not required, prime as required by DSD level
- .3 2 coats MPI #53; VOC Range E3

.2 INT 9.2A - G1 for new painting work:

- .1 1 coat Primer; MPI #50
- .2 2 coats MPI #53; VOC Range E3

.3 All new drywall, whether requiring finish painting or not, must receive prime coat.

.2 Concrete Block, paint: High Performance Architectural Latex, semi-gloss finish

.1 RIN 4.2D - G5 (modified) for repainting work

- .1 1 coat bonding primer; MPI #17 X-Green
- .2 Where bonding primer is not required, prime as required by DSD level
- .3 2 coats finish; MPI #141, VOC Range E3

.2 INT 4.2D - G5 (modified) - 4 coat system, for new painting work

- .1 2 coats latex blockfiller; MPI #4
- .2 2 coats finish; MPI #141, VOC Range E3

.3 Concrete Block, glaze: Epoxy-modified Latex Finish, gloss

.1 RIN 4.2F - G6 (modified) for repainting work

- .1 1 coat bonding primer; MPI #17 X-Green
- .2 2 Coats epoxy-modified latex finish; MPI #115

.2 INT 4.2J - G6 (modified) - 4 coat system, for new painting work

- .1 2 coats latex blockfiller; MPI #4
- .2 2 Coats epoxy-modified latex finish; MPI #115

- .3 Provide in all hallways and washrooms, and where noted as "glazed" in Room Finish Schedule.
- .4 Concrete Block, wet areas: Epoxy, Gloss; "Tile like" Finish
 - .1 RIN 4.2D for repainting work
 - .1 1 coat bonding primer; MPI #17, VOC Range E3
 - .2 2 Coats epoxy finish; MPI #77, VOC \leq 250 g/L
 - .2 INT 4.2G (modified) 4 coat system for new painting work
 - .1 2 coats epoxy blockfiller; MPI #116, VOC Range E3
 - .2 2 Coats epoxy finish; MPI #77, VOC \leq 250 g/L
 - .3 Provide in all wet areas, including washrooms.
- .5 Cast in Place Concrete
 - .1 walls: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 3.1J - G5 for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level
 - .3 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .2 INT 3.1C - G5 for new painting work
 - .1 1 coat alkali resistant primer; MPI #3
 - .2 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .2 ceilings: High Performance Architectural Latex, low sheen finish
 - .1 RIN 3.1J - G2 for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level
 - .3 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .2 INT 3.1C - G2 for new painting work
 - .1 1 coat alkali resistant primer; MPI #3
 - .2 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .3 For concrete mixes containing fly ash, primer shall be alkali resistant solvent based primer MPI #223 or, on cured concrete, solvent based bonding primer MPI #69. Confirm suitability of primer for substrate, with product manufacturer.

- .6 Woodwork - Opaque Finish: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 6.3T for repainting work
 - .1 prime as required by DSD level; MPI #39
 - .2 2 coats HIPAC latex finish; MPI #141. VOC Range E3
 - .2 INT 6.4S for new painting work
 - .1 1 coat latex primer MPI #39
 - .2 2 coats HIPAC latex finish; MPI #141. VOC Range E3
- .7 Woodwork - Polyurethane Varnish over Semi-transparent Stain, gloss
 - .1 RIN 6.3E - G6 for repainting work
 - .1 stain as required by DSD level; MPI #90
 - .2 2 coats Polyurethane Varnish, clear gloss; MPI #56
 - .2 INT 6.3E - G6 for new painting work
 - .1 Wood Stain; MPI #90
 - .2 3 coats Polyurethane Varnish, clear gloss; MPI #56
- .8 Ferrous Metal: W.B. Light Industrial Coating, semi-gloss finish
 - .1 RIN 5.1P- G5 for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #101
 - .3 2 coats W.B. light industrial coating; MPI #153
 - .2 INT 5.1N - G5 for new painting work
 - .1 1 coat epoxy primer; MPI #101
 - .2 2 coats W.B. light industrial coating; MPI #153
- .9 Shop Primed Structural Steel and Metal Fabrications (New work):
 - .1 Confirm type of shop primer used with structural steel supplier, and use compatible system listed below.
 - .2 Confirm compatibility of all coatings with manufacturers.
 - .3 Touch up prime coat where damaged, with compatible primer.
 - .4 Over Q.D. metal primer: High Performance Architectural Latex, semi-gloss finish
 - .1 INT 5.1R - G5, for new painting work
 - .1 1 coat Alkyd metal primer MPI #79; VOC Range E2 or E3
 - .2 2 coats HIPAC Latex; MPI #141; VOC Range E3
 - .5 Over epoxy primer: W.B. Light Industrial Coating, semi-gloss finish
 - .1 INT 5.1N - G5, for new painting work
 - .1 1 coat epoxy primer; MPI #101
 - .2 2 coats W.B. light industrial coating #153

- .10 Galvanized Metal: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 5.3J - G5 (over anti-corrosive alkyd primer)for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #134
 - .3 2 coats HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 5.3M for new painting work
 - .1 1 coat water based Galvanized Primer MPI #134
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
- .11 Hollow Metal Doors, Frames, and Screens: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 5.3J - G5 (modified) for repainting work
 - .1 1 coat of bonding primer MPI #17 X-Green
 - .2 2 coats of HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 5.3M - G5 for new painting work
 - .1 1 coat water based Galvanized Primer MPI #134
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
- .12 Insulation on Pipes & Ducts (plastic): High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 6.8A - G5, for repainting work
 - .1 1 coat Bonding Primer MPI #17 X-Green
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 6.8A - G5, for new painting work
 - .1 1 coat Bonding Primer MPI #17 X-Green
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
- .13 Mechanical Equipment:
 - .1 High Performance Architectural Latex, semi-gloss finish
 - .2 As specified for metal types.
 - .3 Use heat resistant paint where required.
- .14 Piping, Conduit & Ductwork (uncoated): High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 5.3J - G5, for repainting work
 - .1 1 coat of bonding primer MPI #17 X-Green
 - .2 2 coats of HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 5.3M - G5, for new painting work
 - .1 1 coat water based Galvanized Primer MPI #134
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3

- .15 Surfaces behind grilles, within 30mm of grille: Institutional Low Odour/ Low VOC, flat finish
 - .1 RIN 5.3K - G1, for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #134
 - .3 2 Coats Acrylic Flat, Black; MPI #143
 - .2 INT 5.3N - G1, for new painting work
 - .1 1 coat galvanized Primer MPI #134
 - .2 2 Coats Acrylic Flat, Black; MPI #143
- .16 Concrete Floors: Alkyd Floor Enamel, gloss
 - .1 RIN 3.2B for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #27
 - .3 2 Coats Alkyd Floor Enamel, MPI #27
 - .2 INT 3.2B for new surfaces
 - .1 3 Coats Alkyd Floor Enamel, MPI #27
- .17 Thermoplastic Rubber Wall Base: High Performance Architectural Latex, semi-gloss finish
 - .1 INT 6.8A - G5
 - .1 1 coat s.b. bonding primer MPI #69
 - .2 2 coats HIPAC Latex MPI #141
- .5 Exterior Work
 - .1 Stucco, cementitious panels: High Performance Architectural Latex (over W.B. alkali-resistant primer), low sheen
 - .1 REX 9.1 K -G3, for repainting work
 - .1 Prime as required by DSD level; Alkali Resistant Acrylic Primer MPI #3
 - .2 2 Coats Latex MPI #315
 - .2 New stucco: not painted (integral colour); refer to Section 09 29 00
 - .2 Galvanized Steel: W.B Light Industrial Coating (over cementitious primer), semi-gloss
 - .1 REX 5.3G for repainting work
 - .1 Over non-compatible coatings, 1 full coat bonding primer
 - .2 or, over compatible epoxy coatings, prime as required by DSD level; MPI #101
 - .3 2 Coats Exterior W.B Light Industrial Coating MPI #163
 - .2 EXT 5.3G for new painting work
 - .1 Touch-up welds and any repairs
 - .2 1 coat Cementitious Primer MPI #26
 - .3 2 Coats Exterior W.B Light Industrial Coating MPI #163

- .3 Ferrous Metals, Structural Steel: W.B. Light Industrial Coating over rust inhibitive primer, semi gloss
 - .1 REX 5.1K - G5, for repainting work
 - .1 Over non-compatible coatings, 1 full coat bonding primer
 - .2 or, over compatible coatings, prime as required by DSD level; MPI #107
 - .3 2 Coats Water Based Light Industrial Coating MPI #163
 - .2 EXT 5.1M - G5, for new painting work
 - .1 1 coat Rust Inhibitive Primer MPI #107
 - .2 2 Coats Water Based Light Industrial Coating MPI #163
- .4 NOTE: Touch up shop primer and field welds using zinc rich primer.
- .5 Wood: Solid Colour Stain
 - .1 REX 6.2D for repainting
 - .1 Over non-compatible coatings, 1 full coat bonding primer
 - .2 or, over compatible coatings, prime as required by DSD level; MPI #5
 - .3 2 Coats Exterior Solid Colour Stain MPI #14
 - .2 EXT 6.2D for new painting work
 - .1 1 Coat Exterior Alkyd Primer MPI #5
 - .2 2 Coats Exterior Solid Colour Stain MPI #14
- .6 For painted markings on asphalt paving refer to Section 32 17 23.

3.5 APPLICATION

- .1 Apply coatings in accordance with manufacturer's printed instructions.
- .2 Use suitable, clean equipment in good condition.
- .3 Maintain dust-free suitable conditions on the surfaces free from machine, tool or sandpaper marks, insects, grease, or any other condition liable to impair finished work to prevent production or good results.
- .4 Do not commence repainting unless substrates are acceptable and until all environmental conditions (heating, ventilation, lighting and completion of other subtrade work, if applicable) are acceptable for application of products.
- .5 Allow appropriate time between surface cleaning and commencement of painting work to permit surface conditions to be ready for coating work, and to prevent re-contamination of surfaces.
- .6 Apply primers, paints, and stains in accordance with the Premium Grade finish requirements of the MPI Painting and Repainting manuals.
- .7 Apply bonding primer over incompatible existing coatings and glossy substrates, as specified above.

SECTION 09 92 00 - PAINTING & REPAINTING

- .8 Number of coats specified is to be considered a minimum. Where deep or bright colours are required, apply a minimum of four coats and as required to achieve satisfactory results. This will include at accent walls in kindergarten classrooms and child care rooms.
- .9 Apply evenly, uniform in sheen, colour and texture, free from brush or roller marks, well brushed or rolled in and free of crawls, runs, join marks or other defects.
- .10 Sand and dust between each coat to provide an anchor for next coat and to remove defects in previous coat (runs, sags, etc.) visible from a distance up to 1000 mm.
- .11 Permit paint to dry between coats. Touch up uneven spots after applying first coat. Tint various coats of multiple coat work in light shades of the final colour selected, to distinguish between coats.
- .12 To avoid air entrapment in applied coats, apply materials in strict accordance with manufacturer's spread rates and application requirements.
- .13 Give Consultant due notice and sufficient opportunity (minimum 48 hours) to inspect each coat. Do not proceed with subsequent coat until preceding coat approved. Consultant reserves the right to order complete retreatment if this condition is not observed.
- .14 At concrete block, two coats of block filler are required to achieve smooth and uniform surface on block.
- .15 Painting coats are intended to cover surfaces perfectly; if in painter's opinion, formula specified is inadequate to provide a first class finished surface, report to the Consultant and have formulas rectified before commencing work. Surfaces imperfectly covered shall receive additional coats at no additional cost. Provide additional coat where ever dark colours are used.
- .16 Use paint unadulterated. Use same brand of paint for primer, intermediate and finish coats. Factory mix all paints.
- .17 Paint finish shall be applied by roller except in the case of wood trim, door frames, base board and similar work of small surface area which shall be painted by brush. Do not use roller for applying finish other than paint.
- .18 Spray painting will not be permitted unless specifically approved in writing by the Consultant in each instance. Consultant may withdraw approval at any time and prohibit spray painting for reasons such as carelessness, poor masking or protection measures, drifting paint fog, disturbance to other Trades, or failure to obtain a dense, even, opaque finish. Spray painting shall be full double coat, i.e. at least two passes for each coat. Do not use spray or roller on wood or metal surfaces, brush only unless approved in writing by Consultant.
- .19 Paint entire surfaces, including areas where millwork or other items are to be installed.
- .20 Finish edges of doors with paint or stain treatment as required to match face of door. Seal hidden edges of wood doors with one coat of shellac and one coat gloss varnish or two coats paint. Repaint tops and edges of wood doors after fitting.

- .21 Even up stained woodwork in colour as required by nature of wood and as directed by Consultant. Apply same finish on trim, fitments cupboards and other protecting ledges as on surrounding work, disregard sight lines.
- .22 Carefully hand smooth and sandpaper wood between coats (including priming). Apply one coat sealer before applying first coat paint filler to knots or sap blemishes on wood surfaces to receive paint or stain finish.
- .23 After first coat, fill nail holes, splits and scratches, using putty coloured to match finish.
- .24 Remove rust, oil, grease and loose shop paint from metal work by brushing or with wire brushes and make good shop coat before proceeding with final finish. Feather out edges to make touch up patches inconspicuous.
- .25 Clean castings with wire brush before application of first paint coat.
- .26 Do not etch galvanized metal. Use zinc rich primer. This includes metal door frames and the like with wiped zinc coating.
- .27 Note that bonding primer is required on all existing hollow metal doors, frames and screens to be repainted. A full coat of primer is required on all new hollow metal doors, frames and screens. Three coat system is required in all cases. Sand between all coats.
- .28 Remove form oil or parting compounds from concrete surfaces. Use Xylol or approved compound.
- .29 Paint interior of pipe spaces, ducts, etc. visible through grilles or through linear metal ceilings in black matt finish.
- .30 Conform with Consultant's colour schedule and exactly match approved samples.
- .31 Mechanical and Electrical Pipes, Ducts and Conduits:
 - .1 Commence Work when new piping installation is complete in the area concerned.
 - .2 Unless otherwise noted, repainting shall also include exposed to view / previously painted mechanical and electrical equipment and components (panels, conduits, piping, hangers, ductwork, etc.). Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.
 - .3 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.
 - .4 Do not paint plated or other prefinished surfaces, unless otherwise noted.
 - .5 Do not paint over name plates or instruction labels.
 - .6 Keep repainted sprinkler heads free of paint.

- .7 Paint conduit in same colour as background paint.
- .8 Apply formulae specified even with new items surface prime painted at shop prior to delivery. Touch up shop priming where damaged.
- .9 Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65 degrees C.
- .10 Paint exposed pipes and ducts and their supports and related items in colours to suit colour coding included below; confirm with Consultant. Refer to Mechanical Division 23 for further instructions.
- .32 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- .33 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

3.6 COLOUR CODING OF PIPING

- .1 The following is a general list of typical painting requirements for piping. All repainting of piping shall match colours and pattern of existing. Painting of new piping shall match colours and patterns of existing piping of same type. Confirm colours and patterns with Owner.

FUNCTION	COLOUR	WHERE EXPOSED	WHERE CONCEALED	DIRECTION INDICATION
Natural Gas	Yellow	Solid	Solid	-
Stand Pipe System	Red	Solid	Solid	-
Heating Water Supply	Dark Green	Solid	300mm Band Every 6m	At minimum of every 6m, Direction Arrow 250mm Long, 25mm wide
Heating Water Return	Pale Green	Solid	300mm Band Every 6m	
Chilled Water Supply	Orange	Solid	Solid	
Chilled Water Return	Orange	Solid	Solid	
Cooling Water To Tower	Buff	Solid	Solid	
Cooling Water From Tower	Buff	Solid	Solid	
Domestic Hot Water	Dark Blue	Solid	300mm Band Every 6m	At minimum of every 6m, Direction Arrow 250mm Long, 25mm wide
Domestic Cold Water	Pale Blue	Solid	300mm Band Every 6m	

3.7 CLEAN-UP AND PROTECTION

- .1 Replace and reinstall all items previously removed and stored upon completion of repainting work in each area.
- .2 Protect all newly painted exterior surfaces from rain and snow, condensation, contamination, dust, salt spray and freezing temperatures until paint coatings are completely dry. Curing periods shall exceed the manufacturer's recommended minimum time requirements.
- .3 Erect barriers or screens and post signs to warn, limit or direct traffic away or around work area as required.
- .4 Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .5 Clean equipment and dispose of wash water and solvents as well as all other cleaning and protective materials, paints, thinners, paint removers/strippers in accordance with the environmental and safety requirements of authorities having jurisdiction.

3.8 REPAIRS

- .1 Cracks occurring in walls or ceilings requiring patching during the Warranty Period shall be repainted in such a way that the patch is not visible at a distance of 1m.
- .2 If patch painting is not acceptable, repaint entire wall, or ceiling.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|--------------------|------------------|
| .1 | Rough Carpentry | Section 06 10 00 |
| .2 | Custom Cabinets | Section 06 41 00 |
| .3 | Projection screens | Section 10 95 00 |

1.2 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 Submit samples of visual display boards as requested by the Consultant.
- .4 Include copies of trade literature, outlining the care and maintenance of the installation, in Maintenance Manual.

1.3 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.

1.4 WARRANTY

- .1 Extend the Warranty period stipulated in the General Conditions of the Contract to two (2) years.
- .2 Writing boards shall carry a 25 year warranty against defects appearing under regular classroom usage and wear. All Warranties to be given in writing.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Materials listed herein are as manufactured by Architectural School Products. Equivalent products as supplied by Global School Products Inc. are acceptable. Da-Lite is an approved manufacturer of the projection whiteboards / smartboards..
- .2 Markerboards and tackboards are to be of sizes indicated on drawings.

SECTION 10 11 00 - VISUAL DISPLAY BOARDS

- .3 Standard Aluminum Trim to be Series 200, as follows:
 - .1 Perimeter Trim: No.205
 - .2 Map Rail with Cork Insert: No.206
 - .3 Dividerstrip: No.207
 - .4 Marker/Chalk tray: No. 212, complete with end pieces
 - .5 Marker/Chalk tray over millwork: No. 264, where mounted on or directly above millwork
 - .6 Marker/Chalk tray in Gym: No. 461 non projecting
- .4 All exposed aluminum to have clear anodized satin finish.
- .5 Furnish map rails, where shown, complete with hooks at the rate of two hooks every 1200mm. of rail.
- .6 Joints to be absolutely flush and level, plumb and true with edges finished square and fitted as closely as possible. Use concealed joint fasteners.
- .7 Markerboards (Whiteboards):
 - .1 White porcelain enamel writing board for markers.
 - .2 12mm thickness composed of porcelain enamel surface fused under high heat to a high quality enamelling steel surface face sheet with 11mm impregnated fibreboard core with balancing zinc coated steel back-up sheet.
- .8 Tackboards: 12.7mm thick A.S.P. Prelaminated tackboards, consisting of 6.35mm natural cork laminated to 6.35mm hardboard backing, to sizes as shown on Drawings.
- .9 Mounting heights of marker boards, projection whiteboards, marker/chalk rail and tackboards shall be as directed by Consultant, or as indicated on drawings.
- .10 Sliding Units: Horizontal Slider Series No.20. Refer to Drawings for sizes and number of operating panels. Units to be complete with all standard hardware and tube type frame ends. Visual display panels as specified above.
- .11 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 7 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, large top and lower mounting brackets, full length marker tray and one set of markers.
- .3 Provide one case (12 bottles) of whiteboard cleaner, one pack (12 cloths) of cleaning cloths and eight sets of spare markers.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Supply all labour, materials, anchors, brackets, fasteners necessary to complete the installation of markerboards (writing boards), projection whiteboards and tackboards throughout the project. 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 projection whiteboards shall be coordinated with the Owner and forces installing projectors above the whiteboards. Install projection whiteboards on steel brackets.
- .4 Include for extended aluminum jambs, trim, track and marker/chalk trays and accommodate all other special conditions as required.
- .5 Accurately cut, machine and fit to form tight flush hairline connections all joints in trim and rails. Corners of trim to be square and true and mitre cut. Cap ends of rails with cast aluminum end fittings.
- .6 Joints in markerboards to be tight hairline flush butt joints properly aligned by means of a continuous 14 ga galvanized steel spline let into edges.
- .7 Adjust all operation hardware for smooth, trouble free operation.
- .8 Do not install finished materials until overhead work such as acoustic ceiling, electrical, mechanical and painting have been completed.

3.2 CLEANING

- .1 Leave trim and board surfaces clean and free of stains or marks and completely cover all markerboards , projection whiteboards, with "Pliofilm" immediately after installation. Remove cover at time of occupancy.

END OF SECTION

PART 1 - GENERAL

1.1 ALLOWANCE

- .1 Supply and installation of interior signs shall be through Cash Allowance.

1.2 REFERENCES

- .1 CAN/CSA B651 M Barrier Free Design

1.3 SUBMITTALS

- .1 Submit sign schedule listing each sign required, showing sizes, materials, lettering, numbers, colours and mounting locations and heights.
- .2 Submit full size samples of each size type required using materials and colours selected.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- .1 Acceptable Manufacturers / Fabricators:
 - .1 Arihunt Signs Inc. 905-795-1927
 - .2 Everest Signs 416-755-1432
 - .3 New Style Signs 905-363-0101
 - .4 WSI Sign Systems Ltd 905-857-8044

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|---------------------|------------------|
| .1 | Masonry Walls | Section 04 22 00 |
| .2 | Ceramic Tile | Section 09 30 16 |
| .3 | Toilet Compartments | Section 10 21 13 |
| .4 | Hand Dryers | Division 26 |

1.2 SUBMITTALS

- .1 Submit samples of all accessories for approval by the Consultant, in accordance with Section 01 3 23.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Package accessories and label with description of contents and installation location. Each accessory to be individually wrapped complete with all fixings as required.

1.4 MAINTENANCE AND OPERATING INSTRUCTIONS

- .1 Provide in Maintenance Manual, three (3) printed copies of maintenance and operating instructions of all accessories.

PART 2 - PRODUCTS

2.1 MATERIALS

- | | | |
|----|-------------------------|---|
| .1 | Stainless Steel: | Type 302 with #4 finish 0.76 ga unless otherwise noted. |
| .2 | Steel: | in accordance with CAN/CSA G40.21 Grade 300W. |
| .3 | Welding Materials: | in accordance with CSA W59. |
| .4 | Hot dipped Galvanizing: | to conform to CSA-G164. |

2.2 KEYING

- .1 All accessories to be keyed alike. Provide six keys.

2.3 TRADEMARKS AND LABELS

- .1 Trademarks and labels shall not be visible in the finish exposed surfaces.

2.4 MANUFACTURER

- .1 Specified manufacturer's catalogue references establish minimum acceptable standards for Work of this Section. Products shall be as manufactured by Frost Products Ltd., American Specialties Inc., Bobrick Washroom Equipment Ltd., or Bradley Corp., unless noted otherwise.

SECTION 10 28 13 - MISCELLANEOUS ACCESSORIES

- .2 All items to be from one manufacturer, except where equivalent items are not listed.

2.5 ACCESSORIES

- .1 Paper towel dispensers: Jumbo roll paper towel dispensers, surface mount, with key lock; Frost 101J.

2.6 FABRICATION

- .1 Weld, ground flush and smooth joints of fabricated components. Use mechanical fasteners only when approved.
- .2 Form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal with 2 mm radius bends.
- .4 Form flat surfaces without distortion. Maintain flat surfaces without scratches or dents.
- .5 Paint back of components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip ferrous metal anchors and fastening devices to conform with CGSB G164.
- .7 Shop assemble and package components complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to site at appropriate time for building in. Provide templates or rough-in measurements as required.
- .9 Provide steel anchor plates and components for installation on studding and building framing.
- .10 All exposed stainless steel edges to be hemmed.
- .11 All stainless steel units to be double panned.

PART 3 - EXECUTION**3.1 LOCATIONS**

- .1 Washroom accessories to be installed as indicated as follows:
 - .1 Paper Towel Dispenser:
 - .1 one per classroom, at sinks
 - .2 four per Science Rooms

3.2 INSTALLATION

- .1 Securely fasten accessories level and plumb in the locations shown on the Drawings and as specified herein. Mounting heights as shown on Drawings, or as directed by Consultant.
- .2 Install accessories for barrier-free facilities in accordance with the barrier-free provisions of the Ontario Building Code.

SECTION 10 28 13 - MISCELLANEOUS ACCESSORIES

- .3 Co-ordinate installation with the work of Trades providing adjacent construction as required to achieve the reveals or other edge conditions shown where front faces of units are flush with the finished wall surfaces.
- .4 Perform drilling of steel, masonry and concrete necessary to install the accessories.
- .5 Insulate accessory surfaces to prevent electrolysis due to contact with masonry, concrete or dissimilar metal surfaces. Use bituminous paint, building paper or other approved means.
- .6 Clean all accessories in conformance with Section 01 74 00.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Demolition and Alterations Section 02 40 00

1.2 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 LOCKER TRIM & FILLER PANELS

- .1 Provide new trim and filler panels, to match existing, where lockers are removed or altered by the work of this Contract. Locker components shall be as manufactured by GSS Limited., Shanahan, Hadrian Manufacturing Inc., ASI Storage Solutions, Anthony Steel Manufacturing, or Perfix Inc., all meeting these specifications.
- .2 Sheet Steel: Cold-rolled, stretcher-levelled, to ASTM Specification A446, Grade A.
- .3 Primer: Comply with CGSB 1-GP-81.
- .4 Trim: Vertical members to be 16 gauge rigid channels. Horizontal members to be minimum 18 gauge.
- .5 Filler Panels: Filler, end, and closure panels to be of 16 gauge cold rolled steel.
- .6 All cold rolled steel surfaces shall be thoroughly machine cleaned, pretreated with an iron phosphate corrosion inhibitor and finished with a high performance, abrasion and graffiti resistant polymer powder coating, to provide a smooth and uniform finish. Colours shall match existing.
- .7 Isolate dissimilar metals or metals in contact with concrete or masonry in manner to prevent corrosion using methods and materials approved by the manufacturer.
- .8 Supply and install all fastenings, anchors, filler panels, trim, clips, and accessories required for the completion of the Work.

2.2 INTERIOR SIGNAGE

- .1 Interior signage for renovated spaces is to be supplied and installed under the Cash Allowance included in the Contract.
- .2 Coordination of signage installation by the Contractor is to be included in the Contract.

10 95 00 - MANUFACTURED SPECIALTIES

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Deliver to site and install as per manufacturer's instructions and drawing details.
- .2 Coordinate to ensure all required blocking and supports are installed prior to commencing installation of the products specified herein.
- .3 Clean all substrates thoroughly before commencing installation.
- .4 Install work square, plumb, straight, true and accurately fitted.
- .5 Clean surfaces and clean up work area at completion of installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|--------------------------|------------------|
| .1 | Concrete block walls | Section 04 22 00 |
| .2 | Architectural Casework | Section 06 41 00 |
| .3 | Laboratory Work Surfaces | Section 12 36 13 |
| .4 | Plumbing and HVAC | Division 15 |
| .5 | Electrical | Division 16 |

1.2 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 30 00. Clearly indicate installation details and service connection requirements.
- .2 Submit evidence that products are approved for use in Canada and conform to the requirements of local authorities having jurisdiction.
- .3 Include maintenance data in Maintenance Manuals; refer to Section 01 70 00.

1.3 PROTECTION

- .1 Protect work from damage during storage, handling, installation and until building is turned over to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- .1 Specifications are based on the products of CiF Lab Solutions LP, unless indicated otherwise. Equivalent products from Mott Lab Inc., VWR International LLC, or SAI Systems will be accepted, subject to conformance to these specifications.

2.2 RETORT STANDS

- .1 Retort stands to consist of upright rod and base; 990mm upright 13mm diameter aluminum rod, model AAP125-039, with aluminum rod socket for recessed mounting, model AAP103 socket with locknut, both as manufactured by Water Saver Faucet Co.
- .2 Provide two (2) retort stands at each gas cock indicated on drawings. Confirm exact locations with Consultant. Coordinate installation of bases in countertops.

2.3 PEGBOARD DRYING RACK

- .1 Fabricate drying rack from 304 stainless steel with a No.4 satin finish complete with integral drip trough and catch drain; size 914mm x 914mm.
- .2 Polypropylene pegs shall be removable without tools.

11 53 00 - LABORATORY EQUIPMENT

- .3 Provide wall hanger to allow removal of pegboard without tools.
- .4 Pegboard to be complete with funnel rack, drain basket and screen insert.
- .5 Pegboard drying racks to be CIF model SP502.
- .6 Install in Science Room 105.

2.4 FUME HOOD

- .1 Provide laboratory fume hood with acid storage and flammable storage base cabinets where indicated on drawings. Fume hood to be 1220mm wide x 900mm deep, constant volume air flow units with sash and by-pass grilles, remote control service fixtures mounted in front vertical posts.
- .2 Double Sided Fume Hood:
 - .1 Apex-air GP series Double Sided Fume Hood, Model 100-48-DS-GP as supplied by CiF.
 - .2 Location:
 - .1 Science Room 105 / Prep. Room 105B
- .3 Provide removable metal closure panels at all exposed sides from top of fume hood to underside of gypsum board bulkhead and / or ceiling. Closure panels to match fume hood colour.
- .4 Service Fixtures:
 - .1 Colour coded remote controlled epoxy coated cold water gooseneck with vacuum breaker.
 - .2 Colour coded remote controlled epoxy coated gas outlet (labelled).
 - .3 Provide UL/CSA approved 120V 15A electrical duplex receptacles; one on each side (4 at double sided fume hood).
 - .4 Externally mounted two-tube fluorescent light fixture and light switch.
 - .5 Fan motor starters switch with pilot lights and overloads (on both sides of double fume hood).
 - .6 Blower and 250mm diameter exhaust collar.
- .5 Work surface to be solid epoxy resin, black, with dished surface; minimum 25mm thick. Provide cast epoxy cup sink, 150mm x 75mm. Work surface to be CiF model FB841 or approved equivalent.
- .6 Hoods to have lead-weighted, counter balanced 6mm laminated safety glass sashes suspended on stainless steel cables.
- .7 Provide interior liner of 6mm non-asbestos white polyresin material supported on a metal frame. Size and locate liner so as to provide space for running services at both ends of fume hood. Provide access panels for installation of services.

- .8 Front posts of fume hood to be constructed of 18 ga. steel, enamelled, and designed to ensure smooth, even flow of air into the hood. Provide stainless steel air foil across hood opening, mounted so as to provide 25mm air space between foil and top of work surface. Install stop in sash track to prevent closing of air space when sash is closed.
- .9 Incorporate constant volume feature which will automatically keep the volume of air exhausted through the hood constant, regardless of the position of the sash.
- .10 Fume hood to be plumbed and wired in the factory.
- .11 All electrical components to be CSA approved.
- .12 Base cabinets shall lockable metal cabinets consisting of two 610mm wide insulated flammable storage unit; 560mm deep by 890mm high.
 - .1 Flammable storage cabinets shall be CiF model SC311 (hinged right & left); ULC or cUL listed.
 - .2 Cabinet doors to open into Prep Room.
- .13 Include two hours of demonstration on all equipment.

2.5 ACID STORAGE CABINET

- .1 Remove, store and reinstall existing acid storage cabinet.

2.6 FLAMMABLE LIQUIDS CABINETS

- .1 Remove, store and reinstall flammable liquid cabinet.
- .2 Supply and install two (2) caps on exhaust openings in existing cabinet.

2.7 SAFETY GOGGLE CABINET

- .1 Supply and install safety goggle germicidal cabinet with 24 gauge steel lockable enclosure and minimum 2.13m long electrical chord.
- .2 Cabinet shall be Model SA600 as supplied by CiF lab Solutions.
- .3 Unit shall be 812mm high x 635mm wide, by 254mm deep, holding up to 40 pairs of goggles or 48 pairs of glasses, with white enamel finish.
- .4 Install in Science Room 105. Confirm mounting height with Owner.

2.8 DEIONIZATION EQUIPMENT

- .1 Supply and install Thermo Scientific water purification/deionizer model Barnstead Bantam DO800, complete with full size Ultrapure mixed bed model DO809 cartridges.
- .2 Specifications:
 - .1 Flow Rate: Up to 38L/hr
 - .2 Feedwater Pressure: 0.35 to 4.9kg/cm²
 - .3 Inlet Pressure: 5 to 70psi

11 53 00 - LABORATORY EQUIPMENT

- .4 Resistivity: Reads 25,000 to 18,000,000ohms-cm
- .5 Dimensions: 220mm L x 150mm W x 720mm H
- .6 Electrical Reqm'ts: 120V 50/60Hz

- .3 Install deionizer in Science Room 105, where indicated on drawings.

2.9 GAS COCKS

- .1 Provide deck mounted, double outlet, 90°, ball valve gas cocks, CiF model SV050, complete with key operated nozzle caps, shanks, coupling lock units, tailpieces and plastic index buttons.

2.10 ELECTRICAL OUTLETS

- .1 Typical science desk electrical outlets shall be deck mounted double faced, double ganged type, as supplied by CiF, type SE006, chrome plated with stainless steel cover plate.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install equipment as per manufacturer's printed instructions and reviewed shop drawings. Coordinate connection by mechanical and electrical trades.
- .2 Coordinate installation of retort stand sockets and other accessories in epoxy resin countertops.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|--------------------|------------------|
| .1 | Structural Steel | Section 05 12 00 |
| .2 | Metal Fabrications | Section 05 52 00 |
| .3 | Stage Lighting. | Division 26 |

1.2 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 23 showing layout and connection details.
 - .2 Shop drawings shall be stamped by a Professional Engineer, licenced in the Province of Ontario confirming the structural design of the rigging system, for dead loads and live loads of equipment and people using the equipment, and design of seismic restraints.
 - .3 Verify that all component parts and assembly of each item will support the superimposed loads without deflection detrimental to function, appearance and/or safety. Account for seismic vibration.
 - .4 Indicate field measurements on shop drawings, including distances to structure and adjacent equipment, for confirmation of clearances. Coordinate with forces installing lighting, projection screen, folding partition, gym divider curtain, basketball backstops, and other nearby building elements.
- .2 Submit 150mm x 150mm samples of fabric for approval and colour selection.
- .3 Submit test reports from an independent laboratory confirming that fabric conforms to flame resistance and the flame spread ratings specified.
- .4 Provide maintenance and operating instructions for incorporation into maintenance manual.
- .5 At the conclusion of the work, the Subcontractor shall supply to the Consultant as-built drawings, stamped by an Engineer licenced to practise in the Province of Ontario.

1.3 QUALIFIED BIDDERS

- .1 All pipe grids, lighting bars, and drapery tracks shall be installed by qualified rigging specialists from the list below.
 - .1 Ash-Stevenson Inc., 21 Progress Avenue, Units 10 & 11, Scarborough, Ontario, M1P 4S8, Contact: Tony Lautenbach
 - .2 JOEL Theatrical Rigging Contractors Ltd., 364 Watline Avenue, Mississauga, Ontario, L4Z 1P3, Contact: Van Marinea

11 61 33 - STAGE DRAPERY & RIGGING

- .3 Ontario Staging Limited, 78 Mack Street, Toronto, Ontario, M1L 1M9, Contact: Tony Physenzou
- .4 Scenework, 67 Watson Road South, Unit 7, Guelph, Ontario, N1L 1E3, Contact: Ron Foley
- .5 Jack A. Frost Limited, 3245 Wharton Way, Mississauga, Ontario, L4X 2R9, Contact: Craig Blackley

1.4 WORK INCLUDED

- .1 Supply and installation of complete stage rigging system, including pipe grid, drapery tracks, drapery, and all hardware and accessories for the complete installation at Stage.
- .2 Drapery includes all fabric curtains, teasers, cloth backdrops, panels and drape accessories.

1.5 ITEMIZED PRICE (INCLUDED IN CONTRACT)

- .1 Cost to remove existing Stage drapery / rigging and replace with new drapery / rigging system.

1.6 SEPARATE PRICE (CREDIT TO CONTRACT)

- .1 Credit to remove existing Stage drapery / rigging; shorten drapery to suit new ceiling height and reinstall drapery / rigging.

1.7 WARRANTIES

- .1 All rigging equipment, drapery tracks, and hardware shall be supplied and installed free from defects and in accordance with manufacturers' recommendations.
- .2 Any equipment that fails, or is found to be defective within **two (2) years** from the date of completed installation shall be replaced at no cost to the Owner.
- .3 The warranty period shall begin upon total completion of the work of this Section, or on the commencement date of the General Contractor's warranty period (date of Substantial Performance), whichever is later.

1.8 SUB-CONTRACTOR'S RESPONSIBILITIES

- .1 No requirement of the Work shall supersede Municipal, Provincial or federal laws and regulations and the sub-contractor is obliged to abide by all pertinent laws, codes and regulations.

1.9 SCAFFOLDING

- .1 This Sub-contractor shall be responsible for scaffolding or other ascent equipment in the installation of the Work.

1.10 TRANSPORTATION

- .1 This Sub-contractor is responsible for all transportation of components and tools for the Work, and, the safe storage of all components and tools on site during the Work.

PART 2 - PRODUCTS

2.1 STAGE LIGHTING SUPPORTS AND PIPE GRID

- .1 Pipe grid shall be an over/under design, modular construction, manufactured from 38mm ID schedule 40 steel pipe (structural grade) supported at a minimum 1800mm intervals. Grid suspension shall be via 9mm threaded rods to structure above and shall be stabilized from movement with wall flanges every second pipe anchored to the walls. Properly rated anchors shall be used. Over-under pipe clamps are acceptable. In-line pipe fittings shall not be used unless support points are provided on each sectional pipe. A safety factor of 8:1 shall be maintained on all support points.
- .2 Lighting supports shall be 48mm diameter pipe frame supported by 13mm threaded hanger rods and unistrut channels. Alvin A8-8 Straight Coupling, or equivalent, to join pipe lengths.

2.2 RIGGING SUPPORTS

- .1 Rigging support shall consist of:
 - .1 Proscenium Brackets:
 - .1 Type A Brackets, each with:
 - .1 One (1) 450 mm Unistrut P3300 channel
 - .2 Three (3) Unistrut P1068 90 degree angle fittings
 - .3 Nuts, spring nuts, washers, bolts and woodscrews as required for the complete assembly.
 - .2 Type C Brackets, each of which will require:
 - .1 One (1) Unistrut P2452 Bracket
 - .2 Two (2) Unistrut P1068 90 degree angle fittings
 - .3 Nuts, spring nuts, washers, bolts and woodscrews as required for the complete assembly.
 - .4 Two (2) ½ " threaded rods secured with Epcon 6 Ceramic Epoxy System or equal.
 - .2 Unistrut Channel.

2.3 VALANCE RIGGING

- .1 Valance rigging shall consist of 25 x 150mm (1" x 6") clear, attached to main drape brackets.

2.4 MAIN DRAPE TRACK

- .1 Main drape track shall be as follows:
 - .1 Two (2) lengths of H&H Specialties Inc. #110A, 6063-T5 extruded aluminum, or similar
 - .2 Lengths allow for 600mm track overlap at proscenium centre.
 - .3 Hand line position shall be determined
 - .4 One (1) H & H Specialties Inc. #103 Double End Pulley.
 - .5 One (1) H & H Specialties Inc. # 104 Single End Pulley.
 - .6 Two (2) H & H Specialties Inc. # 105 Overlap Clamp
 - .7 Two (2) H & H Specialties Inc. #109 End Stop and Cord Support.
 - .8 H & H Specialties Inc., #106 Clamp Hanger, as required, refer to beam clamp description below.

11 61 33 - STAGE DRAPERY & RIGGING

- .9 H & H Specialties Inc., #126 Centre Support Hanger, refer to beamclamp descriptions below.
- .10 One (1) H & H Specialties Inc., #108 Floor Block with #108DK Detachable Floor Block Kit, complete with attachment hardware
- .11 Hand line position shall be determined on site.
- .12 H & H Specialties Inc., #114 Operating Line, as required.
- .13 Two (2) H & H Specialties Inc., #102 Master Carriers.
- .14 H & H Specialties Inc., #101 Single Carrier, one (1) per grommet.

- .2 Install the main drape panels on track carriers using Turner & Seymour #105 Special s-hooks to attach each grommet.

2.5 BORDER TRACKS

- .1 Border track rigging shall consist of:
 - .1 Rigging Points:
 - .1 Seven (7) rigging points securing the track to the top cords of the open web steel joists.
 - .2 Track:
 - .1 One (1) length of H & H Specialties Inc. #110A, 6063- T5 extruded aluminum
 - .2 Two (2) H & H Specialties Inc., #109 End Stops.
 - .3 H & H Specialties Inc., #101 Single Carrier, one (1) 300 mm of track length plus one (1).

2.6 LEG TRACKS

- .1 Brackets:
 - .1 Provide seven (7) rigging points securing the track to the top cords of the open web steel joists.
 - .2 Rigging points securing the track to the rigging support members shall be as required for the installation.
- .2 Track:
 - .1 One (1) continuous length of H & H Specialties Inc., #300.
 - .2 H & H Specialties Inc. #307 splices to connect track lengths.
 - .3 H & H Specialties Inc. 321 end stops on each end of the leg track.
 - .4 Two (2) H & H Specialties Inc., #30 Pivot Devices, on each of the leg track, each complete with:
 - .1 One (1) #30BK brake kit complete with operating lanyard.
 - .2 One (1) 1" ID schedule 40 steel pipe, 1,550 mm long, centred on each device.

2.7 TRAVELLER TRACK

- .1 The main drape rigging shall consist of the following:
 - .1 Brackets:
 - .1 Seven (7) rigging points securing the track to the bottom cords of the open web steel joists.
 - .2 Rigging points securing the track to the rigging support members shall be as required for the installation.

- .2 Track:
 - .1 Two (2) lengths of H & H Specialties Inc. #310A, 6063-T5 extruded aluminum.
 - .2 Lengths shall allow for 600mm track overlap at proscenium centre.
 - .3 Hand line position shall be determined on site.
 - .4 Two (2) H & H specialties Inc., #309 End Stop.
 - .5 H & H Specialties Inc., #301 single Carrier, one (1) per 300 mm of track plus one (1).
- .3 Install the traveller drape panels on track carriers using Turner & Seymour #105 Special s-hooks to attach each grommet.
- .4 Provide two (2) H & H Specialties Inc. #342 Walk Along Master Carriers.

2.8 DRAPERY GENERAL

- .1 All drapery sizes are approximate only, and are intended for pricing purposes. The Contractor is required to site verify all measurements.
- .2 All fabric, including jute webbing, shall meet the requirements for a high degree of flame resistance, in accordance with CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films" and meet the requirements of the Ontario Fire Code.
- .3 Valance and Main Drape shall be one of the following:
 - .1 21 oz "Concertino", as manufactured by JB Martin Ltd.
 - .2 21 oz "Sydney", as manufactured by JL DeBall.
- .4 Upstage masking shall be as manufactured by Melfabco or Fred Krieger & Co. Inc.
- .5 A certificate confirming compliance with the above standard shall be shipped with all drapery panels.
 - .1 One (1) additional copy of the certificate must be forwarded to the Consultant.
 - .2 The following information must be displayed on the certificate:
 - .1 Project Name.
 - .2 Date of Certificate Issue.
 - .3 Material Used.
 - .4 Material Colour
 - .5 Fabrication Date.
 - .6 Dye Lot Number
- .6 Each panel shall have six (6) 40mm wide x 130mm long flame test swatches sewn to an offstage, bottom corner.
 - .1 The swatches shall be made from the same fabric used to construct the drape
 - .2 These fabric swatches shall be used for flame testing purposes.
- .7 Provide on each panel a sewn-on label which clearly states:
 - .1 Manufacturer's Name
 - .2 Material Used.
 - .3 Material Colour.
 - .4 Fabrication Date.

11 61 33 - STAGE DRAPERY & RIGGING

- .5 Flame Resistance Compliance.
- .6 Finished Panel Size.
- .7 This information label shall be sewn next to the flame test swatches.
- .8 Puckering, voids, discoloration or any irregularity.
- .9 All panels will be sewn square and true.
- .10 Horizontal seams will not be accepted.
- .11 All fabrics of the same colour will also be from the same dye lot.
- .12 Fullness will be added using box style pleats.
- .13 Top finish shall be 89mm (3½ ") wide heavy jute webbing with #4 brass sheet grommets spaced on 305mm centers.
- .14 All drapes shall be installed to hang 12mm to 25mm above the finishing floor.
- .15 The Contractor shall allow for one return visit to the school three (3) to six (6) months after the installation is complete to adjust drape heights.

2.9 PANELS

- .1 Valance Drape Panel:
 - .1 Panel shall be fabricated of 21 oz. velour, single backed, 100% cotton, Concertino 2603 or equivalent.
 - .2 Colour to be determined; provide fabric samples for selection.
 - .3 Sew with 50% fullness.
 - .4 Minimum 100 mm flame-resistant jute webbing sewn across the top.
 - .5 Minimum 76 mm offstage hems with 50 mm turn backs.
 - .6 Minimum 152 mm bottom hem with 76 mm turn under.
 - .7 Use new, black, tie line, 1,000 mm long at each grommet.
- .2 Main Drape Panels:
 - .1 Panels shall be fabricated of 21 oz. velour, single backed, 100% cotton, Concertino 2603 or equivalent.
 - .2 Colour to be determined; provide fabric samples for selection.
 - .3 Sew with 50% fullness.
 - .4 Minimum 100 mm flame-resistant jute webbing sewn across the top.
 - .5 #6 brass grommets installed 25 mm in from each end with additional grommets equally spaced on maximum 305 mm centres.
 - .6 Minimum 150 mm offstage hems with 50 mm turnbacks.
 - .7 Minimum 300 mm onstage hems with 76 mm turnbacks.
 - .8 Minimum 300 mm bottom hem with 76 mm turnunder.
 - .9 Special Turner & Seymour #105 s-hooks to attach each grommet to a carrier.
- .3 Leg Panels and Border Panels:
 - .1 Panels shall be fabricated of 16 oz heavy duty 100% cotton, Commando cloth or equivalent.

- .2 Colour to be black.
 - .3 Sew flat.
 - .4 Minimum 100 mm flame-resistant jute webbing sewn across the top.
 - .5 #6 brass grommets installed 25 mm in from each end with additional grommets equally spaced on maximum 305 mm centres.
 - .6 Minimum 76 mm offstage hems with 50 mm turnbacks.
 - .7 Minimum 152 mm bottom hem with 76 mm turnunder.
 - .8 Use new, black, tie line, 1,000 mm long at each grommet.
- .4 Traveller Panels
- .1 Panels shall be fabricated of 16 oz heavy duty 100% cotton, Commando cloth or equivalent.
 - .2 Colour to be black
 - .3 Sew with 50% fullness.
 - .4 Minimum 100 mm flame-resistant jute webbing sewn across the top.
 - .5 #6 brass grommets installed 25 mm in from each end with additional grommets equally spaced on maximum 305 mm centres.
 - .6 Minimum 150 mm offstage hems with 50 mm turnbacks.
 - .7 Minimum 300 mm bottom hem with 76 mm turnunder.
 - .8 Special Turner & Seymour #105 s-hooks to attach each grommet to a carrier.

2.10 MISCELLANEOUS HARDWARE

- .1 Eye Bolts: Shoulder type, 13mm (½"), forged eyebolts, Crosby S-279 or equal.
- .2 Turnbuckles: Jaw & eye turnbuckles, 8mm (5/16"), forged, Crosby HG-227 or equal.
- .3 Compressions Sleeves: Crosby "Cold Tuff™" Sleeve, or Nicopress copper; use recommended turn back and manufacturer's grip verification methods.
- .4 Shackles: Anchor shackles, bolt type, 8mm (5/16"), Crosby G-2130 or equal. Any equals must be pre-approved by the Owner or Consultant before use.
- .5 Channel:
 - .1 Channel, 41mm x 41mm (1 5/8" x 1 5/8"), structural channel, Unistrut P1000 or equal.
 - .2 Flat plate fitting, 41mm x 41mm (1 5/8" x 1 5/8"), Unistrut P1045 or equal.
 - .3 Spring nuts, Unistrut P1010 or equal.
 - .4 Remove all burrs and break sharp edges.
- .6 Cable Cradle: Altman Lighting, Part Number, Altman 512, 19mm to 32mm(¾" to 1 ¼")
- .7 Drapery Trim Chain: Description. No. 8 Jack Chain, length 305mm (12"); Quantity, one (1) per grommet on main drape.
- .8 Main Drape Operating Line :
 - .1 Manual: 9.5mm (3/8") black cord, length as required
 - .2 Winch: 3mm (1/8") galvanized aircraft cable, length, as required.

11 61 33 - STAGE DRAPERY & RIGGING

- | | | |
|-----|--------------------------|---|
| .9 | Steel Pipe: | Schedule 40 steel pipe, diameters as noted. Remove all burrs and break sharp edges |
| .10 | Unistrut Spring Nuts: | Hex nuts and bolts, SAE Grade 3 typical; 13 UNC threaded rod (remove burrs and sharp edges). |
| .11 | Washers and Flat Plates: | ANSI standard plain and helical spring lock washers; Unistrut Flat Plate fittings. |
| .12 | Beam Clamps: | Unistrut clamp assemblies as noted. |
| .13 | Batten Clamps: | H&H Specialties Inc.; Alvin or Kee clamps. |
| .14 | Wire Rope: | Galvanized 7 x 19, diameter as noted, use recommended turn back. |
| .15 | Thimble: | Wire rope thimbles, ¼", hot dip galvanized steel, Crosby G-411 or equal. |
| .16 | Other: | Additional hardware, components and responsibilities as required for the complete installation. |

PART 3 - EXECUTION**3.1 EXAMINATION OF WORK IN PLACE**

- .1 Before commencing installation, examine all work in place, including concrete block walls, steel work, mechanical and electrical work, and installed casework and equipment.
- .2 Advise the Consultant in writing of any site conditions which may delay or impede the installation of the System.
- .3 Commencement of the work shall imply acceptance of existing conditions.

3.2 INSTALLATION

- .1 The Subcontractor shall take full responsibility for supplying complete and fully functioning rigging system.
- .2 Tracks shall be supported from structure above using rated beam clamps, or threaded concrete anchors with 9mm threaded rod on a maximum of 1800mm centres. Utilizing suspended welded link chain (coil proof) is also acceptable, providing it has a minimum 365kg working strength. An 8:1 safety margin shall be required for all supports for drapery tracks border pipes and grids.
- .3 All tracks shall be mounted/supported in a manner to permit levelling and height adjustment in the future.
- .4 Tighten all hardware to manufacturer's specifications.

- .5 Use hardware only for its designed purpose.
- .6 Install all equipment generally as described by this documentation, as required by codes, and as intended by the manufacturers.
- .7 Install all pipes, track and channel parallel to the stage floor.
- .8 Report unforeseen or unsafe conditions to the Owner and the Consultant immediately.
- .9 The position of installed electrical and mechanical equipment shall take precedence during installation.
- .10 Inform the Consultant prior to adjusting any rigging positions.
- .11 All positions shall be finally determined on site.

3.3 DRAPERY INSTALLATION

- .1 Install drapery as soon as possible after the completion of the rigging installation.
- .2 Report unforeseen or unsafe conditions immediately.
- .3 Use trim chain with s-hooks on carriers as required.
- .4 Bottom of all drapery panels, when installed, shall be at the same level, hanging between 5mm and 25mm from the stage floor.
- .5 Installation Conditions
 - .1 The supplier will install the drapery panels on the rigging hardware.
 - .2 The Supplier will co-ordinate the delivery of the drapery with the rigging Contractor.
 - .3 All discarded materials are to be removed from the site and disposed of in an environmentally responsible and legal manner.
 - .4 Report unforeseen or unsafe conditions immediately.

3.4 DIMENSIONS

- .1 This project involves installation as part of new construction. All dimensions shall be determined by site conditions.
- .2 Distance from Plaster Line

.1	Valance	-200
.2	Main Drape	60
.3	1st Border	1400
.4	1st Legs	1600
.5	2nd Legs	2450
.6	2nd Border	3900
.7	3rd Legs	4600
.8	Upstage Traveller	6700
- .3 Distance from Stage Floor

DIVISION 11 - EQUIPMENT**NORWOOD DISTRICT HIGH SCHOOL
RENOVATIONS - PHASE 2
Tender No. PUR-19-24-ITT****11 61 33 - STAGE DRAPERY & RIGGING**

- | | | |
|----|-------------------|------|
| .1 | Valance | 4130 |
| .2 | Main Drape | 4570 |
| .3 | 1st Border | 5400 |
| .4 | 1st Legs | 5400 |
| .5 | 2nd Legs | 5400 |
| .6 | 2nd Border | 5400 |
| .7 | 3rd Legs | 5400 |
| .8 | Upstage Traveller | 5400 |
- .4 Length
- | | | |
|----|-------------------|-------|
| .1 | Valance | 12100 |
| .2 | Main Drape | 12100 |
| .3 | 1st Border | 14000 |
| .4 | 1st Legs | 15000 |
| .5 | 2nd Legs | 15000 |
| .6 | 2nd Border | 14000 |
| .7 | 3rd Legs | 17000 |
| .8 | Upstage Traveller | 20000 |
- .5 Quantities and Dimensions
- | | |
|----|--|
| .1 | one (1) Valance Drape Panel, height 750mm, width 12100 mm. |
| .2 | two (2) Main Drape Panels, height 4570 mm, width 6150 / Panel. |
| .3 | six (6) Leg Panels; height 5400 mm, width 1800 mm. |
| .4 | two (2) Border Panels; height 1300 mm, width 12800 mm. |
| .5 | two (2) Traveller Panels; height 5400 mm, width 6500 mm / Panel. |

3.5 DEMONSTRATION AND TRAINING

- .1 Provide demonstration of operation to the Owner and his representatives.
- .2 Provide training or maintenance and repairs to the Stage Rigging and Drapery.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- .1 Alluminum Windows and Doors Section 08 51 13
- .2 Acoustic Ceilings Section 09 51 00

1.2 WORK INCLUDED

- .1 Supply and installation of blackout shades in Cafetorium and Stage.
- .2 Supply and install manually operated window shades at all exterior windows in renovated rooms.
- .3 Removal of existing shades in all rooms.

1.3 SUBMITTALS

- .1 Submit list of proposed materials.
- .2 Submit manufacturer's specifications, product data, and other data needed to prove compliance with the specified requirements.
- .3 Shop drawings shall include sufficient detail to show fabrication, installation, anchorage, electrical and control wiring, and interface of the work of this Section with the work of adjacent trades. Indicate field measurements on shop drawings.
- .4 Manufacturer's recommended installation procedures which, when approved by the Consultant will become the basis for accepting or rejecting actual installation procedures used on the work.
- .5 Fabric to be flame retardant. Provide proof of compliance with CAN/ULC S109, Flame Tests of Flame-Resistant Fabrics and Films, small scale vertical burn requirement test.
- .6 Submit fabric samples for colour selection by the Consultant.
- .7 Provide printed operation and maintenance instructions for inclusion in maintenance manuals.

1.4 WARRANTY

- .1 Provide a warranty for an extended period of **three (3) years** from date of Substantial Performance.

12 24 00 - WINDOW SHADES**PART 2 - PRODUCTS****2.1 MATERIALS**

- .1 Window shades shall be Teleshade manually operated system with smooth operating chain and sprocket roller as manufactured by Solarfective Products Ltd., or equivalent by Draper Inc. Mecho/5 system by MechoShade, as manufactured by CartsPlus Healthcare Products Ltd., provided in accordance with these specifications, is an approved equivalent.
- .2 Provide system with easy lift (chain operated) action with infinite positioning. Left or right hand operation to be determined.
- .3 Provide fully factory assembled shade unit consisting of two end brackets, shade tube, extruded anodized aluminum fascia, hembar and specified fabric.
 - .1 Mounting type: Wall mounted above window opening.
 - .2 Removal must not require the disassembly of the shade units.
- .4 End Bracket:
 - .1 77x96mm end bracket shall be a two piece moulded ABS construction with a 64mm diameter nylon drive sprocket.
 - .2 Bracket colour shall co-ordinate with the fascia colour.
- .5 Shade Tube:
 - .1 38mm extruded anodized aluminum shade tube shall be 1.52mm thick with three internal continuous fins 4.82mm high, for strength and drive capabilities when attached to the nylon sprocket.
 - .2 The fins shall be spaced 120 degree apart.
- .6 Fascia: Extruded anodized aluminum fascia shall be 1.7mm thick, squared design, to cover underside of assembly.
- .7 Drive Assembly:
 - .1 Shall be factory set for size and travel of shades.
 - .2 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.
 - .3 Provide with a built-in shock absorber system to prevent chain breakage, under normal usage conditions.
- .8 Drive Chain: No. 10 stainless steel bead chain formed in a continuous loop. The chain shall have a 90# test strength.
- .9 Exterior Hembar: Extruded aluminum, clear anodized, with plastic end finials.
Finish to match side channels at blackout shades.
- .10 Blackout Side Channels: Clear anodized extruded aluminum channel guides with "fuzz", to reduce light infiltration at sides of the shades, at blackout shades only.

- .11 Blackout Shades (Cafetorium)
 - .1 Phifer ShearWave style 7000 blackout fabric.
 - .2 100% polyester with acrylic backing.

2.2 SHADING FABRIC

- .1 Standard shades (Classrooms & other renovated rooms):
 - .1 Solarfactive 300 Series Solar Block 3% open.
 - .2 Fabric shall be woven vinyl coated polyester.
- .2 Fabric shall hang flat, without buckling or distortion. Edge, when trimmed, shall hang straight, without ravelling. An unguided shade cloth shall roll true and straight, without shifting sideways more than 3mm in either direction due to warp distortion or weave design.
- .3 Fabric shall be dimensionally stable, and flame retardant, in accordance with CAN/ULC S-109 small scale vertical burn test.
- .4 Colours will be selected by the Consultant from the manufacturer's standard collection. A minimum of 8 colour choices must be offered.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS

- .1 Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- .1 Co-ordinate as required with other trades to assure proper and adequate provision in the work of those trades interfaced with the work of this Section.
- .2 Fasten support brackets to masonry and/or steel lintels. Fastening brackets to aluminum window or curtain wall frames will not be accepted.
- .3 Install the work of this section in strict accordance with approved Shop Drawings, pertinent requirements of government agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Consultant anchoring all components firmly into position for long life under School environment use.
- .4 Install the work plumb, level, and in proper operating condition.
- .5 Upon completion of the installation, put each operating component through at least five complete cycles, adjusting as required to achieve optimum operation and complete blackout at all edges.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Provide all countertops in Science Rooms and Prep. Room. Countertops shall be solid epoxy resin.
- .2 Provide all epoxy sinks and drain tail pieces in epoxy countertops.
- .3 All epoxy countertops and sinks must be ordered promptly after award of the construction contract due to long delivery dates for this product.

1.2 RELATED WORK

- | | | |
|----|----------------------|------------------|
| .1 | Framing and Grounds | Section 06 10 00 |
| .2 | Finish Carpentry | Section 06 20 00 |
| .3 | Custom Cabinets | Section 06 41 16 |
| .4 | Door Hardware | Section 08 71 00 |
| .5 | Laboratory Equipment | Section 11 53 00 |
| .6 | Plumbing Fixtures | Division 15 |
| .7 | Electrical | Division 16 |

1.3 SUBMITTALS

- .1 Refer to Section 01 33 23.
- .2 Submit two 300 x 300mm samples of all materials to the Consultant for approval. The samples shall be identified by the project number, date and the name of the contractor the samples shall show colours and details of edging, forming and construction. The materials used in the building shall correspond to the approved samples.
- .3 Shop Drawings:
 - .1 Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - .2 Show full-size details, edge details, attachments, etc.
 - .3 Show locations and sizes of furring, blocking, including concealed blocking and reinforcement required.
 - .4 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers and other items installed in countertops.
- .4 Submit data sheets for solid epoxy materials, adhesives, joint sealants, and sealers.
- .5 Submit testing results for epoxy work surface material confirming chemical resistance, water resistance, hardness, heat and fire resistance, impact and shock resistance, and flexural strength.
- .6 Maintenance Data and Materials:
 - .1 Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project closeout documents.
 - .2 Provide maintenance kit for finishes.

12 36 53 - LABORATORY WORK SURFACES**1.4 PROTECTION**

- .1 Refer to General Instructions Section 01 10 00.
- .2 Handle and store countertops in accordance with manufacturers recommendations.
- .3 Countertop surfaces shall be covered with heavy kraft paper, or tops shall be put in cartons for protection during shipment.
- .4 If protective film is provided, do not remove until counters have been installed.
- .5 Comply with the printed directions, issued by the material manufacturers.

1.5 WARRANTY

- .1 Epoxy countertops shall be warranted against warping or defects in manufacture for a period of **five (5) years** from the date of Substantial Performance.
- .2 Work showing defects during the warranty periods shall be replaced or made good without delay and at no expense to the Owner.

PART 2 - MATERIALS**2.1 MATERIALS - WORK SURFACES**

- .1 Counters to be cast from modified epoxy resin and non-asbestos inert fillers; resin formulated, cured and thermoset to provide exceptional resistance to chemicals, heat, and abuse, for laboratory use.
- .2 Epoxy resin countertops to be as manufactured by Durcon Inc., as supplied by CIF Lab Solutions LP or Mott Manufacturing.
- .3 Counters to be monolithic, non-porous, and with non-glare finish; colour: Black Onyx.
- .4 All joining fittings, fixing clips, adhesives, and sealants shall be as recommended by the manufacturer.

2.2 SINKS AND ACCESSORIES

- .1 Sinks and accessories shall be from same manufacturer as that of epoxy countertops.
- .2 Epoxy Sinks:
 - .1 Durcon undermount sinks, integrally moulded from modified thermosetting epoxy resin, and oven cured.
 - .2 Wall thickness of nominal 12mm
 - .3 All interior corners coved to 38mm radius
 - .4 Bottoms pitched to the outlet opening
 - .5 Colour: Black Onyx
 - .6 Type S1: Durcon U23C, 400mm long x 400mm wide x 300mm deep

- .7 Type S2: Durcon U10C, 406mm long x 203mm wide x 178mm deep
- .3 Sink Outlets:
 - .1 Polypropylene outlet with 36mm outlet opening and 38mm NPSM threads
 - .2 Outlet Colour: Black Onyx
 - .3 Sink outlets shall accommodate a plastic disc strainer
 - .4 Durcon model S03-R
- .4 Sink Overflows:
 - .1 Sink overflows shall have an open intake located at least 50mm lower than the sink rim when installed.
 - .2 Overflow base shall taper to fit all 36mm outlet openings.
 - .3 Overflow Colour: Black Onyx
 - .4 Durcon model U-OE Open End Overflow; pipe length to suit installation.
 - .5 With Durcon model O.E.S. strainer cap.

2.3 FABRICATION

- .1 Fabricate epoxy resin laboratory countertops in accordance with manufacturer's recommendations, and final reviewed shop drawings. Supply finished countertops in maximum practical length up to 2438 mm finished. Bond all joints with chemical and corrosion resistant epoxy grout.
- .2 Typical work surface:
 - .1 Nominal 25 mm thick, flat.
 - .2 Surface finish to be smooth, non-glare matte finish with clean exposed edges in uniform plane, free of defects.
- .3 Edge profile: All exposed work surface edges and corners shall have 3 mm radius.
- .4 Drip Grooves:
 - .1 Provide continuous drip grooves under all work surface exposed edges.
 - .2 Drip grooves shall be 13 mm, set back from the front edge where the top overhangs 25 mm and 6 mm from the edge where the edge overhangs 13 mm.
 - .3 The drip groove is to be 3.2 mm deep and 3.2mm wide.
- .5 Curbs and Backsplashes:
 - .1 25 mm, to match thickness of countertops
 - .2 Height: 100 mm, unless noted otherwise on drawings.
 - .3 Same material as countertops and bonded or field applied to the surface of the work surface top to form a square 90 degree joint.
 - .4 Include end curbs where work surfaces end at walls, adjacent cabinetry, fume hoods, and other locations indicated on drawings
- .6 Sink Mounting:
 - .1 Epoxy sinks are to be mounted under counter. Make cutouts in the countertop material 6mm to 13mm larger than the inside diameter of the sink being installed. The sink is to be applied to the underside of the countertop with Epoxy Adhesive and secured in place with Sink Supports until adhesive cures, and shall be left in place thereafter. Apply additional epoxy adhesive under the countertop ledge to create a complete and water tight seal.

12 36 53 - LABORATORY WORK SURFACES

- .2 Drop in Sink Cutout - Provide cutouts profiled to provide support for the sink, and to ensure that the rim of the installed sink is 3 mm below the surrounding work surface level or bottom of drain grooves, if present. The top edge of the cutout shall have 3 mm bevel. Ensure that there shall be no gaps between the installed sink rim and work surface. Coordinate with plumbing subtrade.
- .7 Provide all faucet & utility holes and cutouts as required for built in equipment and mechanical and electrical service fixtures.
 - .1 Verify size and location of opening with actual size of equipment to be used prior to making openings.
 - .2 Form inside corners to a radius of not less than 3 mm. After drilling, rout and file cutouts to ensure smooth, crack free edges.
 - .3 Seal exposed edges after cutting with a waterproofing material recommended by the manufacturer.
- .8 Install bases for retort stands, supplied in Section 11 53 00.

PART 3 - EXECUTION**3.1 EXAMINATION OF SURFACES AND CONDITIONS**

- .1 Examine work in place and report any deficiencies or dimensional discrepancies to Consultant, in writing. Commencement of installation of the Work of this section will infer acceptance of existing conditions.
- .2 Surface and ambient temperatures shall be minimum of 20°C at a relative humidity between 20 to 80%.

3.2 INSTALLATION

- .1 Install all work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around periphery and where fixed objects pass through or project into countertops, to permit normal movement without restriction.
- .3 Secure work by concealed means in an approved manner (or as detailed). Fasteners shall not be more than 600mm o.c. and 150mm from edges and ends. Where concealed fastening is not possible use stainless steel trim threaded screws with matching cup washers or other approved means.
- .4 Install epoxy resin countertops in accordance with manufacturer's instructions, using their recommended silicone or Epoxy resin adhesive for attachment to the casework.
 - .1 All square butt joints, splashes and sealing around sinks to be with manufacturer's recommended compatible chemical resistant epoxy adhesive.
 - .2 Provide all hardware and accessories required for the complete installation.
 - .3 Coordinated with forces installing plumbing fixtures and fittings, including stainless steel sinks, specified in Division 15.

- .5 Upon completion of installation remove identification marks and clean surfaces. Protect as specified above.
- .6 At junction of counter back splash and adjacent wall finishes, apply small bead of sealant. Walls shall be cleaned of chalk lines, dirt, grease, etc., before sealant is applied.

3.3 CLEANING AND PROTECTION

- .1 Remove any stickers immediately after installation.
- .2 Clean counters, sinks and splashbacks in accordance with manufacturer's recommendations.
- .3 Protect installed countertop surfaces with heavy kraft paper secured in position with masking tape. Do not remove until immediately prior to occupancy of renovated areas by Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|---------------------|------------------|
| .1 | Grading | Section 31 22 00 |
| .2 | Excavation and Fill | Section 31 23 00 |
| .3 | Topsoil | Section 32 91 00 |

1.2 SITE CONDITIONS

- .1 Establish the location of all utilities and buried objects prior to commencement of any work. Known underground and surface utility lines and buried objects are indicated on the drawings.
- .2 It is assumed that all soils adjacent to and below any asphalt and concrete paving will be contaminated with de-icing salts. Include for disposal of site soils at facilities accepting salt contaminated materials.

1.3 PROTECTION

- .1 Prevent damage to existing building, roads, sidewalks , trees, landscaping, natural features, bench marks, and surface or under-ground utility lines which are to remain. Repair any damage.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 N/A

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

- .1 Coordinate with forces doing demolition work.
- .2 Clear work area of all vegetation, sod, topsoil, paving, and gravel, prior to excavation and grading required for new Work. Remove tree stumps so that they do not constitute an obstruction to services and underground work or cause later settlement of paved areas.
- .3 Dig out and remove all roots, boulders, loose rocks or other obstructions encountered. If any large rocks are excavated they may be left on site provided they are located as directed by the Consultant.
- .4 All trees and plants to be retained must be properly protected, to municipal standards.
- .5 Note that no usable topsoil is expected to be available site; topsoil is to be imported, as specified in Section 32 91 00. Claims for removal or supply of topsoil will not be considered.

31 10 00- SITE CLEARING

3.2 SURPLUS MATERIAL

- .1 Remove surplus materials from site.
- .2 Remove materials unsuitable for fill, grading or landscaping from site.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|---------------|------------------|
| .1 | Site Clearing | Section 31 10 00 |
| .2 | Topsoil | Section 32 91 00 |

1.2 SITE CONDITIONS

- .1 Establish the location of all utilities and buried objects prior to commencement of any work.
- .2 Contractor will be responsible for providing adequate site access and storage areas.
- .3 It is assumed that all soils adjacent to and below asphalt and concrete paving will be contaminated with de-icing salts. Include for disposal at facilities accepting salt contaminated materials.

1.3 QUALITY CONTROL

- .1 Testing and inspection by a Geotechnical Testing and Inspection Company is required. Refer to the Field Quality Control specifications included in Section 31 23 00, Excavation and Fill.
- .2 Costs of testing and inspection will be paid from the Cash Allowance included in the Contract. Refer to Section 01 10 00.
- .3 These specifications include the requirement for the provision of a topographical survey after the completion of finish grading as specified under the Finish Grading subsection, below. The cost of this survey is to be included in the Contract.

1.4 PROTECTION

- .1 Prevent damage to existing natural features, bench marks, surface or under-ground utility lines which are to remain. Make good any damage.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Obtain Consultants approval of all material used as fill for grading work. Protect approved material from contamination.
- .2 All backfilling and granular materials must conform to Section 31 23 00. Fill types referenced below are listed in that Section.
- .3 Fill at landscaped/sodded areas: Fill shall be clean imported fill, free from contaminants, and approved by Inspection Company (Fill Type F6).
- .4 Fill at paved areas and slab-on-grade: Fill shall be Fill Type F2, clean, granular imported fill, suitable for compaction to 98% Standard Proctor modified dry density and approved by Inspection Company.

SECTION 31 22 00 - GRADING**PART 3 - EXECUTION****3.1 GRADING**

- .1 Rough grade to depths required for surface finishes indicated.
- .2 Prior to placing fill over existing ground at landscaped areas, scarify surface to depth of 150mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .3 Prior to placing fill over existing ground at paved areas remove any wet and/or soft spots and re-compact the surface to 98% Standard Proctor Maximum Dry Density.
- .4 Do not exceed slopes of 1:3 at landscaped areas and 1:4 otherwise unless indicated and ensure that subgrade is sloped to drain water away from the building.
- .5 Slope rough grade away from the building at minimum slope of 2% min.
- .6 Grade ditches to depth required for maximum run-off as indicated.
- .7 At paved areas, lay and compact fill Type F2 to at least 98% of its Standard Proctor maximum dry density, prior to placement of the granular sub-base course. Remove soft or saturated areas encountered, replace with approved imported fill, and compact as above.
- .8 At sodded and landscaped areas, bring grades up to levels required for placement of topsoil with imported fill. Lay and compact fill generally to 95% Standard Proctor maximum dry density, and to 98% SPMDD within 3m of building or paved areas, to ASTM D698.

3.2 FINISH GRADING

- .1 Import and place topsoil to depths indicated at sodded, seeded and landscaped areas. Fine grade and loosen topsoil. Eliminate rough spots and low areas to ensure positive drainage.
- .2 Roll to consolidate topsoil for areas to be sodded, leaving surface smooth, uniform, firm against deep foot printing. Refer to Section 32 91 00 for topsoil.
- .3 After completion of finish grading, and before commencement of sodding and landscaping, submit a topographical survey, prepared by an Ontario Land Surveyor, indicating finished grades. Grades must be accepted by the Consultant before work proceeds. Refer to Section 32 91 00.

3.3 SURPLUS MATERIAL

- .1 Remove surplus material from site. On site material, approved by Consultant, can be used as fill only at landscaped areas.
- .2 Remove material unsuitable for fill, grading or landscaping from site.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|---------|------------------|
| .1 | Grading | Section 31 22 00 |
| .2 | Sodding | Section 32 92 23 |

1.2 TESTING

- .1 Provide sufficient topsoil for work of this project. Import sufficient topsoil to provide depths as specified herein, and remove any excess topsoil from site after final grading.
- .2 Test all topsoil for residual pesticides, phosphorus, potassium, nitrogen, pH, organic content and soil structure (sand/silt/clay).
- .3 Submit one box of each source of topsoil to testing laboratory and indicate intended use and type of organic material to be applied.
- .4 Determine required lime or sulphur treatment to bring pH value of soil to 5.5 to 7.5 level.
- .5 Submit one copy of soil analysis and recommendations for corrections to Consultant.
- .6 Testing of topsoil to be carried out by Agri-Food Laboratories, Unit 1, 503 Imperial Road, Guelph, Ontario N1H 6T9 or A. and L. Laboratories, 2136 Jetstream Road, London, Ontario, N5V 3P5. Provide tests of imported topsoil & provide test for each source used.
- .7 Cost for testing to be included in Contract.

1.3 SAMPLES

- .1 If requested, submit to the Consultant 0.2kg samples of the following materials:
 - .1 Fertilizer
 - .2 Agricultural limestone
 - .3 Sulphur
 - .4 Peatmoss
 - .5 Bonemeal

1.4 SCHEDULING OF WORK

- .1 Schedule placing of topsoil and finish grading to permit sodding operation within one week.

1.5 SURVEY

- .1 On completion of finish grading, and before commencing sodding, submit a survey prepared by a registered Ontario Land Surveyor indicating grades. Grades must be verified by the Consultant prior to sodding.

SECTION 32 91 00 - TOPSOIL

PART 2 - MATERIALS

2.1 MATERIALS

.1 Topsoil for General Use:

- .1 Topsoil to be friable, soil texture to consist of 45 % sand, 35 % silt and 20% clay and contain a maximum of 5 % organic matter.
- .2 Free from subsoil, roots, grass, weeds, toxic materials, stones, foreign objects and with an acidity range (pH) of 5.5 to 7.5.
- .3 Topsoil containing crabgrass or noxious weeds is not acceptable.

.2 Peatmoss:

- .1 Decomposed plant material, fairly elastic and homogenous, free of decomposed colloidal residue, wood, sulphur and iron containing minimum 60% organic matter by weight and moisture content not exceeding 15%.
- .2 Shredded particles may not exceed 6mm in size. Minimum pH value of peat 4.5, maximum 6.0.

.3 Fertilizer:

- .1 Complete commercial synthetic slow release fertilizer with minimum 65 % insoluble nitrogen.
- .2 Formulation ratio and quantity as recommended by soil test results.

.4 Lime:

- .1 Ground agricultural limestone containing minimum 85 % of total carbonates.
- .2 Gradation requirements: percentage passing by weight, 90 % passing 1.0mm, sieve, 50 % passing 125 micrometer sieve.
- .3 Use lime as indicated by acidity analysis of topsoil to bring pH to required level.

.5 Bonemeal: raw bonemeal, finely ground with a minimum analysis of 20 % phosphoric acid.

.6 Manure: well rotted cattle manure.

.7 Sulphur: finely crushed agricultural elemental sulphur, free of impurities.

2.2 SOIL MIXTURE FOR PLANTING

- .1 Planting soil mixture to be 9 parts imported general use topsoil, 1 part peatmoss and 1.5 kg of superphosphate per cubic metre of planting soil.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Grade subgrade, eliminating uneven areas and low spots, ensuring positive drainage. Remove debris, roots, branches, stones in excess of 50mm diameter and other deleterious materials. Remove subsoil that has been contaminated with oil, gasoline or calcium chloride.
- .2 Cultivate entire area which is to receive topsoil to depth of 100mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted subgrade.

3.2 SPREADING OF TOPSOIL

- .1 Do not spread topsoil until Consultant has inspected and approved subgrade and topsoil.
- .2 Spread topsoil with adequate moisture in uniform layers during dry weather over approved, dry, unfrozen subgrade, where sodding or seeding is indicated.
- .3 Apply topsoil to minimum depths:
 - .1 150mm for sodded areas.
 - .2 300mm depth for sports field.
 - .3 450mm depth for shrub beds.
 - .4 900mm depth for trees.

3.3 SOIL AMENDMENTS

- .1 Apply soil amendments at rate as specified and as determined from soil sample test.
- .2 Mix soil amendments into full depth of topsoil prior to application of fertilizer.

3.4 APPLICATION OF FERTILIZER

- .1 Spread fertilizer uniformly over entire area of topsoil at rate determined on basis of soil sample test.
- .2 Mix fertilizer thoroughly to full depth of topsoil.

3.5 FINISH GRADING

- .1 Fine grade and loosen topsoil. Eliminate rough spots and low areas to ensure positive drainage.
- .2 Roll to consolidate topsoil for areas to be sodded, leaving surface smooth, uniform, firm against deep foot printing.

SECTION 32 91 00 - TOPSOIL

- .3 Keep topsoil 15mm below finished grade for sodded areas; elsewhere, bring topsoil up to finished grade.

3.6 SURPLUS MATERIAL

- .1 Dispose of surplus materials off site.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 All areas of site indicated as new sod are to be prepared with topsoil, graded and fertilized, and finished with first quality sod.
- .2 Resod all grassed areas affected by the Work of this Contract. Regrade grassed areas rutted by vehicular movement or other construction activities, and place new topsoil, fertilize, and provide sod to these specifications.
- .3 Sod is to be watered and maintained until ready for first mowing, and mowed as detailed below.
- .4 Newly sodded areas are required to be protected with temporary fencing, at the Contractor's expense, until the time of acceptance; refer to Section 01 56 00, Temporary Barriers and Controls.

1.2 RELATED WORK

- | | | |
|----|-------------------|------------------|
| .1 | Temporary fencing | Section 01 56 00 |
| .2 | Grading | Section 31 22 00 |
| .3 | Topsoil | Section 32 91 00 |

1.3 SOURCE QUALITY CONTROL

- .1 Obtain approval from Consultant of source of sod.
- .2 When proposed source of sod is approved, use no other source without written authorization.

1.4 SCHEDULING

- .1 Schedule sod laying to closely follow topsoil operations.

1.5 SURVEY

- .1 Before commencing with the work of this section, submit a survey prepared by a registered Ontario Land Surveyor indicating grades. Do not proceed until grades have been verified by the Consultant. Refer to section 32 91 00.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Nursery sod: Number one Kentucky Bluegrass sod, nursery grown solely from seed of cultivars of Kentucky Bluegrass with a minimum mixture of 3 Kentucky Bluegrass cultivars. All sod to conform to Canadian Standards for Nursery Stock, latest edition.
- .2 Topsoil: Refer to Section 32 91 00 Topsoil.

SECTION 32 92 23 - SODDING

- .3 Water: potable.
- .4 Herbicide: type, rate, and method of application as approved by Owner.
- .5 Fertilizer: complete, synthetic, slow release fertilizer with maximum 35% water soluble solution.
- .6 Wooden Pegs: Used for pegging sod on steep slopes shall be hardwood pegs, minimum 230mm long and approximately 25mm x 25mm square, or approved equal. In all cases, pegs shall be of sufficient length to ensure satisfactory anchorage of the sod.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Prior to laying of sod, submit the following to the Consultant:
 - .1 Test results for the composition of top soil
 - .2 Written confirmation of the depth of top soil
 - .3 Written confirmation of the composition of the sod that is being used
 - .4 Written confirmation that the sod has been fertilized
 - .5 Survey indicating finished grades
- .2 Do not proceed with laying of sod until in receipt of written acceptance of the grading and top soil from the Consultant.

3.2 CUTTING, HANDLING AND STORAGE

- .1 Sod shall be cut by approved methods in accordance with recommendations of the Nursery Sod Growers Association of Ontario. In addition it shall be cut in pieces, approximately one (1) square metre in area with the soil portion having a minimum of 20mm.
- .2 Sod shall be rolled or folded prior to lifting in such a manner as to prevent tearing or breaking.
- .3 Sod shall be protected during transportation to prevent drying out and shall arrive at the site in a fresh and healthy condition.
- .4 Sod shall be installed immediately after arrival. If there is any delay in installation the sod shall be kept moist and cool at all times until installation.
- .5 All commercial fertilizer shall be packed in standard containers, clearly marked with the name of the manufacturer, weight and analysis.
- .6 Fertilizer shall be stored in a weatherproof storage place and in such a manner that it will stay dry and its effectiveness is not impaired.

3.3 LAYING OF SOD

- .1 All rough grading, filling, spreading of topsoil and fine grading and other preparation work required, shall be executed and completed as described in the appropriate sections of these specifications.
- .2 The specified fertilizer shall be applied to and well worked into the topsoil by discing, raking or harrowing, at the rate specified. This shall be done 48 hours before laying sod.
- .3 The finished surface shall be smooth, firm against footprints, with a fine, loose texture before sod is placed.
- .4 Sodding operations shall take place during suitable weather conditions and on ground which is free from frost, snow and water. Sod shall be laid as soon as possible after delivery to prevent deterioration. Sod shall be laid closely knit together in such a manner that no open joints are visible, or pieces are overlapping. Sod shall be laid smooth and flush with adjoining grass areas and paving and top surface of curbs unless shown otherwise on the drawings.
- .5 On any slopes of 4:1 and steeper, sod shall be laid perpendicular to the slope, and every row shall be pegged with wooden pegs at intervals of not more than 600mm. Pegs shall be driven flush with sod. For drainage swales place 5 pegs per square metre.
- .6 After installation of sod, the area shall be watered immediately with sufficient amounts to saturate the sod and upper 100mm of soil.
- .7 After sod and soil has dried sufficiently to prevent damage, the area shall be rolled with a roller providing 680kg pressure per square metre, to ensure a good bond between sod and soil and to remove minor depressions and irregularities.
- .8 Protect all newly laid sod areas until vigorous, hardy, even growth is established, and to time of acceptance as specified below. Temporary fencing is specified in Section 01 56 00, Temporary Barriers and Controls.

3.4 MAINTENANCE

- .1 Maintenance for sodded areas shall begin immediately after sod has been installed and shall continue until the date of acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist to depth of 75mm to 100mm.
- .3 Cut grass when required to maintain a maximum height of 65mm. Not more than 1/3 of blade shall be cut at any one mowing. Edges of sodded areas shall be neatly trimmed and hand clipped where necessary. Heavy clippings shall be removed immediately after mowing and trimming. Cut minimum of two (2) times.

SECTION 32 92 23 - SODDING

- .4 Maintain sodded areas weed free by mechanical or chemical means, using locally accepted integrated pest management practices. When herbicides are used they shall be applied in accordance with manufacturer's recommendations. Any damage resulting from Contractor's use of herbicides shall be remedied at his expense. Herbicides are not to be used where prohibited by local bylaws.
- .5 Fertilize sodded areas one month after sodding with 2:1:1 ratio fertilizer. Spread fertilizer evenly at rate of 0.5 kg of nitrogen/100m² and water well.
- .6 Erosion occurring as a result of faulty workmanship and/or materials on the part of the Contractor shall be repaired at his expense.
- .7 Any sodded areas which show deterioration or bare spots shall be repaired immediately.

3.5 ACCEPTANCE

- .1 Sodded areas will be accepted when:
 - .1 Sodded areas are properly established and are in a vigorous growing condition.
 - .2 Sod is free of bare and dead spots and without weeds.
 - .3 No surface soil is visible when grass has been cut to height of 50mm.
 - .4 Sodded areas have been cut minimum two times.
- .2 Areas sodded in fall will be accepted in following spring, one month after start of growing season, provided acceptance conditions are fulfilled.

3.6 WARRANTY

- .1 Sodded areas will be under a warranty period covering two full growing seasons from the date of final acceptance and or substantial performance, whichever comes later.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Maintenance work during the warranty period will include, but not be limited to:
 - .1 Replacement of all bare and dead spots with new sod, and protection of resodded areas with approved methods.
 - .2 Rolling of sodded areas to maintain surface drainage patterns and eliminate any depressions, ponding or low spots.
 - .3 Repair and regrading of all areas of settlement.
- .2 Notify the Owner upon completion of the maintenance period to arrange review of sodded areas and transfer of maintenance responsibilities.

END OF SECTION