

TECHNICAL SPECIFICATIONS FOR :

PROJECT:

RENOVATION TO WAVERLEY DRIVE PUBLIC SCHOOL

CLIENT:

UPPER GRAND DISTRICT SCHOOL BOARD

PROJECT No.:

16127

TENDER No.:

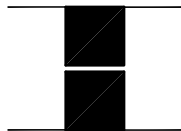
DATE:

MARCH 2017

BINDER:

A ARCHITECTURAL, STRUCTURAL, ARCHITECTURAL DETAIL DRAWINGS & DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS SURVEY

ARCHITECT:



**HOSSACK
& ASSOCIATES**
ARCHITECTS

4-2150 DUNWIN DRIVE
MISSISSAUGA, ONTARIO L5L 5M8
Tel (905) 607-8284 Fax (905) 607-8290

CONSULTANTS & ENGINEERS :

ALSPEX Building Consultants Inc.
66 Westlawn Drive, Hamilton, Ontario, L8B 2K3
Tel: 905-575-0038 Fax: 905-575-0038 E-mail: info@alspex.ca

KALOS ENGINEERING INC.
875 MAIN ST. W. UNIT 3 HAMILTON, ONTARIO L8S 4P9 905-512-2619

875 Main Street W, Unit 3, Hamilton, ON L8S 4P9
Phone: 905-333-9119
Email: info@kaloseng.ca
Website: kaloseng.ca

DEI & ASSOCIATES INC.
BUILDING SERVICE CONSULTING ENGINEERS

40 Durward Place, Waterloo, ON N2L 4E4
Phone: 519-725-3555 Fax: 519-725-2515
Email: dei@dejassociates.ca Website:
dejassociates.ca

SET NUMBER



PROJECT NAME

Renovations to Waverley Drive Public School
140 Waverley Drive
Guelph, ON N1E 1H1,

PROJECT OWNER

UPPER GRAND DISTRICT SCHOOL BOARD
500 Victoria Road North
Guelph ON N1E 6K2

CONSULTANTS

ARCHITECT

HOSSACK & ASSOCIATES ARCHITECTS
2150 Dunwin Drive, Unit 4
Mississauga, ON L5L 5M8
Tel.: (905) 607-8284
Fax: (905) 607-8290

STRUCTURAL ENGINEERING CONSULTANTS

KALOS ENGINEERING INC.
875 Main St. W. Unit 3
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Tel.: (905) 512-2619

MECHANICAL & ELECTRICAL CONSULTANTS

DEI & ASSOCIATES INC.
40 Durward Place
Waterloo ON N2L 4E4
Tel.: (519) 725-3555
Fax: (519) 725-2515

ROOFING CONSULTANT

ALSPEX BUILDING CONSULTANTS INC.
Tel: (905)-575-0038
E-mail: info@alspex

END OF SECTION

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No **DIVISION 11- Equipment**

No items in this section.

DIVISION 12- Furnishings

No items in this section.

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No items in this section.

MECHANICAL AND ELECTRICAL: DIVISIONS

Refer to Binder B

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No items in this section

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No items in this Section

SPECIFICATIONS BINDER “A”

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ELECTRICAL DIVISION

SPECIFICATIONS BINDER "C"

Copy of Previous Designated Substance Surveys provided for Information

Asbestos Building Materials Survey, June 14, 2007, Golder Associates Ltd.

Asbestos-Containing Materials Visual Reassessment, April 30, 2015, Golder Associates Ltd.

DRAWING SET

Refer to Cover Page of Drawings for the complete Drawing List including Architectural, Mechanical and Electrical drawings.

END OF TABLE OF CONTENTS

1. INSTRUCTIONS TO BIDDERS

This Section is intended to guide the Construction manager in tender procedures and the coordination of sub-trade bids. Any tender that does not comply with the ***Instructions to Bidders and Supplementary General Conditions*** must be approved by the Board Project Manager.

1.1. DEFINITIONS

- 1.1.1. The words “Bidder” & “Tenderer” and “Bids” & “Tenders” are interchangeable in the documents and their meanings are identical.
- 1.1.2. The words “Owner” & “Board” are interchangeable in the documents and their meanings are identical.

1.2. DESCRIPTION

- 1.2.1. Work under this Contract covers the construction of the Project as identified in the Contract Documents.
- 1.2.2. Work not included in Contract comprises of a list of items as identified in the ***General Instructions***.

1.3. CONTRACT

- 1.3.1. Consult all Contract Documents consisting of the following:
 - 1.3.1.1. Standard Form of Agreement “*Construction Management Contract for Services and Work, CCDC-5B, 2010*” and “*Amendments to the Construction Management Contract for Services and Work, CCDC-5B, 2010*”
 - 1.3.1.2. Instructions to Bidders Section 00 21 13
 - 1.3.1.3. General Instructions and Summary Work Section 01 11 00
 - 1.3.1.4. Specifications as listed in the Specification Index prepared by the Architect and Consultants.
 - 1.3.1.5. Drawings as listed in the Drawing Index and Detail Sheets as listed in the Detail Sheet Index and as applicable - prepared by the Architects and Consultants.
 - 1.3.1.6. Any Addenda issued prior to the closing of tenders.

1.4. BOARD

- 1.4.1. The “Owner” of the project is:

**Upper Grand District School Board
500 Victoria Road North
Guelph, ON. N1E 6K2**
- 1.4.2. The words “Owner” & “Board” are interchangeable in the Documents and their meanings are identical.

1.5. ARCHITECT

1.5.1. The Prime Consultant (Architect) on this project is identified in the Contract Documents.

1.6. CONSULTANTS

1.6.1. The Sub-Consultants on this project are identified in the Contract Documents.

1.7. CONSULTANTS

1.7.1. The Sub-Consultants on this project are identified in the Contract Documents.

1.8. BID SUBMISSION

1.8.1. The particular details of the sub-contractor bid submissions will be coordinated by the Construction Manager.

1.9 ALTERNATE, SEPARATE AND ITEMIZED PRICES

1.9.1 All prices submitted take into consideration and allow for changes and adjustments in other Work as may be necessary, to provide a finished and functional result, unless specifically indicated otherwise.

1.9.2 Supply any Itemised, Alternate and Separate Prices requested by the Board and as may be described in the tender documents.

.1 **ELECTRICAL-PA SYSTEM:** Refer to Electrical Specifications and Drawings for alternate price for Public Address system. PA speakers with handsets will be the base bid and an Alternate Price for PA speakers with integral call switches is to be provided.

.2 **ARCHITECTURAL-CLADDING:** Refer to architectural and structural plans for window-wall system replacement with new cold rolled stud system. Supply alternate prices for cladding as may be indicated on the drawings or requested by the Architect or Board Project Manager.

1.9.2 The Board reserves the right to accept or reject any of the Alternate or Separate prices proposed.

1.10. SUB-CONTRACTORS

1.10.1. For the information of the Project Manager a list of Prequalified Sub-Contractors is listed herein. The Project Manager may, but is not required to engage sub-contractors from this list.

1.10.2. The selection of all Sub-Contractors must be acceptable to the Board and to the Consultants. If the required substitution of a Sub-Contractor affects the sub-tender price, an adjustment will be made in the amount of the General Contract by the amount only of the difference in sub-tenders, without additional overhead or profit to the General Contractor.

- 1.10.3. Sub-Contractors shall be actually engaged as their own recognized business, in the line of Work required by the specifications and shall carry out themselves the Work which they are awarded by subcontract. They shall not be permitted to re-subcontract their Work or portions thereof, to other contractors. THIS INCLUDES SHOP DRAWINGS.

1.11. COMPLETION DATES

- 1.11.1. The Construction Manager shall cooperate with the Board Project Manager in the determination of Completion dates
- 1.11.2. Work must continue during all adverse weather conditions as necessary to ensure meeting the completion dates agreed to.

1.12. OCCUPANCY REQUIREMENTS

- 1.12.1. The building(s) shall be deemed to be ready for full legal occupancy when the building is “Substantially Complete” and meeting the requirements of OAA/OGCA Document 100, Construction Lien Act (latest amendments) and occupancy approval of Authorities Having Jurisdiction.

1.13. BID BOND, PERFORMANCE BOND, LABOUR & MATERIAL BOND/MAINTENANCE BOND

- 1.13.1. Supply any Bonds as deemed required by the Owner.

1.14. PREQUALIFIED SUB-CONTRACTORS

- 1.14.1. The Construction Manager may, but is not required to, select from the following Pre-Qualified **Mechanical Sub-Contractors. Consult the Board Project Manager of other Board pre-qualified subcontractors who may be added to this list:**

1. Bessling Mechanical
2. BML Multi Trades
3. Conestogo Mechanical
4. Kittel Mechanical (2003) Inc.
5. O’Brien Fabrications Ltd.
6. Superior Boiler Works
7. Sutherland Schultz
8. Wellington Plumbing & Heating
9. Pilon Mechanical
10. Riteway Mechanical Ltd.
11. Roberts On-Site
12. Soan Mechanical
13. Stellar Mechanical

1.14.2. The Construction Manager may, but is not required to, select from the following Pre-Qualified **ELECTRICAL Sub-Contractors. Consult the Board Project Manager of other Board pre-qualified subcontractors who may be added to this list:**

1. Angton Electric
2. CEC Services
3. Harold Stecho Electric
4. Juno Electric
5. MJM Electric Limited
6. T. Lloyd Electric
7. Turnay Electric
8. Yake Electric
9. P&S Electric
10. Roberts On-Site
11. Robertson Bright Inc.
12. Sutherland Schultz Ltd.

1.15. SUB-CONTRACT BIDDERS

1.15.1. Persons or firms submitting sub-contract proposals shall be actually engaged as their recognized business in the lines of Work required by the specifications, and shall be able to refer to Work of a similar character which has been satisfactorily performed by them.

1.16. FAIR WAGE AND LABOUR

1.16.1. Rate of wages, hours and conditions of Work shall be in accordance with Provincial Codes and as generally recognized and accepted in the locality. Building mechanics and labourers resident in the district are to be employed where suitable.

1.16.2. Labour forces employed on the site may have compatible affiliation with any labour organization. Union contract itself is not a prerequisite.

1.17. DISCREPANCIES AND OMISSIONS

1.17.1. Bidders, including Sub-Contractors, finding specified items unavailable, 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 at once notify the Consultant, who will issue a Bulletin to all Bidders in explanation of the inquiry if necessary.

1.17.2. All definitions, Addenda, explanations, corrections or additional information will be issued by the Consultant during the time of bidding in the form of typewritten Bulletins and such Bulletins will be available to the Construction Manager. **It is the Construction Manager's responsibility to**

coordinate this information to inform all sub-contractors or other potential bidders throughout the pricing process.

1.17.3. NO ORAL INSTRUCTIONS WILL BE VALID.

1.18. BIDDING ASSUMPTIONS

1.18.1. All bids submitted, including bids by Sub-Contractors, are assumed to be based upon the complete set of Contract Documents. No alterations in prices for items of Work will be considered if it is determined by the Consultants, or the General Contractor, that bids were not based on the complete set of documents (e.g. bids based upon Specifications but not on drawings and vice-versa).

1.19. ERRORS IN TENDER

1.19.1. The Board shall not entertain requests for gratuitous payments arising from errors alleged to have been made in a Tender that the Board has accepted.

1.20. INQUIRY AND INSTRUCTION

1.20.1. All correspondence, inquiries, instructions, etc. in connection with the Work shall be made **by Fax or email**, through the office of the Architect (Prime Consultant) whose name, contact person, address and telephone and fax numbers appear below:

Attention: Chris Telfer
Hossack & Associates Architects,
5-2155 Dunwin Drive, Mississauga, ON L5L 4M1
Fax: (905) 607-8290
Email: ctelfer@hossackarch.com

1.21. EXAMINATION OF SITE

1.21.1. Visit the project site and surrounding area before submitting prices and ensure all sub-contractors similarly are made familiar with site conditions.

1.25.2 There is no pre-arranged Site Orientation arranged for this project.

1.25.3 The Construction manager and subtrades shall examine the site, and review all existing conditions. Where required, in conjunction with the Board Project Manager perform or have performed on site investigations to determine the make-up or condition of components, etc.

1.25.4 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 ALLOWANCE WILL BE MADE FOR FAILURE TO EXAMINE THE EXISTING SITE.**

1.25.5 The levels and other information shown on the drawings are furnished in good faith for the guidance of the General Contractor. This information, however, shall in no way relieve the General Contractor of the responsibility of ascertaining to his/her own satisfaction the nature of all conditions at the site.

1.22. BUILDING PERMIT

- 1.22.1. Building Permit has been applied for by the Consultant. The Permit cost shall be paid by the Owner.
- 1.22.2. The General Contractor must, however, pay all other necessary fees, deposits and charges related to Municipal, Provincial and Federal Requirements. The General Contractor is responsible for determining the amounts of these permits, fees, etc.

1.23. CONTRACT DOCUMENTS

- 1.23.1. The Contract shall be subject to the **Canadian Standard Construction Document CCDC – 5B 2010** all Supplementary Conditions and Contract Documents as prepared by the Owner or Consultants.
- 1.23.2. All Contractors will be held to have examined and made themselves familiar with the various articles of these Standard Documents and shall be as binding for all sections of the following specifications as though written in full therein.

1.24. DEPOSIT ON PLANS

- 1.24.1. Not applicable to this project.

1.25. INSURANCE COVERAGE ON EXISTING SCHOOLS VACATED DURING CONSTRUCTION

- 1.25.1. This article is not applicable to this project.

1.26. FINAL ACCEPTANCE

- 1.26.1. This article is not applicable to this project.
- 1.26.2. The Tender Amount shall include all applicable excise taxes, custom duties, freight, exchange and all other charges in effect and known to come into effect during the construction of the building described in this Contract.
- 1.26.3. The successful Bidder must provide his H.S.T. Registration Number and each request for payment must show this number.

END OF INSTRUCTIONS TO BIDDERS

UNIT PRICES

Client:

Project:

Tender No.:

Location:

Submitted By:

Address:

The following are our Unit Prices for Described Work. Unit Prices are NOT included in our Stipulated Price. The unit prices include the specified cost, overhead, profit and any applicable taxes, excluding the Value Added Taxes. All Work shall be done in accordance with Contract Documents.

<i>Item No.</i>	<i>Description of Work</i>	<i>Unit Price</i>	<i>Unit</i>
1.	To remove existing damaged wood blocking and provide new 50 x 150 mm wood blocking	\$ _____	/m
2.	To remove existing damaged wood cant and provide new 75 x 75 mm wood cant secured as per Rough Carpentry Section	\$ _____	/m
3.	To remove and replace 63 mm (2-1/2") Polyisocyanurate Insulation and 13 mm (1/2") Fibreboard, with new to match and both applied in spray foam adhesive, 'Duotack' by Soprema Inc., at 150 mm (6") on centre	\$ _____	/m ²

End of Section 00 31 00

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UPPER GRAND DISTRICT SCHOOL BOARD

500 Victoria Road North, Guelph, Ontario N1E 6K2

CONSTRUCTION MANAGEMENT FOR SERVICES AND CONSTRUCTION

**2017 GENERAL RENOVATION
WAVERLEY DRIVE PUBLIC SCHOOL
140 Waverley Drive, Guelph, ON N1E 1H1**

**Project Number: BDM – 2017 – 101
Issued: January 30, 2017**



UPPER GRAND DISTRICT SCHOOL BOARD

500 Victoria Road North, Guelph, Ontario N1E 6K2

Martha Rogers
Director of Education

GENERAL INSTRUCTIONS

Project Title and Location: 2017 General Renovation
Waverley Drive Public School
140 Waverley Drive, Guelph, ON N1E 1H1

Project Number: BDM – 2017 – 101
Issued: January 30, 2017

Intent:

The Upper Grand District School Board intends to sign an appropriately modified **Construction Management Contract for Services and Construction, CCDC 5B, 2010** with the Construction Manager. The Construction Manager shall provide all **“Services”** and **“Work”** for the project as noted in these General Instructions and in accordance with the modified form of contract.

The estimated construction value for the project, exclusive of HST, is **\$1,400,000.00**

The Prime Consultant (Architect) for the project is **Hossack & Associates Architects**

Timetable:

Anticipated start date	May 1, 2017
Substantial Performance date	August 18, 2017
Total Completion date	September 4, 2017

Scope of Work:

See Appendix C

The Construction Manager shall provide all “Services” and “Work” related to this project as stipulated in CCDC 5B, 2010 (Appendix A) including Amendments and Supplementary Conditions for CCDC 5B, 2010 (Appendix B).

Upper Grand District School Board Contact:

The project manager representing the Upper Grand District School Board for this project is Bruce McLeod, bruce.mcleod@ugdsb.on.ca, 519-822-4420, ext. 766. Inquiries regarding this project shall be directed to the project manager.



UPPER GRAND DISTRICT SCHOOL BOARD

500 Victoria Road North, Guelph, Ontario N1E 6K2

Martha Rogers
Director of Education

Construction Safety:

The Construction Manager will be the “Constructor” as defined by the OHSA, Regulations for Construction Projects (O. Reg. 213/91). The Construction Manager will clearly define the Project work area with barriers and signage as required. The Construction Manager will be responsible for Health & Safety for the duration of the project and will control all site activities.

The Board may have other activities scheduled on-site during construction such as, grounds maintenance, custodial work, information/technology work, fire alarm inspections/verifications, boiler service, etc.

To complete these activities, personnel not in the direct employ of the Construction Manager may require access to the Construction Manager’s defined work area.

Access to the construction work area will be at the sole discretion of the Construction Manager and all construction safety protocols required by the Construction Manager must be strictly followed or access is not to be granted.

As part of this contract, the Construction Manager must understand that coordinating appropriate and occasional entry into their defined work area is part of the scope of work and shall not be unreasonably withheld while ensuring the Board does not become the “constructor” under any circumstance.

Asbestos and Other Designated Substances:

An asbestos building materials survey prepared by the Board’s environmental consultant for each school in the Upper Grand District School Board System is available at the school’s main office or the Upper Grand Board Office in Guelph. The Construction Manager shall obtain and become familiar with the survey and shall comply with all applicable legislation regarding asbestos and other designated substances.

If required for the Project, the Upper Grand District School Board’s environmental consultant will prepare a comprehensive scope of work and procedures for asbestos abatement. The Construction Manager will tender and supervise the abatement as part of this contract.

In addition, lead, silica, and other designated substances are anticipated to be present in existing facilities. The Construction Manager will be required to comply with applicable legislation.

Insurance Requirements:

The Construction Manager shall provide certificates of insurance and maintain General Liability, Automobile, and ‘Broad Form’ property and contractor’s equipment insurances for the duration of the Project in accordance with CCDC 5B, 2010, GC 11.1 and CCDC 41 – Insurance Requirements. Premiums associated with General Liability and



UPPER GRAND DISTRICT SCHOOL BOARD

500 Victoria Road North, Guelph, Ontario N1E 6K2

Martha Rogers
Director of Education

Automobile insurances are included in the Construction Manager's fee for Services and Work. Premiums for project specific 'Broad Form' insurances will be included in Article A-7 - Cost of the Work.

Criminal Background Checks:

The Upper Grand District School Board must comply with Regulation 521 (Collection of Personal Information) to the Education Act with respect to criminal background checks and offence declarations. The Construction Manager will provide the Board with a Criminal Background Check for the Construction Manager's site supervisor covering offences under the criminal code, the controlled drugs and substances act, and any other offences which would be revealed by a search of the automated system.

If requested by the Board, the Construction Manager may also be required to provide the Board with a Criminal Background Check for all on-site personnel covering offences under the criminal code, the controlled drugs and substances act, and any other offences which would be revealed by a search of the automated system.

Tendering Procedures for Subcontractors:

The Construction Manager will be responsible to solicit competitive bids for all subcontract work as follows:

The Board may provide a list of prequalified subcontractors. The Construction Manager is not restricted to using this list alone and may solicit bids from other subcontractors with Board approval.

Subcontract tender packages with a value less than \$5,000 may close at the Construction Manager's office and may be submitted by fax or email. A minimum of three bids for each division of work will be required. The closing deadline for tender packages with a value less than \$5,000 will be 24 hours prior to the closing deadline for tender packages with a value greater than \$5,000.

Subcontract tender packages with a value greater than \$5,000 shall close at the Board office in sealed envelopes. A minimum of three bids for each division of work will be required.

The Construction Manager will attend the tender opening at the Board office. As sealed subcontract tenders are opened, the elemental budget will be populated with bid results so that a total project cost can be determined.

The Construction Manager shall enter into subcontract agreements with the successful subcontract bidders as directed by the Board. Work will not proceed without written Board approval.



UPPER GRAND DISTRICT SCHOOL BOARD

500 Victoria Road North, Guelph, Ontario N1E 6K2

Martha Rogers
Director of Education

Photovoltaic Systems:

Many of the schools within the Upper Grand District School Board system contain an electricity generating solar photovoltaic system. The system generates DC power on the roof even when the AC power system has been shut down within the building. The DC power is converted to AC at an inverter and then distributed directly to the grid. It is the Construction Managers responsibility to become familiar with the system and understand what aspects of the PV system remain live when the building AC system has been shut down. All workers under the direction of the Construction Manager must be made aware of the solar photovoltaic system and understand the appropriate precautionary measures to be taken to protect the system from damage.

Hot Work:

Welding, cutting, grinding, or other hot work is not permitted without Upper Grand District School Board hot work permits. The Construction Manager shall obtain hot work permits from the Board, complete them in full and post on site prior to proceeding with any hot works.

Access:

The Construction Manager must obtain the keys from the Board office for use during the project. A \$250.00 cash deposit is required for each set of keys and codes. Deposit will be refunded when keys are returned.

No Smoking Policy:

The Upper Grand District School Board has designated all Board properties to be smoke free. Smoking will not be permitted on-site. Offenders will be asked to leave the site and infractions could result in corrective action.

Attachments:

- .1 **Appendix A** - Construction Management Contract for Services and Construction, CCDC 5B, 2010
- .2 **Appendix B** – Amendments and Supplementary General Conditions for Construction Management Contract for Services and Construction, CCDC 5B, 2010
- .3 **Appendix C** – Proposed Scope of Work
- .4 **Appendix D** – Procedures for Construction in an Occupied School



UPPER GRAND DISTRICT SCHOOL BOARD

500 Victoria Road North, Guelph, Ontario N1E 6K2

Martha Rogers
Director of Education

APPENDIX A

Construction Management Contract for Services and Construction, CCDC 5B, 2010

CCDC 5B

Construction Management Contract – for Services and Construction

2 0 1 0

[Name of the Project]

Apply a CCDC 5B copyright seal here. The application of the seal demonstrates the intention of the party proposing the use of this document that it be an accurate and unamended form of CCDC 5B – 2010 except to the extent that any alterations, additions or modifications are set forth in supplementary conditions.

CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE
CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE
CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE

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DEFINITIONS

1.	Class A Construction Cost Estimate
2.	Class B Construction Cost Estimate
3.	Class C Construction Cost Estimate
4.	Class D Construction Cost Estimate
5.	Change Directive
6.	Change Order
7.	Construction Cost
8.	Construction Cost Estimate
9.	Construction Documents
10.	Construction Equipment
11.	Construction Manager
12.	Construction Manager's Fee
13.	Consultant
14.	Contract
15.	Contract Documents
16.	Contract Time
17.	Cost of the Work
18.	Drawings
19.	Guaranteed Maximum Price
20.	Notice in Writing
21.	Owner
22.	Place of the Work
23.	Price of the Services
24.	Price of the Work
25.	Product
26.	Project
27.	Services
28.	Shop Drawings
29.	Specifications
30.	Subcontractor
31.	Substantial Performance of the Work
32.	Supplemental Instruction
33.	Supplier
34.	Temporary Work
35.	Value Added Taxes
36.	Work
37.	Working Day

GENERAL CONDITIONS

PART 1 GENERAL PROVISIONS

GC 1.1	Contract Documents
GC 1.2	Law of the Contract
GC 1.3	Rights and Remedies
GC 1.4	Assignment
GC 1.5	Performance of the Services
GC 1.6	Project Representatives

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.1	Owner's Responsibilities
GC 2.2	Authority of the Consultant
GC 2.3	Consultant's Responsibilities
GC 2.4	Review and Inspection of the Work
GC 2.5	Defective Work

PART 3 PERFORMANCE OF THE SERVICES AND EXECUTION OF THE WORK

GC 3.1	Control of the Work
GC 3.2	Construction by Owner or Other Contractors
GC 3.3	Temporary Work
GC 3.4	Review of Drawings, Specifications and Material and Finish Schedules
GC 3.5	Construction Schedule
GC 3.6	Supervision
GC 3.7	Subcontractors and Suppliers
GC 3.8	Labour and Products
GC 3.9	Documents at the Site
GC 3.10	Shop Drawings
GC 3.11	Use of the Work
GC 3.12	Cutting and Remedial Work
GC 3.13	Cleanup

PART 4 ALLOWANCE

GC 4.1	Cash Allowances

PART 5 PAYMENT

GC 5.1	Financing Information Required of the Owner
GC 5.2	Accounting and Audit
GC 5.3	Progress Payment for the Services
GC 5.4	Progress Payment for the Work
GC 5.5	Substantial Performance of the Work
GC 5.6	Payment of Holdback Upon Substantial Performance of the Work
GC 5.7	Progressive Release of Holdback for the Work
GC 5.8	Final Payment for the Work
GC 5.9	Withholding of Payment for the Work
GC 5.10	Non-Conforming Work

PART 6 CHANGES

GC 6.1	Owner's Right to Make Changes
GC 6.2	Change Order
GC 6.3	Change Directive
GC 6.4	Concealed or Unknown Conditions
GC 6.5	Delays
GC 6.6	Claims for a Change in Construction Manager's Fee for the Services, the Price of the Work or the Guaranteed Maximum Price

PART 7 DEFAULT NOTICE

GC 7.1	Owner's Right to Perform the Work or Terminate the Contract
GC 7.2	Construction Manager's Right to Suspend the Work or Terminate the Contract

PART 8 DISPUTE RESOLUTION

GC 8.1	Authority of the Consultant
GC 8.2	Negotiation, Mediation and Arbitration
GC 8.3	Retention of Rights

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1	Protection of Work and Property
GC 9.2	Toxic and Hazardous Substances
GC 9.3	Artifacts and Fossils
GC 9.4	Construction Safety
GC 9.5	Mould

PART 10 GOVERNING REGULATIONS

GC 10.1	Taxes and Duties
GC 10.2	Laws, Notices, Permits, and Fees
GC 10.3	Patent Fees
GC 10.4	Workers' Compensation

PART 11 INSURANCE — CONTRACT SECURITY

GC 11.1	Insurance
GC 11.2	Contract Security

PART 12 INDEMNIFICATION, WAIVER OF CLAIMS AND WARRANTY

GC 12.1	Indemnification
GC 12.2	Waiver of Claims
GC 12.3	Warranty

APPENDIX STIPULATED PRICE OPTION

**AGREEMENT BETWEEN OWNER AND CONSTRUCTION MANAGER
– FOR SERVICES AND CONSTRUCTION**

This agreement made on the _____ day of _____ in the year _____
by and between _____

hereinafter called the “*Owner*”
and _____

hereinafter called the “*Construction Manager*”

The *Owner* and *Construction Manager* agree as follows:

ARTICLE A-1 THE SERVICES AND THE WORK

The *Construction Manager* shall

- 1.1 perform the *Services* and the *Work* for

[Name of the Project]

_____ insert above the title of the Project

located at

_____ insert above the Place of the Work

and as further described in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT, for which the Agreement has been signed by the parties, and for which

_____ insert above the name of the Consultant

is acting as and is hereinafter called the “*Consultant*”, and

- 1.2 do and fulfill everything indicated by the *Contract Documents*, and
- 1.3 commence the *Services* and the *Work* by the _____ day of _____ in the year _____ and continue in accordance with any schedule provided in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT. The *Construction Manager*’s obligation to provide *Services* shall end no later than one year after the date of *Substantial Performance of the Work*.

ARTICLE A-2 AGREEMENTS AND AMENDMENTS

- 2.1 This *Contract* supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the *Project*.
- 2.2 This *Contract* may be amended only as provided in the *Contract Documents*.

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ARTICLE A-3 DESCRIPTION OF THE PROJECT

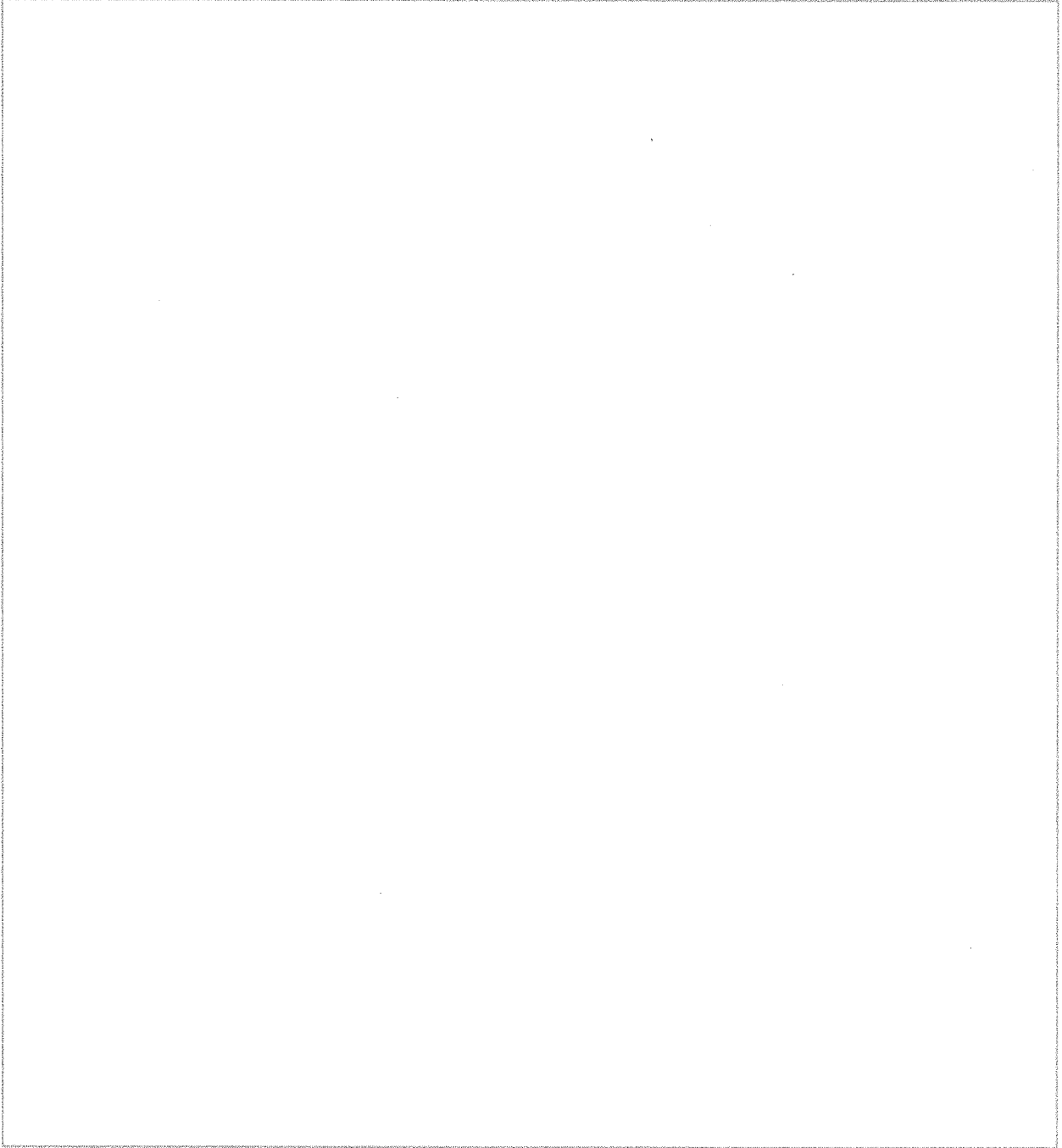
- 3.1 The following is a description of the *Project* including intended use, scope, budget, schedule, phases if applicable, and the anticipated date of *Substantial Performance of the Work*), and any other information which further generally describes the nature of the *Project* and the *Work*:

ARTICLE A-4 CONTRACT DOCUMENTS

4.1 The following are the *Contract Documents* referred to in Article A-1 of the Agreement – THE SERVICES AND THE WORK:

- the Agreement Between *Owner* and *Construction Manager* (including the Schedules to the Agreement)
- the Appendix – STIPULATED PRICE OPTION
- the Definitions
- the General Conditions
- the *Construction Documents*

*



*

(Insert here, attaching additional pages if required, a list identifying all other *Contract Documents*)

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ARTICLE A-5 CONSTRUCTION MANAGER'S FEE

5.1 The *Construction Manager's Fee* shall be equal to the sum of the fee for the *Services* as specified in paragraph 5.2 and the fee for the *Work* as described in paragraph 5.3.

5.2 The *Construction Manager's Fee* for the *Services* is comprised of one or more of the following:

- ~~1.~~ A fixed amount of _____; and
- ~~2.~~ A percentage amount of _____ percent (____%) of the *Construction Cost Estimate*. Final reconciliation payments shall be adjusted based on *Class A Construction Cost Estimate*; and
- ~~3.~~ An amount based on the time-based rates for personnel employed by the *Construction Manager* as described in Schedule B to the Agreement and engaged in performing the *Services* to the level of effort agreed prior to the commencement of the *Services*. The *Owner* may by written request require the *Construction Manager* to provide prior to commencement of the *Services* an estimate of the total fee for *Services* to be performed based on the time-based rates for evaluation and verification purposes.

* Strike out inapplicable paragraph(s).

5.3 The *Construction Manager's Fee* for the *Work* is comprised of one or more of the following:

- ~~1.~~ A percentage fee of _____ percent (____%) of the *Cost of the Work* earned as the *Cost of the Work* accrues. In the event the *Owner* furnishes labour or material below market cost or materials are re-used beyond that anticipated in the original scope of the *Work*, the *Cost of the Work* for purposes of establishing the *Construction Manager's Fee* for the *Work* is the cost of all materials and labour necessary to complete the *Project* as if all materials had been new and as if all labour had been paid for at market prices at the time of construction or, in the event that the construction does not proceed, at existing market prices at the anticipated time of construction; and
- ~~2.~~ A fixed fee of _____, earned as follows:

☒ Delete inapplicable paragraph.

5.4 The *Construction Manager's Fee* shall be subject to adjustment as may be required in accordance with the provisions of the *Contract Documents* listed in Article A-4 of the Agreement – CONTRACT DOCUMENTS.

5.5 All amounts are in Canadian funds.

ARTICLE A-6 REIMBURSABLE EXPENSES FOR THE SERVICES

6.1 The reimbursable expenses are the actual expenses, supported by receipts or invoices, that the *Construction Manager* incurred in performing the *Services*, and as identified in Schedule A2 to the Agreement plus the administrative charge of _____ percent (____%). If there are no receipts or invoices, the expenses shall be at rates prevailing in the area of the *Place of the Work* and supported with suitable documentation.

6.2 The *Owner* may by written request require the *Construction Manager* to:

1. provide prior to commencement of the *Services* an estimate of the total reimbursable expenses incurred by the *Construction Manager* in performing the *Services* for evaluation and verification purposes; and
2. inform the *Owner* in writing prior to incurring reimbursable expenses relating to the *Services*.

ARTICLE A-7 COST OF THE WORK

7.1 The *Cost of the Work* is the actual cost incurred by the *Construction Manager* in performing the *Work* and is limited to the actual cost of the following:

- .1 salaries, wages and benefits paid to personnel in the direct employ of the *Construction Manager* under a salary or wage schedule agreed upon by the *Owner* and the *Construction Manager*, or in the absence of such a schedule, actual salaries, wages and benefits paid under applicable bargaining agreement, and in the absence of a salary or wage schedule and bargaining agreement, actual salaries, wages and benefits paid by the *Construction Manager*, for personnel
 - (1) stationed at the *Place of the Work*, in whatever capacity employed;
 - (2) engaged in expediting the production or transportation of material or equipment, at shops or on the road;
 - (3) engaged in the preparation or review of *Shop Drawings*, fabrication drawings and coordination drawings; or
 - (4) engaged in the processing of changes in the *Work*.
- .2 contributions, assessments or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan, insofar as such cost is based on wages, salaries or other remuneration paid to employees of the *Construction Manager* and included in the cost of the *Work* as provided in paragraph 7.1.1;
- .3 travel and subsistence expenses of the *Construction Manager's* personnel described in paragraph 7.1.1;
- .4 all *Products* including cost of transportation thereof;
- .5 materials, supplies, *Construction Equipment*, *Temporary Work*, and hand tools not owned by the workers, including transportation and maintenance thereof, which are consumed in the performance of the *Work*; and cost less salvage value on such items used but not consumed, which remain the property of the *Construction Manager*;
- .6 all tools and *Construction Equipment*, exclusive of hand tools used in the performance of the *Work*, whether rented from or provided by the *Construction Manager* or others, including installation, minor repairs and replacements, dismantling, removal, transportation, and delivery cost thereof;
- .7 the *Construction Manager's* field office;
- .8 deposits lost provided that they are not caused by negligent acts or omissions of the *Construction Manager* and the *Services* are performed in accordance with this *Contract*;
- .9 the amounts of all contracts or written agreements with *Subcontractors* and *Suppliers* and the unrecoverable costs to the *Construction Manager* that result from any *Subcontractor's* or *Supplier's* default, insolvency or abandonment; termination of any *Subcontractor's* or *Supplier's* right to perform due to default by the *Subcontractor* or *Supplier*; or termination of any *Subcontractor's* or *Supplier's* contract due to default by the *Subcontractor* or *Supplier*;
- .10 quality assurance such as independent inspection and testing services;
- .11 charges levied by authorities having jurisdiction at the *Place of the Work*;
- .12 royalties, patent license fees and damages for infringement of patents and cost of defending suits therefor subject always to the *Construction Manager's* obligations to indemnify the *Owner* as provided in paragraph 10.3.1 of GC 10.3 – PATENT FEES;
- .13 premiums for all contract securities and insurance that the *Construction Manager* is required, by the *Contract Documents*, to purchase and maintain;
- .14 taxes, other than *Value Added Taxes*, and duties relating to the *Work* for which the *Construction Manager* is liable;
- .15 charges for long distance communications, courier services, expressage, printing, and reproduction incurred in relation to the performance of the *Work*;
- .16 removal and disposal of waste products and debris;
- .17 the cost of safety measures and requirements;
- .18 legal costs, incurred by the *Construction Manager* in relation to the performance of the *Work* provided that they are not caused by negligent acts or omissions of the *Construction Manager* and the *Work* is performed in accordance with this *Contract*;
- .19 the cost of financing the *Work* in accordance with the method determined by the parties and identified in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT;

- .20 the cost of auditing when requested by the *Owner*;
- .21 the cost of project-specific information technology and usage in accordance with the method determined by the parties in writing;
- .22 the cost of removal or containment of toxic or hazardous substances pursuant to GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES;
- .23 other costs incurred in the performance of the *Work* as listed below:

- 7.2 The *Cost of the Work* excludes *Value Added Taxes* and shall be at rates prevailing in the locality of the *Place of the Work*, except with the prior consent of the *Owner*.
- 7.3 Any costs incurred by the *Construction Manager* due to failure on the part of the *Construction Manager* to exercise reasonable care and diligence in the *Construction Manager's* attention to the *Work* shall be borne by the *Construction Manager*.
- 7.4 All cash discounts shall accrue to the *Construction Manager* unless the *Owner* deposits funds with the *Construction Manager* with which to make payments, or where the *Owner* pays the costs of financing the *Work*, in which case the cash discounts shall accrue to the *Owner*.
- 7.5 All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment applicable to the *Work* shall accrue to the *Owner*, and the *Construction Manager* shall make provisions so that they can be secured.
- 7.6 The *Owner* may by written request require the *Construction Manager* to:
 - .1 provide prior to commencement of the *Work* an estimate of the total *Cost of the Work* for evaluation and verification purposes; and
 - .2 inform the *Owner* in writing prior to incurring reimbursable expenses relating to the *Cost of the Work*.

ARTICLE A-8 OPTIONS

- 8.1 The *Owner* and the *Construction Manager* may agree to exercise the options described in paragraph 8.2, 8.3 or 8.4 at the time of signing of this *Contract* or any time during the term of the *Contract*. Any agreement to exercise any of the following options after the signing of this *Contract* shall be recorded by a *Change Order*.

8.2 GUARANTEED MAXIMUM PRICE (GMP) OPTION

The sum of the *Price of the Services* and the *Price of the Work* are guaranteed by the *Construction Manager* not to exceed _____/100 dollars (\$ _____), subject to the adjustment as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE. Any amount, consisting of the sum of the *Price of the Services* and the *Price of the Work*, in excess of this *Guaranteed Maximum Price* will be paid by the *Construction Manager* without reimbursement by the *Owner*.

8.3 GUARANTEED MAXIMUM PRICE PLUS % COST SAVINGS OPTION

The *Price of the Services* and the *Price of the Work* are guaranteed by the *Construction Manager* not to exceed _____/100 dollars (\$ _____), subject to the adjustment as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

At the conclusion of the *Project*,

- .1 any amount, consisting of the sum of the *Price of the Services* and the *Price of the Work*, in excess of this *Guaranteed Maximum Price* will be paid by the *Construction Manager* without reimbursement by the *Owner*.
- .2 if the sum of the *Price of the Services* and the *Price of the Work* is less than this *Guaranteed Maximum Price*, the difference will be disbursed as follows:
 - (1) retained by the *Owner*: _____ %
 - (2) paid to the *Construction Manager*: _____ %

8.4 STIPULATED PRICE OPTION

The *Owner* and the *Construction Manager* may agree to change this *Contract* to a stipulated price contract, in accordance with the amendments as provided in the Appendix – STIPULATED PRICE OPTION.

ARTICLE A-9 PAYMENT

- 9.1 Where required by provincial or territorial legislation, payments shall be subject to the lien legislation applicable to the *Place of the Work*. The *Owner* shall pay the *Construction Manager*:
 - .1 payments on account of the *Construction Manager's Fee* for the *Services* earned as described in Article A-5 of the Agreement – CONSTRUCTION MANAGER'S FEE together with such *Value Added Taxes* as may be applicable to such payments, and
 - .2 payments on account of the reimbursable expenses for the *Services* earned as described in Article A-6 of the Agreement – REIMBURSABLE EXPENSES FOR THE SERVICES together with such *Value Added Taxes* as may be applicable to such payments,
 - .3 payments on account of the *Price of the Work* when due in the amount certified by the *Consultant* together with such *Value Added Taxes* as may be applicable to such payments,
 - .4 upon *Substantial Performance of the Work*, the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment, and
 - .5 upon the issuance of the final certificate for payment, the unpaid balance of the *Construction Manager's Fee* for the *Services*, the reimbursable expenses for the *Services*, and the *Price of the Work* when due together with such *Value Added Taxes* as may be applicable to such payment.
- 9.2 In the event of loss or damage occurring where payment becomes due under the property and boiler insurance policies, payments shall be made to the *Construction Manager* in accordance with the provisions of GC 11.1 – INSURANCE.
- 9.3 Interest
 - .1 Should either party fail to make payments as they become due under the terms of this *Contract* or in an award by arbitration or court, interest at the following rates on such unpaid amounts shall also become due and payable until payment:
 - (1) 2% per annum above the prime rate for the first 60 days.
 - (2) 4% per annum above the prime rate after the first 60 days.Such interest shall be compounded on a monthly basis. The prime rate shall be the rate of interest quoted by

(Insert name of chartered lending institution whose prime rate is to be used)
for prime business loans as it may change from time to time.

- .2 Interest shall apply at the rate and in the manner prescribed by paragraph 9.3.1 of this Article on the settlement amount of any claim in dispute that is resolved either pursuant to Part 8 of the General Conditions – DISPUTE RESOLUTION or otherwise, from the date the amount would have been due and payable under the *Contract*, had it not been in dispute, until the date it is paid.

ARTICLE A-10 RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

- 10.1 *Notices in Writing* will be addressed to the recipient at the address set out below.
- 10.2 The delivery of a *Notice in Writing* will be by hand, by courier, by prepaid first class mail, or by facsimile or other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.
- 10.3 A *Notice in Writing* delivered by one party in accordance with this *Contract* will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it shall be deemed to have been received 5 calendar days after the date on which it was mailed, provided that if either such day is not a *Working Day*, then the *Notice in Writing* shall be deemed to have been received on the *Working Day* next following such day.
- 10.4 A *Notice in Writing* sent by facsimile or other form of electronic communication shall be deemed to have been received on the date of its transmission provided that if such day is not a *Working Day* or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it shall be deemed to have been received at the opening of business at the place of receipt on the first *Working Day* next following the transmission thereof.
- 10.5 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.

Owner

name of Owner*

address

facsimile number

email address

Construction Manager

name of Construction Manager*

address

facsimile number

email address

Consultant

name of Consultant*

address

facsimile number

email address

* If it is intended that the notice must be received by a specific individual, that individual's name shall be indicated.

8

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ARTICLE A-11 LANGUAGE OF THE CONTRACT

11.1 When the *Contract Documents* are prepared in both the English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English/French# language shall prevail.

#Complete this statement by striking out inapplicable term.

11.2 This Agreement is drawn in English at the request of the parties hereto. La présente convention est rédigée en anglais à la demande des parties.

ARTICLE A-12 SUCCESSION

12.1 The *Contract* shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors, and assigns.

In witness whereof the parties hereto have executed this Agreement by their respective hands or the hands of their duly authorized representatives.

SIGNED AND DELIVERED

in the presence of:

WITNESS

OWNER

name of Owner

signature

signature

name of person signing

name and title of person signing

signature

signature

name of person signing

name and title of person signing

WITNESS

CONSTRUCTION MANAGER

name of Construction Manager

signature

signature

name of person signing

name and title of person signing

signature

signature

name of person signing

name and title of person signing

N.B. Where legal jurisdiction, local practice or Owner or Construction Manager requirement calls for:

- (a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or
- (b) the affixing of a corporate seal, this Agreement should be properly sealed.

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SCHEDULE A1 TO THE AGREEMENT – SERVICES AND COMPENSATION

1. PRECONSTRUCTION		Performed by the Owner or someone other than the Construction Manager	Performed by the Construction Manager (*F1/F2/F3)	Not Applicable
(*Note: F1 Included in the fixed amount as described in paragraph 5.2.1 of Article A-5 – CONSTRUCTION MANAGER’S FEE. F2 Included in the percentage amount as described in paragraph 5.2.2 of Article A-5 – CONSTRUCTION MANAGER’S FEE. F3 Fee to the Construction Manager based on time-based rates as described in paragraph 5.2.3 of Article A-5 – CONSTRUCTION MANAGER’S FEE.)				
1.1 General Services			F3	
.1 Attend regular <i>Project</i> meetings with the <i>Owner</i> and the <i>Consultant</i> .		☐	F3	☐
.2 Provide advice to the <i>Owner</i> and the <i>Consultant</i> with respect to construction and market conditions.		☐		☐
1.2 Predesign			F3	
.1 Estimating:		☐		☐
(1) Confirm or prepare a <i>Class D Construction Cost Estimate</i> .				
(2) Advise the <i>Owner</i> if it appears that the <i>Construction Cost Estimate</i> may exceed the <i>Project</i> budget, and make recommendation for corrective action.		☐	F3	☐
.2 Scheduling: Prepare a preliminary overall <i>Project</i> schedule.				
1.3 Schematic Design Phase			F3	
.1 Constructability: Provide advice on site use and possible improvements, selection of materials, assembly systems, and, equipment and provide recommendations on construction feasibility, availability of materials and labour, time requirements for installation and construction, and factors related to alternative designs and possible economies.		☐	F3	☐
.2 Estimating:		☐	F3	☐
(1) Prepare a <i>Class C Construction Cost Estimate</i> at the end of the Schematic Design Phase.				
(2) Advise the <i>Owner</i> if it appears that the <i>Construction Cost Estimate</i> may exceed the <i>Project</i> budget, and make recommendation for corrective action.		☐	F3	☐
.3 Scheduling: Prepare, in consultation with the <i>Consultant</i> and the <i>Owner</i> , a preliminary <i>Project</i> schedule for the <i>Owner's</i> review; such <i>Project</i> schedule shall take into consideration the sequence and timing of the required basic program decisions, including anticipated design time, approval period, preparation of documentation, bid calls and subsequent evaluations, trade contract awards, on-site construction activities, and the anticipated date of <i>Substantial Performance of the Work</i> .		☐	F3	☐
.4 Other Services: Assist in providing liaison and coordination among government authorities, utility companies, and other authorities having jurisdiction over the <i>Place of the Work</i> .		☐	F3	☐
1.4 Design Development Phase			F3	
.1 Constructability:		☐		☐
(1) Provide updates as necessary regarding the availability of materials and labour, building systems, and possible economies.				
(2) Make recommendations to the <i>Owner</i> and the <i>Consultant</i> regarding the scope of <i>Work</i> packages and <i>Work</i> to be performed by the <i>Construction Manager's</i> own forces to help facilitate the subsequent bidding and awarding of <i>Subcontractor</i> and <i>Supplier</i> contracts.				
(3) Review the <i>Specifications</i> and <i>Drawings</i> and, at the end of the Design Development Phase, make recommendations to the <i>Owner</i> and the <i>Consultant</i> as to constructability and coordination among the <i>Subcontractors</i> .		☐	F3	☐
.2 Estimating and Cost Control:				
(1) Prepare a <i>Class B Construction Cost Estimate</i> at the end of the Design Development Phase.				
(2) Advise the <i>Owner</i> if it appears that the <i>Construction Cost Estimate</i> may exceed the <i>Project</i> budget, and make recommendations for corrective action.		☐	F3	☐
(3) Establish a cost control program and prepare a cash flow forecast for the <i>Project</i> .				

1. PRECONSTRUCTION		Performed by the Owner or someone other than the Construction Manager	Performed by the Construction Manager (*F1/F2/F3)	Not Applicable
(*Note: F1 Included in the fixed amount as described in paragraph 5.2.1 of Article A-5 – CONSTRUCTION MANAGER'S FEE. F2 Included in the percentage amount as described in paragraph 5.2.2 of Article A-5 – CONSTRUCTION MANAGER'S FEE. F3 Fee to the Construction Manager based on time-based rates as described in paragraph 5.2.3 of Article A-5 – CONSTRUCTION MANAGER'S FEE.)				
.3 Scheduling: (1) Review and update the <i>Project</i> schedule with appropriate details. (2) Advise the <i>Owner</i> if it appears that the <i>Project</i> schedule may vary from that specified in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT or otherwise agreed with the <i>Owner</i> , and make recommendations for corrective action. (3) Make recommendations to the <i>Owner</i> regarding any equipment or materials which should be pre-ordered to meet the <i>Project</i> schedule.		☐	F3	☐
1.5 Construction Document Phase .1 Constructability: (1) Provide updates as necessary regarding the availability of materials and labour, building systems, and possible economies. (2) Review the <i>Specifications</i> and <i>Drawings</i> and make recommendations to the <i>Owner</i> and the <i>Consultant</i> as to clarity, consistency, constructability, and coordination among the <i>Subcontractors</i> . (3) Assist the <i>Owner</i> and the <i>Consultant</i> in preparing bid documents for <i>Subcontractors</i> . (4) Assist the <i>Owner</i> in determining the contract security requirements of <i>Subcontractors</i> .		☐	F3	☐
.2 Estimating and Cost Control: (1) Update the <i>Class B Construction Cost Estimate</i> at defined intervals of <i>Construction Documents</i> completion. (2) Prepare a <i>Class A Construction Cost Estimate</i> at the end of the Construction Document Phase. (3) Update the cash flow forecasts for the <i>Project</i> . (4) Advise the <i>Owner</i> if it appears that the <i>Construction Cost Estimate</i> may exceed the <i>Project</i> budget, and make recommendations for corrective action.		☐	F3	☐
.3 Scheduling: (1) Review and update the <i>Project</i> schedule with appropriate details. (2) Advise the <i>Owner</i> if it appears that the <i>Project</i> schedule may vary from that specified in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT or otherwise agreed with the <i>Owner</i> , and make recommendations for corrective action, including changes to <i>Project</i> scope, schedule or budget.		☐	F3	☐
.4 Other Services: (1) Make recommendations to the <i>Owner</i> regarding any equipment or materials which should be pre-ordered to meet the <i>Project</i> objective.		☐	F3	☐
1.6 Construction Procurement Phase .1 Scheduling: (1) Review and update the <i>Project</i> schedule with appropriate details.		☐	F3	☐
.2 Contracting: (1) Develop methods of solicitation for <i>Subcontractors</i> and the distribution of addenda. (2) Prepare the prequalification criteria for <i>Subcontractors</i> and <i>Suppliers</i> as required by the <i>Owner</i> . (3) Review for completeness and coordinate all bid documents for the solicitation of competitive bids for the <i>Work</i> to be performed by <i>Subcontractors</i> .		☐	F3	☐
.3 Other Service: (1) Update the cash flow forecasts for the <i>Project</i> .		☐	F3	☐

SCHEDULE A1 TO THE AGREEMENT – SERVICES AND COMPENSATION

2. CONSTRUCTION (*Note: F1 Included in the fixed amount as described in paragraph 5.2.1 of Article A-5 – CONSTRUCTION MANAGER’S FEE. F2 Included in the percentage amount as described in paragraph 5.2.2 of Article A-5 – CONSTRUCTION MANAGER’S FEE. F3 Fee to the Construction Manager based on time-based rates as described in paragraph 5.2.3 of Article A-5 – CONSTRUCTION MANAGER’S FEE.)		Performed by the Owner or someone other than the Construction Manager	Performed by the Construction Manager (*F1/F2/F3)	Not Applicable
2.1 General Service				
.1 Chair and minute regular <i>Project</i> meetings with the <i>Owner</i> and the <i>Consultant</i> .		☐	F3	☐
2.2 Cost Control and Accounting				
.1 Prepare and update the <i>Construction Cost</i> and cash flow forecasts in accordance with the <i>Project</i> budget as specified in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT or otherwise agreed with the <i>Owner</i> .		☐	F3	☐
.2 Develop, implement and maintain a system of <i>Project</i> cost control and accounting.		☐	F3	☐
.3 Advise the <i>Owner</i> and the <i>Consultant</i> on the variances between actual cost and <i>Construction Cost Estimate</i> .		☐	F3	☐
.4 Provide reasonable assistance and information to permit recovery of all tax rebates where applicable.		☐		☐
.5 Provide recommendations to the <i>Owner</i> for necessary changes to maintain the <i>Project</i> budget and <i>Project</i> schedule.		☐	F3	☐
3. POST-CONSTRUCTION				
3.1 General Service				
.1 Prepare final <i>Construction Cost</i> report.		☐	F3	☐
3.2 Occupancy Review				
.1 Assist the <i>Owner</i> in conducting post-construction occupancy review.		☐	F3	☐

SCHEDULE A2 – REIMBURSABLE EXPENSES APPLICABLE TO SCHEDULE A1

Unless otherwise agreed to by the parties or as indicated in the following table, all expense items relating to *Services* are included in the *Construction Manager's Fee* for the *Services* as described in paragraph 5.2 of Article of the Agreement A-5 – CONSTRUCTION MANAGER'S FEE.

	Costs Included in the Construction Manager's Fee (A-5.2)	Reimbursable Expenses (A-6)
1. Travel and subsistence expenses of the <i>Construction Manager's</i> personnel outside a radius of 50km from the <i>Place of the Work</i> .	☐	☒
2. Charges for long distance telephone and facsimile communications, courier services, reproduction of <i>Contract Documents</i> incurred in relation to the performance of this Contract.	☐	☒
3. The cost of <i>Project</i> specific information technology support in accordance with the method determined by the parties.	☐	☒
4. Deposits lost provided that they are not caused by negligent acts or omissions of the <i>Construction Manager</i> and the <i>Services</i> are performed in accordance with this <i>Contract</i> .		☒
5. The costs to the <i>Construction Manager</i> that result from any <i>Subcontractor's</i> insolvency or failure to perform.		☒
6. Charges levied by authorities having jurisdiction at the <i>Place of the Work</i> .		☒
7. Royalties, patent licence fees and damages for infringement of patents and cost of defending suits therefore.		☒
8. Any adjustment in taxes and duties directly related to the <i>Project</i> for which the <i>Construction Manager</i> is liable.		☒
9. Losses and expenses sustained by the <i>Construction Manager</i> for matters which are the subject of the insurance coverages obtained pursuant to GC 11.1 – INSURANCE when such losses and expenses are not recoverable because the amounts are in excess of collectible amounts, within the deductible amounts or are not insurable.		☒
10. The costs incurred due to emergencies affecting the safety of persons or property.		☒
11. Legal costs, incurred by the <i>Construction Manager</i> in relation to the performance of the <i>Services</i> provided that they are not caused by negligent acts or omissions of the <i>Construction Manager</i> and the <i>Services</i> are performed in accordance with this <i>Contract</i> .		☒
12. Such other costs directly incurred by the <i>Construction Manager</i> in the performance of this <i>Contract</i> as follows: 		☒

SCHEDULE B – TIME-BASED RATES FOR PERSONNEL EMPLOYED BY THE CONSTRUCTION MANAGER

[illegible]

DEFINITIONS

The following Definitions apply to this *Contract Documents*. References in the definition to the singular shall be considered to include the plural as the context requires.

Class A Construction Cost Estimate

The *Class A Construction Cost Estimate* is an estimate of the *Construction Cost* based on the completed *Contract Documents*. *Class A Construction Cost Estimate* is the final estimate before the bid or proposal call. *Class A Construction Cost Estimate* shall be presented in elemental format and include labour and material costs, allowance for all costs resulting from the *Project* schedule, all actual associated costs, including cash allowances, contingencies, allowances for design, escalation, market conditions and anticipated amendment amounts as applicable.

Class B Construction Cost Estimate

The *Class B Construction Cost Estimate* is an estimate of the *Construction Cost* with a level of precision that is based on the degree of completion of the *Contract Documents* at the time of preparation of the estimate. The *Class B Construction Cost Estimate* is typically prepared when all site or installation investigations are completed and the design of the major systems and sub-systems of the *Project* (including outline specifications and preliminary drawings and models) are well underway. *Class B Construction Cost Estimate* shall be presented in elemental format and include labour and material costs, allowance for all costs resulting from the *Project* schedule, all actual associated costs, including cash allowances, contingencies, allowances for design, escalation, market conditions and anticipated amendment amounts as applicable.

Class C Construction Cost Estimate

The *Class C Construction Cost Estimate* is an estimate of the *Construction Cost* based on updated *Owner* requirements, general description of the *Project*, preliminary site information and existing conditions, and takes into consideration market conditions as well as basic implementation logistics. *Class C Construction Cost Estimate* shall include labour and material costs and the *Owner's* construction contingencies and allowances.

Class D Construction Cost Estimate

The *Class D Construction Cost Estimate* is an estimate of the *Construction Cost* based on the *Owner's* functional requirements to the degree known at the time. The *Class D Construction Cost Estimate* shall as a minimum be based on historical cost data for similar projects, suitably adjusted for such factors as inflation, location, risk, quality, size, and time. All related factors affecting cost are considered to the extent possible. The *Class D Construction Cost Estimate* provides the *Owner* an indication of the order of magnitude of the *Construction Cost* for a project completed within the estimated completion date, and shall include labour and material costs and the *Owner's* construction contingencies and allowances.

Change Directive

A *Change Directive* is a written instruction prepared by the *Consultant* and signed by the *Owner* directing the *Construction Manager* to proceed with a change in the *Work* within the general scope of this *Contract* prior to the *Owner* and the *Construction Manager* agreeing upon an adjustment in any or all of the *Construction Manager's Fee*, the *Guaranteed Maximum Price* and the *Contract Time*.

Change Order

A *Change Order* is a written amendment to this *Contract* prepared by the *Consultant* and signed by the *Owner* and the *Construction Manager* stating their agreement upon:

- a change in the *Services*;
- a change in the *Work*;
- the method of adjustment or the amount of the adjustment in the *Construction Manager's Fee*, if any;
- the method of adjustment or the amount of the adjustment in the *Guaranteed Maximum Price*, if any;
- the extent of the adjustment in the *Contract Time*, if any; and
- the options described in Article A-8 of the Agreement – OPTIONS.

Construction Cost

Construction Cost means the actual cost of all elements of the *Project* including all applicable taxes but excluding the applicable value added taxes, whether recoverable or not. *Construction Cost* does not include the *Construction Manager's Fee*, the reimbursable expenses for the *Services* as described in Article A-6 of the Agreement – REIMBURSABLE EXPENSES FOR THE SERVICES and the compensation of the *Consultant*.

Construction Cost Estimate

Construction Cost Estimate is either a *Class A Construction Cost Estimate*, a *Class B Construction Cost Estimate*, a *Class C Construction Cost Estimate*, or a *Class D Construction Cost Estimate*, as the context shall require and is prepared with a level of precision commensurate with the level of detail of information available at the time.

Construction Documents

The *Construction Documents* consist of the *Specifications* and *Drawings* that are consistent with the *Contract Documents* and are prepared by the *Consultant* and accepted by the *Owner* after execution of the Agreement for the performance of the *Project*.

Construction Equipment

Construction Equipment means all machinery and equipment, either operated or not operated, that is required for preparing, fabricating, conveying, erecting, or otherwise performing the *Work* but is not incorporated into the *Work*.

Construction Manager

The *Construction Manager* is the person or entity identified as such in the Agreement.

Construction Manager's Fee

The *Construction Manager's Fee* is the *Construction Manager's* fee for performing the *Services* and the *Work* and the amount is as stipulated in Article A-5 of the Agreement – CONSTRUCTION MANAGER'S FEE.

Consultant

The *Consultant* is the person or entity engaged by the *Owner* and identified as such in the Agreement. The *Consultant* is the Architect, the Engineer or entity licensed to practise in the province or territory of the *Place of the Work*.

Contract

The *Contract* is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the *Contract Documents* and represents the entire agreement between the parties.

Contract Documents

The *Contract Documents* consist of those documents listed in Article A-4 of the Agreement – CONTRACT DOCUMENTS and amendments agreed upon between the parties.

Contract Time

The *Contract Time* is the time stipulated in paragraph 1.3 of Article A-1 of the Agreement – THE SERVICES AND THE WORK.

Cost of the Work

The *Cost of the Work* is the amount stipulated in Article A-7 of the Agreement – COST OF THE WORK which excludes *Value Added Taxes*.

Drawings

The *Drawings* are the graphic and pictorial portions of the *Contract Documents*, wherever located and whenever issued, showing the design, location and dimensions of the *Work*, generally including plans, elevations, sections, details, and diagrams.

Guaranteed Maximum Price

The *Guaranteed Maximum Price* is the amount, if any, stipulated in paragraphs 8.2 or 8.3 of Article A-8 of the Agreement – OPTIONS which excludes *Value Added Taxes*. In the event that no amount is stipulated in paragraphs 8.2 or 8.3 of Article A-8 of the Agreement – OPTIONS, the provisions pertinent to the *Guaranteed Maximum Price*, wherever they appear in this *Contract*, shall be individually inoperative and considered as deleted from this agreement.

Notice in Writing

A *Notice in Writing*, where identified in this *Contract*, is a written communication between the parties or between them and the *Consultant* that is transmitted in accordance with the provisions of Article A-10 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

Owner

The *Owner* is the person or entity identified as such in the Agreement.

Place of the Work

The *Place of the Work* is the designated site or location of the *Work* identified in the Agreement.

Price of the Services

The *Price of the Services*, which excludes *Value Added Taxes*, is the sum of the *Construction Manager's Fee* for the *Services* as stipulated in paragraph 5.2 of Article A-5 – CONSTRUCTION MANAGER'S FEE and the reimbursable expenses for the *Services* as stipulated in paragraph 6.1 of Article A-6 of the Agreement – REIMBURSABLE EXPENSES FOR THE SERVICES.

Price of the Work

The *Price of the Work*, which excludes *Value Added Taxes*, is the sum of the *Construction Manager's Fee* for the *Work* as stipulated in paragraph 5.3 of Article A-5 – CONSTRUCTION MANAGER'S FEE and the *Cost of the Work*.

Product

Product means material, machinery, equipment, and fixtures incorporated into the *Work*, but does not include *Construction Equipment*.

Project

The *Project* means the total construction as described in Article A-3 of the Agreement – DESCRIPTION OF THE PROJECT contemplated by the *Owner* of which the *Work* may be the whole or a part.

Services

The *Services* means all services described in Schedule A1 to the Agreement – SERVICES AND COMPENSATION to be performed by the *Construction Manager* under this *Contract*.

Shop Drawings

Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, *Product* data, and other data which the *Construction Manager* provides to illustrate details of portions of the *Work*.

Specifications

The *Specifications* are that portion of the *Contract Documents*, wherever located and whenever issued, consisting of the written requirements and standards for *Products*, systems, workmanship, quality, and the services necessary for the performance of the *Work*.

Subcontractor

A *Subcontractor* is a person or entity having a direct contract with the *Construction Manager* to perform a part or parts of the *Work* at the *Place of the Work*.

Substantial Performance of the Work

Substantial Performance of the Work is as defined in the lien legislation applicable to the *Place of the Work*. If such legislation is not in force or does not contain such definition, or if the *Work* is governed by the Civil Code of Quebec, *Substantial Performance of the Work* shall have been reached when the *Work* is ready for use or is being used for the purpose intended and is so certified by the *Consultant*.

Supplemental Instruction

A *Supplemental Instruction* is an instruction, not involving adjustment in the *Price of the Work* or *Contract Time*, in the form of *Specifications*, *Drawings*, schedules, samples, models or written instructions, consistent with the intent of the *Contract Documents*. It is to be issued by the *Consultant* to supplement the *Contract Documents*, as required for the performance of the *Work*.

Supplier

A *Supplier* is a person or entity having a direct contract with the *Construction Manager* to supply *Products*.

Temporary Work

Temporary Work means temporary supports, structures, facilities, services, and other temporary items, excluding *Construction Equipment*, required for the execution of the *Work* but not incorporated into the *Work*.

Value Added Taxes

Value Added Taxes means such sums as shall be levied upon the *Owner's* payment to the *Construction Manager* by the Federal or any Provincial or Territorial government and is computed as a percentage of such payment and includes the Goods and Services Tax, the Quebec Sales Tax, the Harmonized Sales Tax, and any other similar tax, the collection and payment of which have been imposed on the *Construction Manager* by the tax legislation.

Work

The *Work* means the total construction and related services to be performed by the *Construction Manager* as required by the *Contract Documents* but does not include *Services*.

Working Day

Working Day means a day other than a Saturday, Sunday, statutory holiday or statutory vacation day that is observed by the construction industry in the area of the *Place of the Work*.

GENERAL CONDITIONS

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

- 1.1.1 The intent of the *Contract Documents* is to include the labour, *Products* and services necessary for the performance of the *Work* by the *Construction Manager* in accordance with these documents. It is not intended, however, that the *Construction Manager* shall supply products or perform services or work not consistent with, not covered by, or not properly inferable from the *Contract Documents*.
- 1.1.2 Nothing contained in the *Contract Documents* shall create any contractual relationship between:
 - .1 the *Owner* and a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any of the *Work*.
 - .2 the *Consultant* and the *Construction Manager*, a *Subcontractor*, a *Supplier*, or their agent, employee or other person performing any of the *Work*.
- 1.1.3 The components of the *Contract Documents* are complementary, and what is required by any one shall be as binding as if required by all.
- 1.1.4 Words and abbreviations which have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- 1.1.5 Neither the organization of the *Specifications* nor the arrangement of *Drawings* shall control the *Construction Manager* in dividing the work among *Subcontractors* and *Suppliers*.
- 1.1.6 If there is a conflict within the *Contract Documents*:
 - .1 the order of priority of documents, from highest to lowest, shall be:
 - the Agreement between the *Owner* and the *Construction Manager* (including the Schedules to the Agreement),
 - the Definitions,
 - Supplementary Conditions, if any
 - the General Conditions,
 - the *Construction Documents*
 - Division 1 of the *Specifications*,
 - technical *Specifications*,
 - material and finishing schedules,
 - the *Drawings*.
 - .2 *Drawings* of larger scale shall govern over those of smaller scale of the same date.
 - .3 dimensions shown on *Drawings* shall govern over dimensions scaled from *Drawings*.
 - .4 later dated documents shall govern over earlier documents of the same type.
 - .5 noted materials and annotations shall govern over graphic indications.
- 1.1.7 The *Owner* shall provide the *Construction Manager*, without charge, sufficient copies of the *Construction Documents* to perform the *Work*.
- 1.1.8 *Specifications*, *Drawings*, models, and copies thereof furnished by the *Consultant* are and shall remain the *Consultant's* property, with the exception of the signed *Contract* sets, which shall belong to each party to this *Contract*. All *Specifications*, *Drawings*, and models furnished by the *Consultant* are to be used only with respect to the *Work* and are not to be used on other work. These *Specifications*, *Drawings* and models are not to be copied or altered in any manner without the written authorization of the *Consultant*.
- 1.1.9 Models furnished by the *Construction Manager* at the *Owner's* expense are the property of the *Owner*.

GC 1.2 LAW OF THE CONTRACT

- 1.2.1 The law of the *Place of the Work* shall govern the interpretation of the *Contract*.

GC 1.3 RIGHTS AND REMEDIES

- 1.3.1 Except as expressly provided in the *Contract Documents*, the duties and obligations imposed by the *Contract Documents* and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights, and remedies otherwise imposed or available by law.

- 1.3.2 No action or failure to act by the *Owner*, *Consultant* or *Construction Manager* shall constitute a waiver of any right or duty afforded either of the parties to this *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

GC 1.4 ASSIGNMENT

- 1.4.1 Neither party to the *Contract* shall assign the *Contract* or a portion thereof without the prior written consent of the other, which consent shall not be unreasonably withheld.

GC 1.5 PERFORMANCE OF THE SERVICES

- 1.5.1 Architectural or engineering aspects of the *Project* shall not be the responsibility of the *Construction Manager*. In providing *Services*, the *Construction Manager* assumes no responsibility for the performance of the *Consultant* nor offers any professional design advice.
- 1.5.2 Notwithstanding any other provisions of this *Contract*, the *Construction Manager* shall be deemed not to assume any duties nor responsibilities as agent of the *Owner*.

GC 1.6 PROJECT REPRESENTATIVES

- 1.6.1 The *Owner*, *Construction Manager* and *Consultant* may appoint one or more project representatives to assist in carrying out their responsibilities under this *Contract*. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing.

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.1 OWNER'S RESPONSIBILITIES

- 2.1.1 The *Owner* shall:
- .1 provide full and timely information and approvals regarding the requirements of the *Project* for the orderly progress of the *Services* and the *Work*;
 - .2 review documents submitted by the *Construction Manager* and give the *Construction Manager* timely decisions for the orderly progress of the *Services* and the *Work*;
 - .3 furnish promptly to the *Construction Manager* all information that is available or requested by the *Construction Manager* regarding the *Place of the Work* including surveys as to the physical characteristics of the site, soils reports, subsurface investigations, legal limitations, utility locations, and legal description. Subject to paragraph 9.1.2 of GC 9.1 – PROTECTION OF WORK AND PROPERTY, the *Construction Manager* shall be entitled to rely on such information;
 - .4 designate in writing a representative who shall be fully acquainted with the *Work*; and shall have the authority to act on the *Owner's* behalf in relation to all duties and responsibilities of the *Owner* under this *Contract*;
 - .5 retain the *Consultant* who shall be responsible for the design and design related services required for the *Work*;
 - .6 inform the *Construction Manager* of the scope and terms of the *Consultant's* services;
 - .7 inform the *Consultant* of the scope and terms of the *Services* and the *Work*;
 - .8 immediately notify the *Construction Manager* if the *Owner* observes or otherwise becomes aware of any fault or defect in the *Project* or any non-conformity with the requirements of the *Contract*; and
 - .9 coordinate and facilitate the *Services* of the *Construction Manager* and the *Consultant's* services.

GC 2.2 AUTHORITY OF THE CONSULTANT

- 2.2.1 The *Consultant* will have authority to act on behalf of the *Owner* only to the extent provided in the *Contract Documents*, unless otherwise modified by written agreement as provided in paragraph 2.2.2.
- 2.2.2 The duties, responsibilities and limitations of authority of the *Consultant* as set forth in the *Contract Documents* may be modified or extended only with the written consent of the *Construction Manager* following consultation with the *Consultant*.
- 2.2.3 If the *Consultant's* employment is terminated, the *Owner* shall immediately appoint or reappoint a *Consultant* against whom the *Construction Manager* makes no reasonable objection and whose duties, responsibilities and limitations of authority under the *Contract Documents* will be that of the former *Consultant*.

GC 2.3 CONSULTANT'S RESPONSIBILITIES

- 2.3.1 The *Consultant* will provide administration of the *Work* as described in the *Contract Documents*.
- 2.3.2 The *Consultant* will visit the *Place of the Work* at intervals appropriate to the progress of construction to become familiar with the progress and quality of the *Work* and to determine if the *Work* is proceeding in general conformity with the *Contract Documents*.
- 2.3.3 If the *Owner* and the *Consultant* agree, the *Consultant* will provide at the *Place of the Work*, one or more project representatives to assist in carrying out the *Consultant's* responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing to the *Construction Manager*.
- 2.3.4 The *Consultant* will promptly inform the *Owner* of the date of receipt of the *Construction Manager's* applications for payment for the *Work* performed as provided in paragraph 5.4.7.1 of GC 5.4 – PROGRESS PAYMENT FOR THE WORK.
- 2.3.5 Based on the *Consultant's* observations and evaluation of the *Construction Manager's* applications for payment for the *Work* performed, the *Consultant* will determine the amounts owing to the *Construction Manager* for the *Price of the Work* and will issue certificates for payment as provided in Article A-9 of the Agreement – PAYMENT, GC 5.4 – PROGRESS PAYMENT FOR THE WORK and GC 5.8 – FINAL PAYMENT FOR THE WORK.
- 2.3.6 The *Consultant* will not be responsible for and will not have control, charge or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the *Work* in accordance with the applicable construction safety legislation, other regulations or general construction practice. The *Consultant* will not be responsible for the *Construction Manager's* failure to carry out the *Work* in accordance with the *Contract Documents*. The *Consultant* will not have control over, charge of or be responsible for the acts or omissions of the *Construction Manager, Subcontractors, Suppliers*, or their agents, employees, or any other persons performing portions of the *Work*.
- 2.3.7 Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, the *Consultant* will be, in the first instance, the interpreter of the requirements of the *Work*.
- 2.3.8 Matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents*, except with respect to the scope, fee and reimbursable expenses of the *Services*, shall be initially referred in writing to the *Consultant* by the party raising the question for interpretations and findings and copied to the other party.
- 2.3.9 Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents* as they relate to the *Work*. In making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Construction Manager*.
- 2.3.10 The *Consultant's* interpretations and findings will be given in writing to the parties within a reasonable time.
- 2.3.11 With respect to claims for a change in *Price of the Work*, the *Consultant* will make findings as set out in GC 6.6 – CLAIMS FOR A CHANGE IN CONSTRUCTION MANAGER'S FEE FOR THE SERVICES, THE PRICE OF THE WORK OR THE GUARANTEED MAXIMUM PRICE.
- 2.3.12 The *Consultant* will have authority to reject work which in the *Consultant's* opinion does not conform to the requirements of the *Contract Documents*. Whenever the *Consultant* considers it necessary or advisable, the *Consultant* will have authority to require inspection or testing of work, whether or not such work is fabricated, installed or completed. However, neither the authority of the *Consultant* to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the *Consultant* to the *Construction Manager, Subcontractor, Suppliers*, or their agents, employees, or other persons performing any of the *Work*.
- 2.3.13 During the progress of the *Work* the *Consultant* will furnish *Supplemental Instructions* to the *Construction Manager* with reasonable promptness or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Construction Manager*.
- 2.3.14 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other *Construction Manager's* submittals which are provided in accordance with the *Construction Documents*.
- 2.3.15 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 2.3.16 The *Consultant* will conduct reviews of the *Work* to determine the date of *Substantial Performance of the Work* as provided in GC 5.5 – SUBSTANTIAL PERFORMANCE OF THE WORK.

- 2.3.17 All certificates issued by the *Consultant* will be to the best of the *Consultant's* knowledge, information and belief. By issuing any certificate, the *Consultant* does not guarantee the *Work* is correct or complete.
- 2.3.18 The *Consultant* will receive and review written warranties and related documents required by the *Contract* and provided by the *Construction Manager* and will forward such warranties and documents to the *Owner* for the *Owner's* acceptance.

GC 2.4 REVIEW AND INSPECTION OF THE WORK

- 2.4.1 The *Construction Manager* shall provide the *Owner* and the *Consultant* access to the *Work* at all times. The *Construction Manager* shall provide sufficient, safe and proper facilities at all times for the review of the *Work* by the *Consultant* and the inspection of the *Work* by authorized agencies. If parts of the *Work* are in preparation at locations other than the *Place of the Work*, the *Owner* and the *Consultant* shall be given access to such work whenever it is in progress.
- 2.4.2 If work is designated for tests, inspections or approvals in the *Contract Documents*, or by the *Consultant's* instructions, or by the laws or ordinances of the *Place of the Work*, the *Construction Manager* shall give the *Consultant* reasonable notification of when the work will be ready for review and inspection. The *Construction Manager* shall arrange for and shall give the *Consultant* reasonable notification of the date and time of inspections by other authorities.
- 2.4.3 The *Construction Manager* shall furnish promptly to the *Consultant* two copies of certificates and inspection reports relating to the *Work*.
- 2.4.4 If the *Construction Manager* covers, or permits to be covered, work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, the *Construction Manager* shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed, and make good covering work at the *Construction Manager's* expense.
- 2.4.5 The *Consultant* may order any portion or portions of the *Work* to be examined to confirm that such work is in accordance with the requirements of the *Contract Documents*. If the work is not in accordance with the requirements of the *Contract Documents*, the *Construction Manager* shall correct the work and pay the cost of examination and correction at the *Construction Manager's* expense. If the work is in accordance with the requirements of the *Contract Documents*, the *Owner* shall pay the cost of examination and restoration.

GC 2.5 DEFECTIVE WORK

- 2.5.1 The *Construction Manager* shall promptly correct defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work has been incorporated in the *Work* and whether or not the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Construction Manager*. Subject to paragraph 7.1.9 of Article A-7 of the Agreement – COST OF THE WORK, the correction of defective work shall be at the *Construction Manager's* expense.
- 2.5.2 The *Construction Manager* shall promptly make good other contractors' work destroyed or damaged by such removals or replacements. Subject to paragraph 7.1.9 of Article A-7 of the Agreement – COST OF THE WORK, the correction of destroyed or damaged work shall be at the *Construction Manager's* expense.
- 2.5.3 If in the opinion of the *Consultant* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Construction Manager* the difference in value between the work as performed and that called for by the *Contract Documents*. If the *Owner* and the *Construction Manager* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a finding.

PART 3 PERFORMANCE OF THE SERVICES AND EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

- 3.1.1 The *Construction Manager* shall have total control of the *Work* and shall effectively direct and supervise the *Work* so as to ensure conformity with the *Contract Documents*.
- 3.1.2 The *Construction Manager* shall be solely responsible for construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the *Work* under the *Contract*.

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

- 3.2.1 The *Owner* reserves the right to award separate contracts in connection with other parts of the *Project* to other contractors and to perform work with own forces.
- 3.2.2 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner's* own forces, the *Owner* shall:
- .1 provide for the co-ordination of the activities and work of other contractors and *Owner's* own forces with the *Work*;
 - .2 assume overall responsibility for compliance with the applicable health and construction safety legislation at the *Place of the Work*;
 - .3 enter into separate contracts with other contractors under conditions of contract which are compatible with the conditions of the *Contract*;
 - .4 ensure that insurance coverage is provided to the same requirements as are called for in GC 11.1 – INSURANCE and co-ordinate such insurance with the insurance coverage of the *Construction Manager* as it affects the *Work*; and
 - .5 take all reasonable precautions to avoid labour disputes or other disputes on the *Project* arising from the work of other contractors or the *Owner's* own forces.
- 3.2.3 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner's* own forces, the *Construction Manager* shall:
- .1 afford the *Owner* and other contractors reasonable opportunity to store their products and execute their work;
 - .2 cooperate with other contractors and the *Owner* in reviewing their construction schedules; and
 - .3 promptly report to the *Consultant* in writing any apparent deficiencies in the work of other contractors or of the *Owner's* own forces, where such work affects the proper execution of any portion of the *Work*, prior to proceeding with that portion of the *Work*.
- 3.2.4 Where the *Contract Documents* identify work to be performed by other contractors or the *Owner's* own forces, the *Construction Manager* shall co-ordinate and schedule the *Work* with the work of other contractors and the *Owner's* own forces as specified in the *Contract Documents*.
- 3.2.5 Where a change in the *Work* is required as a result of the co-ordination and integration of the work of other contractors or *Owner's* own forces with the *Work*, the changes shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 3.2.6 Disputes and other matters in question between the *Construction Manager* and other contractors shall be dealt with as provided in Part 8 of the General Conditions – DISPUTE RESOLUTION provided the other contractors have reciprocal obligations. The *Construction Manager* shall be deemed to have consented to arbitration of any dispute with any contractor whose contract with the *Owner* contains a similar agreement to arbitrate.

GC 3.3 TEMPORARY WORK

- 3.3.1 The *Construction Manager* shall have the sole responsibility for the design, erection, operation, maintenance, and removal of *Temporary Work*.
- 3.3.2 The *Construction Manager* shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform those functions referred to in paragraph 3.3.1 where required by law or by the *Contract Documents* and in all cases where such *Temporary Work* is of such a nature that professional engineering skill is required to produce safe and satisfactory results.
- 3.3.3 Notwithstanding the provisions of GC 3.1 – CONTROL OF THE WORK, paragraph 3.3.1 and paragraph 3.3.2 or provisions to the contrary elsewhere in the *Contract Documents* where such *Contract Documents* include designs for *Temporary Work* or specify a method of construction in whole or in part, such designs or methods of construction shall be considered to be part of the design of the *Work* and the *Construction Manager* shall not be held responsible for that part of the design or the specified method of construction. The *Construction Manager* shall, however, be responsible for the execution of such design or specified method of construction in the same manner as for the execution of the *Work*.

GC 3.4 REVIEW OF DRAWINGS, SPECIFICATIONS AND MATERIAL AND FINISH SCHEDULES

- 3.4.1 The *Construction Manager* shall review the *Drawings, Specifications* and material and finish schedules and shall report promptly to the *Consultant* any error, inconsistency or omission the *Construction Manager* may discover. If the *Construction Manager* does discover any error, inconsistency or omission in the *Drawings, Specifications* and material and finish schedules, the *Construction Manager* shall not proceed with the work affected until the *Construction Manager* has received corrected or missing information from the *Consultant*.
- 3.4.2 The review of *Drawings, Specifications* and material and finish schedules under paragraph 3.4.1 shall be to the best of the *Construction Manager's* knowledge, information and belief. In making such review the *Construction Manager* assumes no responsibility for the accuracy of the review. The *Construction Manager* shall not be liable for any damage or costs resulting from errors, inconsistencies or omissions, which the *Construction Manager* did not discover.

GC 3.5 CONSTRUCTION SCHEDULE

- 3.5.1 The *Construction Manager* shall:
- .1 prepare and submit to the *Owner* and the *Consultant* prior to the first application for payment, a construction schedule that indicates the timing of the major activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate that the *Work* will be performed in conformity with the *Contract Time*;
 - .2 monitor the progress of the *Work* relative to the construction schedule and update the construction schedule on a monthly basis or as stipulated by the *Contract Documents*; and
 - .3 advise the *Consultant* of any revisions required to the construction schedule as the result of extensions of the *Contract Time* as provided in Part 6 of the General Conditions – CHANGES.

GC 3.6 SUPERVISION

- 3.6.1 The *Construction Manager* shall provide all necessary supervision and appoint a competent representative who shall be in attendance at the *Place of the Work* while work is being performed. The *Construction Manager* may appoint a new representative for a valid reason and to whom the *Owner* makes no reasonable objection.
- 3.6.2 The appointed representative shall represent the *Construction Manager* at the *Place of the Work*. Information and instructions provided by the *Consultant* to the *Construction Manager's* appointed representative shall be deemed to have been received by the *Construction Manager*, except with respect to Article A-10 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

GC 3.7 SUBCONTRACTORS AND SUPPLIERS

- 3.7.1 The *Construction Manager* shall preserve and protect the rights of the parties under the *Contract* with respect to work to be performed under subcontract, and shall:
- .1 enter into contracts or written agreements with *Subcontractors* and *Suppliers* to require them to perform their work as provided in the *Contract Documents*;
 - .2 incorporate the terms and conditions of the *Contract Documents* into all contracts or written agreements with *Subcontractors* and *Suppliers*; and
 - .3 subject to paragraph 7.1.9 of Article A-7 of the Agreement – COST OF THE WORK, be as fully responsible to the *Owner* for acts and omissions of *Subcontractors, Suppliers* and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Construction Manager*.
- 3.7.2 The *Construction Manager* shall, before entering into contracts or written agreements with *Subcontractors* and *Suppliers*, submit to the *Owner* all bids received for the various parts of the *Work* to be subcontracted and obtain the *Owner's* acceptance of the *Subcontractors* and *Suppliers* selected.
- 3.7.3 The *Construction Manager* shall cause to be obtained contract security from *Subcontractors* to the extent and for the amounts approved by the *Owner*.
- 3.7.4 The *Construction Manager* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Construction Manager* may reasonably object.
- 3.7.5 The *Owner*, through the *Consultant*, may provide to a *Subcontractor* or *Supplier* information as to the percentage of the *Subcontractor's* or *Supplier's* work which has been certified for payment.

GC 3.8 LABOUR AND PRODUCTS

- 3.8.1 The *Construction Manager* shall maintain good order and discipline among the *Construction Manager's* employees engaged on the *Work* and shall not employ on the *Work* anyone not skilled in the tasks assigned.
- 3.8.2 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*.

GC 3.9 DOCUMENTS AT THE SITE

- 3.9.1 The *Construction Manager* shall keep one copy of current *Construction Documents*, submittals, reports, and records of meetings at the *Place of the Work*, in good order and available to the *Owner* and the *Consultant*.

GC 3.10 SHOP DRAWINGS

- 3.10.1 The *Construction Manager* shall provide *Shop Drawings* as required in the *Construction Documents*.
- 3.10.2 The *Construction Manager* shall provide *Shop Drawings* to the *Consultant* to review in orderly sequence and sufficiently in advance so as to cause no delay in the *Work* or in the work of other contractors.
- 3.10.3 Upon request of the *Construction Manager* or the *Consultant*, they shall jointly prepare a schedule of the dates for provision, review and return of *Shop Drawings*.
- 3.10.4 The *Construction Manager* shall provide *Shop Drawings* in the form specified, or if not specified, as directed by the *Consultant*.
- 3.10.5 *Shop Drawings* provided by the *Construction Manager* to the *Consultant* shall indicate by stamp, date and signature of the person responsible for the review that the *Construction Manager* has reviewed each one of them.
- 3.10.6 The *Consultant's* review is for conformity to the design concept and for general arrangement only.
- 3.10.7 *Shop Drawings* which require approval of any legally constituted authority having jurisdiction shall be provided to such authority by the *Construction Manager* for approval.
- 3.10.8 The *Construction Manager* shall review all *Shop Drawings* before providing them to the *Consultant*. The *Construction Manager* represents by this review that:
 - .1 the *Construction Manager* has determined and verified all applicable field measurements, field construction conditions, *Product* requirements, catalogue numbers and similar data, or will do so, and
 - .2 the *Construction Manager* has checked and co-ordinated each *Shop Drawing* with the requirements of the *Work* and of the *Construction Documents*.
- 3.10.9 At the time of providing *Shop Drawings*, the *Construction Manager* shall expressly advise the *Consultant* in writing of any deviations in a *Shop Drawing* from the requirements of the *Construction Documents*. The *Consultant* shall indicate the acceptance or rejection of such deviation expressly in writing.
- 3.10.10 The *Consultant's* review shall not relieve the *Construction Manager* of responsibility for errors or omissions in the *Shop Drawings* or for meeting all requirements of the *Construction Documents*.
- 3.10.11 The *Construction Manager* shall provide revised *Shop Drawings* to correct those which the *Consultant* rejects as inconsistent with the *Construction Documents*, unless otherwise directed by the *Consultant*. The *Construction Manager* shall notify the *Consultant* in writing of any revisions to the *Shop Drawings* other than those requested by the *Consultant*.
- 3.10.12 The *Consultant* will review and return *Shop Drawings* in accordance with the schedule agreed upon, or, in the absence of such schedule, with reasonable promptness so as to cause no delay in the performance of the *Work*.

GC 3.11 USE OF THE WORK

- 3.11.1 The *Construction Manager* shall confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and operations of employees and *Subcontractors* to limits indicated by laws, ordinances, permits, or the *Contract Documents* and shall not unreasonably encumber the *Place of the Work*.
- 3.11.2 The *Construction Manager* shall not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety of the *Work*.

GC 3.12 CUTTING AND REMEDIAL WORK

- 3.12.1 The *Construction Manager* shall perform the cutting and remedial work required to make the affected parts of the *Work* come together properly.
- 3.12.2 The *Construction Manager* shall co-ordinate the *Work* to ensure that the cutting and remedial work is kept to a minimum.
- 3.12.3 Should the *Owner*, the *Consultant*, other contractors or anyone employed by them be responsible for poorly timed work necessitating cutting or remedial work to be performed, the cost of such cutting or remedial work shall be valued as provided in GC 6.1 – OWNER’S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 3.12.4 Cutting and remedial work shall be performed by specialists familiar with the *Products* affected and shall be performed in a manner to neither damage nor endanger the *Work*.

GC 3.13 CLEANUP

- 3.13.1 The *Construction Manager* shall maintain the *Work* in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the *Owner*, other contractors or their employees.
- 3.13.2 Before applying for *Substantial Performance of the Work* as provided in GC 5.5 – SUBSTANTIAL PERFORMANCE OF THE WORK, the *Construction Manager* shall remove waste products and debris, other than that resulting from the work of the *Owner*, other contractors or their employees, and shall leave the *Place of the Work* clean and suitable for use or occupancy by the *Owner*. The *Construction Manager* shall remove products, tools, *Construction Equipment*, and *Temporary Work* not required for the performance of the remaining work.
- 3.13.3 Prior to application for the final payment, the *Construction Manager* shall remove any remaining products, tools, *Construction Equipment*, and *Temporary Work*, and waste products and debris, other than that resulting from the work of the *Owner*, other contractors or their employees.

PART 4 ALLOWANCE

GC 4.1 CASH ALLOWANCES

- 4.1.1 Cash allowances may be stated in this *Contract* if the *Guaranteed Maximum Price* is stipulated in paragraphs 8.2 or 8.3 of Article A-8 of the Agreement – OPTIONS.
- 4.1.2 The *Price of the Work* includes the cash allowances, if any, stated in this *Contract*. The scope of work or costs included in such cash allowances shall be as described in this *Contract*.
- 4.1.3 Expenditures under cash allowances shall be authorized by the *Owner* through the *Consultant*.
- 4.1.4 Where costs under any cash allowance exceed the amount of the allowance specified in this *Contract*, the *Construction Manager’s Fee* for the *Work* and the *Guaranteed Maximum Price* shall be adjusted by *Change Order* to compensate the *Construction Manager* for any excess incurred and substantiated. Where costs under any cash allowance are less than the amount of the allowance, the *Owner* shall be credited for the unexpended portion of the cash allowance, but not for the *Construction Manager’s* overhead and profit on such amount. Multiple cash allowances shall not be combined for the purpose of calculating the foregoing.
- 4.1.5 The *Construction Manager’s* overhead and profit in connection with such cash allowances is eligible to be included in progress payments on account of the *Construction Manager’s Fee* for the *Work*.
- 4.1.6 The value of the *Work* performed under a cash allowance is eligible to be included in progress payments on account of the *Cost of the Work*.
- 4.1.7 The *Construction Manager* and the *Consultant* shall jointly prepare a schedule that shows when the *Consultant* and the *Owner* must authorize ordering of items called for under cash allowances to avoid delaying the progress of the *Work*.

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

- 5.1.1 The *Owner* shall, at the request of the *Construction Manager*, before signing the *Contract*, and promptly from time to time thereafter, furnish to the *Construction Manager* reasonable evidence that financial arrangements have been made to fulfill the *Owner's* obligations under the *Contract*.
- 5.1.2 The *Owner* shall give the *Construction Manager Notice in Writing* of any material change in the *Owner's* financial arrangements to fulfill the *Owner's* obligations under the *Contract* during the performance of the *Contract*.

GC 5.2 ACCOUNTING AND AUDIT

- 5.2.1 The *Construction Manager* shall keep full and detailed accounts and records necessary for the documentation of the *Cost of the Work*.
- 5.2.2 For 60 calendar days after the application for final payment or for such other period specified in the *Contract*, the *Owner* shall be afforded reasonable access to all of the *Construction Manager's* books, records, correspondence, instructions, drawings, receipt vouchers, *Subcontractor* and *Supplier* invoices, and memoranda relating to the *Cost of the Work*, and for this purpose the *Construction Manager* shall preserve all such records.

GC 5.3 PROGRESS PAYMENT FOR THE SERVICES

- 5.3.1 The *Owner* shall make payment for the *Construction Manager's Fee* for the *Services* as described in paragraph of 5.2 of Article A-5 of the Agreement – CONSTRUCTION MANAGER'S FEE and on account of the reimbursable expenses for the *Services* as described in Article A-6 of the Agreement – REIMBURSABLE EXPENSES FOR THE SERVICES no later than 20 calendar days after receipt of an application for payment for the *Services* submitted by the *Construction Manager*.
- 5.3.2 The application for payment for the reimbursable expenses for the *Services* shall include items of cost as defined in Schedule A2 to the Agreement – REIMBURSABLE EXPENSES APPLICABLE TO SCHEDULE A1 and other support documents required by the *Owner* in accordance with the *Contract Documents*.

GC 5.4 PROGRESS PAYMENT FOR THE WORK

- 5.4.1 Applications for payment on account as provided in Article A-9 of the Agreement – PAYMENT may be made monthly as the *Work* progresses.
- 5.4.2 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.
- 5.4.3 The amount applied for shall be the cost of the *Work* performed and *Products* delivered to the *Place of the Work* or other locations designated by the *Owner* in accordance with the provisions of Article A-7 of the Agreement – COST OF THE WORK, as of the last day of the month or an alternative day of the month agreed in writing by the parties plus the *Construction Manager's Fee* for the *Work* earned in accordance with the provisions of Article A-5 of the Agreement – CONSTRUCTION MANAGER'S FEE.
- 5.4.4 The application for payment for the *Work* shall include items of cost as defined in Article A-7 of the Agreement – COST OF THE WORK and other support documents required by the *Owner* as in accordance with the *Contract Documents*.
- 5.4.5 When submitting the second and succeeding applications for payment, the *Construction Manager* shall furnish receipted vouchers or other satisfactory evidence of payment for all items included in the preceding applications. If the *Owner* has reasonable grounds for believing that any amount included in preceding applications has not been paid the *Owner* may withhold payment in respect of such amount from the current application until satisfactory evidence of payment is given by the *Construction Manager*.
- 5.4.6 Applications for payment for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall be supported by such evidence as the *Consultant* may reasonably require to establish the value and delivery of the *Products*.

- 5.4.7 After receipt by the *Consultant* of an application for payment for the *Work* submitted by the *Construction Manager* in accordance with paragraphs 5.4.1 to 5.4.6:
- .1 the *Consultant* will promptly inform the *Owner* of the date of receipt of the *Construction Manager's* application for payment;
 - .2 the *Consultant* will issue to the *Owner* and copy to the *Construction Manager*, no later than 10 calendar days after the receipt of the application for payment, a certificate for payment in the amount applied for, or in such other amount as the *Consultant* determines to be properly due. If the *Consultant* amends the application, the *Consultant* will promptly advise the *Construction Manager* in writing giving reasons for the amendment; and
 - .3 the *Owner* shall make payment to the *Construction Manager* on account as provided in Article A-9 of the Agreement – PAYMENT on or before 20 calendar days after the later of:
 - receipt by the *Consultant* of the application for payment, or
 - the last day of the monthly payment period for which the application for payment is made.

GC 5.5 SUBSTANTIAL PERFORMANCE OF THE WORK

- 5.5.1 When the *Construction Manager* considers that the *Work* is substantially performed, or if permitted by the lien legislation applicable to the *Place of the Work* a designated portion thereof which the *Owner* agrees to accept separately is substantially performed, the *Construction Manager* shall, within 1 *Working Day*, deliver to the *Consultant* and to the *Owner* a comprehensive list of items to be completed or corrected, together with a written application for a review by the *Consultant* to establish *Substantial Performance of the Work* or of the designated portion of the *Work*. Failure to include an item on the list does not alter the responsibility of the *Construction Manager* to complete the *Contract*.
- 5.5.2 The *Consultant* will review the *Work* to verify the validity of the application and shall promptly, and in any event, no later than 20 calendar days after receipt of the *Construction Manager's* list and application:
- .1 advise the *Construction Manager* 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* or a designated portion of the *Work* in a certificate and issue a copy of that certificate to each of the *Owner* and the *Construction Manager*.
- 5.5.3 Immediately following the issuance of the certificate of *Substantial Performance of the Work* or a designated portion of the *Work*, the *Construction Manager*, in consultation with the *Consultant*, shall establish a reasonable date for finishing the *Work*.

GC 5.6 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

- 5.6.1 After the issuance of the certificate of *Substantial Performance of the Work*, the *Construction Manager* shall:
- .1 submit an application for payment of the holdback amount,
 - .2 submit CCDC 9A 'Statutory Declaration' to state that all accounts for labour, subcontracts, *Products*, *Construction Equipment*, and other indebtedness which may have been incurred by the *Construction Manager* in the *Substantial Performance of the Work* and for which the *Owner* might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute.
- 5.6.2 After the receipt of an application for payment from the *Construction Manager* and the statement as provided in paragraph 5.6.1, the *Consultant* will issue a certificate for payment of the holdback amount.
- 5.6.3 Where the holdback amount required by the applicable lien legislation has not been placed in a separate holdback account, the *Owner* shall, 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*, place the holdback amount in a bank account in the joint names of the *Owner* and the *Construction Manager*.
- 5.6.4 In the common law jurisdictions, the holdback amount authorized by the certificate for payment of the holdback amount is due and payable on the first calendar day following the expiration of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*. Where lien legislation does not exist or apply, the holdback amount shall be due and payable in accordance with other legislation, industry practice or provisions which may be agreed to between the parties. The *Owner* may retain out of the holdback amount any sums required by law to satisfy any liens against the *Work* or, if permitted by the lien legislation applicable to the *Place of the Work*, other third party monetary claims against the *Construction Manager* which are enforceable against the *Owner*.
- 5.6.5 In the Province of Quebec, the holdback amount authorized by the certificate for payment of the holdback amount is due and payable 30 calendar days after the issuance of the certificate. The *Owner* may retain out of the holdback amount any sums required to satisfy any legal hypothecs that have been taken, or could be taken, against the *Work* or other third party monetary claims against the *Construction Manager* which are enforceable against the *Owner*.

GC 5.7 PROGRESSIVE RELEASE OF HOLDBACK FOR THE WORK

- 5.7.1 In the common law jurisdictions, where legislation permits and where, upon application by the *Construction Manager*, the *Consultant* has certified that the work of a *Subcontractor* or *Supplier* has been performed prior to *Substantial Performance of the Work*, the *Owner* shall pay the *Construction Manager* the holdback amount retained for such subcontract work, or the *Products* supplied by such *Supplier*, on the first calendar day following the expiration of the holdback period for such work stipulated in the lien legislation applicable to the *Place of the Work*. The *Owner* may retain out of the holdback amount any sums required by law to satisfy any liens against the *Work* or, if permitted by the lien legislation applicable to the *Place of the Work*, other third party monetary claims against the *Construction Manager* which are enforceable against the *Owner*.
- 5.7.2 In the Province of Quebec, where, upon application by the *Construction Manager*, the *Consultant* has certified that the work of a *Subcontractor* or *Supplier* has been performed prior to *Substantial Performance of the Work*, the *Owner* shall pay the *Construction Manager* the holdback amount retained for such subcontract work, or the *Products* supplied by such *Supplier*, no later than 30 calendar days after such certification by the *Consultant*. The *Owner* may retain out of the holdback amount any sums required to satisfy any legal hypothecs that have been taken, or could be taken, against the *Work* or other third party monetary claims against the *Construction Manager* which are enforceable against the *Owner*.
- 5.7.3 Notwithstanding the provisions of the preceding paragraphs, and notwithstanding the wording of such certificates, the *Construction Manager* shall ensure that such subcontract work or *Products* are protected pending the issuance of a final certificate for payment and be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when such certificates were issued.

GC 5.8 FINAL PAYMENT FOR THE WORK

- 5.8.1 When the *Construction Manager* considers that the *Work* is completed, the *Construction Manager* shall submit an application for final payment.
- 5.8.2 The *Consultant* will, no later than 10 calendar days after the receipt of an application from the *Construction Manager* for final payment, review the *Work* to verify the validity of the application and advise the *Construction Manager* in writing that the application is valid or give reasons why it is not valid.
- 5.8.3 When the *Consultant* finds the *Construction Manager's* application for final payment valid, the *Consultant* will promptly issue a final certificate for payment.
- 5.8.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 – WORKERS' COMPENSATION and any lien legislation applicable to the *Place of the Work*, the *Owner* shall, no later than 5 calendar days after the issuance of a final certificate for payment, pay the *Construction Manager* as provided in Article A-9 of the Agreement – PAYMENT.

GC 5.9 WITHHOLDING OF PAYMENT FOR THE WORK

- 5.9.1 If because of climatic or other conditions reasonably beyond the control of the *Construction Manager*, 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.

GC 5.10 NON-CONFORMING WORK

- 5.10.1 No payment by the *Owner* under the *Contract* nor partial or entire use or occupancy of the *Work* by the *Owner* shall constitute an acceptance of any portion of the *Work* or *Products* which are not in accordance with the requirements of the *Contract Documents*.

PART 6 CHANGES

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

- 6.1.1 The *Owner*, through the *Consultant*, without invalidating the *Contract*, may make:
- .1 changes in the *Work* consisting of additions, deletions, or other revisions to the *Work* by *Change Order* or *Change Directive*, and
 - .2 changes to the *Contract Time* for the *Work*, or any part thereof, by *Change Order*.

- 6.1.2 The *Construction Manager* shall not perform a change in the *Work* without a *Change Order* or a *Change Directive*.
- 6.1.3 The *Owner* and the *Construction Manager*, without invalidating the *Contract*, may agree to make changes to the *Services*.

GC 6.2 CHANGE ORDER

- 6.2.1 When a change in the *Work* is proposed or required, the *Consultant* shall provide the *Construction Manager* with a written description of the proposed change in the *Work*. The *Construction Manager* shall promptly present, in a form acceptable to the *Consultant*, a method of adjustment or an amount of adjustment for the *Construction Manager's Fee*, a method of adjustment or an amount of adjustment for the *Guaranteed Maximum Price*, and the adjustment in the *Contract Time*, as applicable, for the proposed change in the *Work*.
- 6.2.2 When the *Owner* and *Construction Manager* agree to the adjustments in the *Construction Manager's Fee*, the *Guaranteed Maximum Price* and the *Contract Time*, or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*. The value of the work performed as the result of a *Change Order* shall be included in applications for progress payment.
- 6.2.3 When the *Owner* and *Construction Manager* agree to exercise the stipulated price option at any time during the term of the *Contract*, such agreement shall be recorded in a *Change Order*.

GC 6.3 CHANGE DIRECTIVE

- 6.3.1 If the *Owner* requires the *Construction Manager* to proceed with a change in the *Work* prior to the *Owner* and the *Construction Manager* agreeing upon any corresponding adjustment in the *Construction Manager's Fee*, the *Guaranteed Maximum Price* and the *Contract Time*, the *Owner*, through the *Consultant*, shall issue a *Change Directive*.
- 6.3.2 A *Change Directive* shall only be used to direct a change in the *Work* which is within the general scope of the *Contract Documents*.
- 6.3.3 A *Change Directive* shall not be used to direct a change in the *Contract Time* only.
- 6.3.4 Upon receipt of a *Change Directive*, the *Construction Manager* shall proceed promptly with the change in the *Work*.
- 6.3.5 If no method of adjustment is agreed:
- .1 the adjustment in the *Construction Manager's Fee* for a change carried out by way of a *Change Directive* shall be determined on the basis of the changes in costs of the *Construction Manager*; and
 - .2 the *Guaranteed Maximum Price* shall be adjusted by the changes in the *Cost of Work* and in the *Construction Manager's Fee* for the *Work* resulting from a *Change Directive*.
- 6.3.6 Pending determination of the adjustment to the *Construction Manager's Fee* required as a result of a *Change Directive*, the *Cost of the Work* incurred and the undisputed amount of the *Construction Manager's Fee* as the result of a *Change Directive* is eligible to be included in progress payments, notwithstanding the limit imposed by the *Guaranteed Maximum Price*.
- 6.3.7 If the *Owner* and the *Construction Manager* do not agree on the proposed adjustment in the *Construction Manager's Fee*, the *Guaranteed Maximum Price*, the *Contract Time*, or in the method of determining them, the adjustment shall be referred to the *Consultant* for a finding.
- 6.3.8 When the *Owner* and the *Construction Manager* reach agreement on the adjustment to the *Construction Manager's Fee*, the *Guaranteed Maximum Price* and the *Contract Time*, this agreement shall be recorded in a *Change Order*.

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- 6.4.1 If the *Owner* or the *Construction Manager* discover conditions at the *Place of the Work* which are:
- .1 subsurface or otherwise concealed physical conditions which existed before the commencement of the *Work* which differ materially from those indicated in the *Contract Documents*; or
 - .2 physical conditions, other than conditions due to weather, that are of a nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the *Contract Documents*,
- then the observing party shall give *Notice in Writing* to the other party of such conditions before they are disturbed and in no event later than 5 *Working Days* after first observance of the conditions.

- 6.4.2 The *Consultant* will promptly investigate such conditions and make a finding. If the finding is that the conditions differ materially and this would justify an increase or decrease in the *Construction Manager's Fee* for the *Work*, the *Guaranteed Maximum Price* or the *Contract Time*, the *Consultant*, with the *Owner's* approval, will issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.
- 6.4.3 If the *Consultant* finds that the conditions at the *Place of the Work* are not materially different or that no change in the *Construction Manager's Fee* for the *Work*, the *Guaranteed Maximum Price* or the *Contract Time* is justified, the *Consultant* will report the reasons for this finding to the *Owner* and the *Construction Manager* in writing.
- 6.4.4 If such concealed or unknown conditions relate to toxic and hazardous substances and materials, artifacts and fossils, or mould, the parties will be governed by the provisions of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, GC 9.3 – ARTIFACTS AND FOSSILS and GC 9.5 – MOULD.

GC 6.5 DELAYS

- 6.5.1 If the *Construction Manager* is delayed in the performance of the *Work* by an action or omission of the *Owner*, *Consultant* or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager*. The *Construction Manager's Fee* and the *Guaranteed Maximum Price* shall be adjusted by a reasonable amount for costs incurred by the *Construction Manager* as the result of such delay.
- 6.5.2 If the *Construction Manager* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Construction Manager* or any person employed or engaged by the *Construction Manager* directly or indirectly, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager*. The *Construction Manager's Fee* and the *Guaranteed Maximum Price* shall be adjusted by a reasonable amount for costs incurred by the *Construction Manager* as the result of such delay.
- 6.5.3 If the *Construction Manager* is delayed in the performance of the *Work* by:
- .1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors' association, of which the *Construction Manager* is a member or to which the *Construction Manager* is otherwise bound),
 - .2 fire, unusual delay by common carriers or unavoidable casualties,
 - .3 abnormally adverse weather conditions, or
 - .4 any cause beyond the *Construction Manager's* control other than one resulting from a default or breach of *Contract* by the *Construction Manager*,
- then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Construction Manager* agrees to a shorter extension. The *Construction Manager's Fee* and the *Guaranteed Maximum Price* shall be adjusted by a reasonable amount for overhead costs incurred by the *Construction Manager* as the result of such delay.
- 6.5.4 No extension shall be made for delay unless *Notice in Writing* of the cause of the delay is given to the *Consultant* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.
- 6.5.5 If no schedule is made under paragraph 2.3.13 of GC 2.3 – CONSULTANT'S RESPONSIBILITIES or paragraph 3.5.1 of GC 3.5 – CONSTRUCTION SCHEDULE, then no request for extension shall be made because of failure of the *Consultant* to furnish instructions until 10 *Working Days* after demand for such instructions has been made.

GC 6.6 CLAIMS FOR A CHANGE IN CONSTRUCTION MANAGER'S FEE FOR THE SERVICES, THE PRICE OF THE WORK OR THE GUARANTEED MAXIMUM PRICE

- 6.6.1 If the *Construction Manager* intends to make a claim for an increase to the *Construction Manager's Fee* for the *Services*, the *Price of the Work* or the *Guaranteed Maximum Price*, or if the *Owner* intends to make a claim against the *Construction Manager* for a credit to the *Construction Manager's Fee* for the *Services*, the *Price of the Work* or the *Guaranteed Maximum Price*, the party that intends to make the claim shall give timely *Notice in Writing* of intent to claim to the other party and, if the claim relates to the *Price of the Work* or the *Guaranteed Maximum Price*, with a copy to the *Consultant*.

- 6.6.2 Upon commencement of the event or series of events giving rise to a claim, the party intending to make the claim shall:
 - .1 take all reasonable measures to mitigate any loss or expense which may be incurred as a result of such event or series of events, and
 - .2 keep such records as may be necessary to support the claim.
- 6.6.3 The party making the claim shall submit within a reasonable time to the other party a detailed account of the amount claimed and the grounds upon which the claim is based.
- 6.6.4 Where the event or series of events giving rise to the claim has a continuing effect, the detailed account submitted under paragraph 6.6.3 shall be considered to be an interim account and the party making the claim shall, at such intervals as the party receiving the claim may reasonably require, submit further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 6.6.5 If the claim is not acceptable to the other party, it shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION.

PART 7 DEFAULT NOTICE

GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK OR TERMINATE THE CONTRACT

- 7.1.1 If the *Construction Manager* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Construction Manager's* insolvency, or if a receiver is appointed because of the *Construction Manager's* insolvency, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, terminate the *Construction Manager's* right to continue with the *Work* by giving the *Construction Manager* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.1.2 If the *Construction Manager* neglects to prosecute the *Work* properly or otherwise fails to comply with the requirements of the *Contract Documents* to a substantial degree, and if the *Consultant* has given a written statement to the *Owner* and *Construction Manager* that sufficient cause exists to justify such action, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Construction Manager Notice in Writing* that the *Construction Manager* is in default of the *Construction Manager's* contractual obligations and instruct the *Construction Manager* to correct the default in the 5 *Working Days* immediately following the receipt of such *Notice in Writing*.
- 7.1.3 If the default cannot be corrected in the 5 *Working Days* specified or in such other time period as may be subsequently agreed in writing by the parties, the *Construction Manager* shall be in compliance with the *Owner's* instructions if the *Construction Manager*:
 - .1 commences the correction of the default within the specified time, and
 - .2 provides the *Owner* with an acceptable schedule for such correction, and
 - .3 corrects the default in accordance with the *Contract* terms and with such schedule.
- 7.1.4 If the *Construction Manager* fails to correct the default in the time specified or in such other time period as may be subsequently agreed in writing by the parties, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may:
 - .1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Construction Manager* provided the *Consultant* has certified such cost to the *Owner* and the *Construction Manager*, or
 - .2 terminate the *Construction Manager's* right to continue with the *Work* in whole or in part or terminate the *Contract*.
- 7.1.5 If the *Owner* terminates the *Construction Manager's* right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Owner* shall:
 - .1 be entitled to take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* at the *Place of the Work*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense, and
 - .2 pay the *Construction Manager* upon the *Consultant's* certificate and in accordance with Part 5 of the General Conditions – PAYMENT for the costs properly incurred by the *Construction Manager* to that time plus the proportionate amount of the fee as provided in Article A-5 of the Agreement – CONSTRUCTION MANAGER'S FEE, and
 - .3 pay to the *Construction Manager* fair compensation, either by purchase or rental, at the option of the *Owner*, for any *Construction Equipment* retained for use in the *Work*, and
 - .4 assume and become liable for all obligations, commitments and unliquidated claims as certified by the *Consultant* that the *Construction Manager* may have heretofore, in good faith, undertaken or incurred in connection with the *Work*, other than such as are properly payable by the *Construction Manager* because of neglect or default.

- 7.1.6 If the *Owner* terminates the *Construction Manager's* right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Construction Manager* shall, as a condition of receiving the payments, execute and deliver such papers and take such action, including the legal assignment in the *Construction Manager's* contractual rights, as the *Owner* may require for the purpose of fully vesting in the *Construction Manager* the rights and benefits of the *Construction Manager* under the obligations or commitments to be assumed by the *Owner*.
- 7.1.7 The *Construction Manager's* obligation under the *Contract* as to quality, correction and warranty of the work performed by the *Construction Manager* up to the time of termination shall continue in force after such termination of the *Contract*.

GC 7.2 CONSTRUCTION MANAGER'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

- 7.2.1 If the *Owner* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Owner's* insolvency, or if a receiver is appointed because of the *Owner's* insolvency, the *Construction Manager* may, without prejudice to any other right or remedy the *Construction Manager* may have, terminate the *Contract* by giving the *Owner* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.2.2 If the *Work* is suspended or otherwise delayed for a period of 20 *Working Days* or more under an order of a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Construction Manager* or of anyone directly or indirectly employed or engaged by the *Construction Manager*, the *Construction Manager* may, without prejudice to any other right or remedy the *Construction Manager* may have, terminate the *Contract* by giving the *Owner Notice in Writing* to that effect.
- 7.2.3 The *Construction Manager* may give *Notice in Writing* to the *Owner*, with a copy to the *Consultant*, that the *Owner* is in default of the *Owner's* contractual obligations if:
- .1 the *Owner* fails to furnish, when so requested by the *Construction Manager*, reasonable evidence that financial arrangements have been made to fulfill the *Owner's* obligations under the *Contract*, or
 - .2 the *Consultant* fails to issue a certificate as provided in GC 5.4 – PROGRESS PAYMENT FOR THE WORK, or
 - .3 the *Owner* fails to pay the *Construction Manager*, or
 - .4 the *Owner* violates the requirements of the *Contract* to a substantial degree and the *Consultant*, except for GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, confirms by written statement to the *Construction Manager* that sufficient cause exists.
- 7.2.4 The *Construction Manager's Notice in Writing* to the *Owner* provided under paragraph 7.2.3 shall advise that if the default is not corrected within 5 *Working Days* following receipt of the *Notice in Writing*, the *Construction Manager* may, without prejudice to any other right or remedy the *Construction Manager* may have, suspend the *Work* or terminate the *Contract*.
- 7.2.5 If the *Construction Manager* terminates the *Contract* under the conditions set out above, the *Construction Manager* 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 *Construction Manager* may have sustained as a result of the termination of the *Contract*.

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

- 8.1.1 Differences between the parties to the *Contract* as to the interpretation, application or administration of the *Contract* or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved in the first instance by findings of the *Consultant* as provided in GC 2.3 – CONSULTANT'S RESPONSIBILITIES, shall be settled in accordance with the requirements of Part 8 of the General Conditions – DISPUTE RESOLUTION.
- 8.1.2 If a dispute arises under the *Contract* in respect of a matter in which the *Consultant* has no authority under the *Contract* to make a finding, the procedures set out in paragraph 8.1.3 and paragraphs 8.2.3 to 8.2.8 of GC 8.2 – NEGOTIATION, MEDIATION AND ARBITRATION, and in GC 8.3 – RETENTION OF RIGHTS apply to that dispute with the necessary changes to detail as may be required.

- 8.1.3 If a dispute is not resolved promptly, the *Consultant* will give such instructions as in the *Consultant's* opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim the party may have. If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Construction Manager* costs incurred by the *Construction Manager* in carrying out such instructions which the *Construction Manager* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*.

GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

- 8.2.1 In accordance with the Rules for Mediation of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, the parties shall appoint a *Project Mediator*
- .1 within 20 *Working Days* after the *Contract* was awarded, or
 - .2 if the parties neglected to make an appointment within the 20 *Working Days*, within 10 *Working Days* after either party by *Notice in Writing* requests that the *Project Mediator* be appointed.
- 8.2.2 A party shall be conclusively deemed to have accepted a finding of the *Consultant* under GC 2.3 – CONSULTANT'S RESPONSIBILITIES and to have expressly waived and released the other party from any claims in respect of the particular matter dealt with in that finding unless, within 15 *Working Days* after receipt of that finding, the party sends a *Notice in Writing* of dispute to the other party and to the *Consultant*, which contains the particulars of the matter in dispute and the relevant provisions of the *Contract Documents*. The responding party shall send a *Notice in Writing* of reply to the dispute within 10 *Working Days* after receipt of such *Notice in Writing* setting out particulars of this response and any relevant provisions of the *Contract Documents*.
- 8.2.3 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, frank, candid, and timely disclosure of relevant facts, information and documents to facilitate these negotiations.
- 8.2.4 After a period of 10 *Working Days* following receipt of a responding party's *Notice in Writing* of reply under paragraph 8.2.2, the parties shall request the *Project Mediator* to assist the parties to reach agreement on any unresolved dispute. The mediated negotiations shall be conducted in accordance with the Rules for Mediation of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing.
- 8.2.5 If the dispute has not been resolved within 10 *Working Days* after the *Project Mediator* was requested under paragraph 8.2.4 or within such further period agreed by the parties, the *Project Mediator* shall terminate the mediated negotiations by giving *Notice in Writing* to the *Owner*, the *Construction Manager* and the *Consultant*.
- 8.2.6 By giving a *Notice in Writing* to the other party and the *Consultant*, not later than 10 *Working Days* after the date of termination of the mediated negotiations under paragraph 8.2.5, either party may refer the dispute to 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. The arbitration shall be conducted in the jurisdiction of the *Place of the Work*.
- 8.2.7 On expiration of the 10 *Working Days*, the arbitration agreement under paragraph 8.2.6 is not binding on the parties and, if a *Notice in Writing* is not given under paragraph 8.2.6 within the required time, the parties may refer the unresolved dispute to the courts or to any other form of dispute resolution, including arbitration, which they have agreed to use.
- 8.2.8 If neither party, by *Notice in Writing* given within 10 *Working Days* of the date of *Notice in Writing* requesting arbitration in paragraph 8.2.6, requires that a dispute be arbitrated immediately, all disputes referred to arbitration as provided in paragraph 8.2.6 shall be
- .1 held in abeyance until
 - (1) Substantial Performance of the *Work*,
 - (2) the *Contract* has been terminated, or
 - (3) the *Construction Manager* has abandoned the *Work*,whichever is earlier, and
 - .2 consolidated into a single arbitration under the rules governing the arbitration under paragraph 8.2.6.

GC 8.3 RETENTION OF RIGHTS

- 8.3.1 It is agreed that no act by either party shall be construed as a renunciation or waiver of any rights or recourses, provided the party has given the *Notice in Writing* required under Part 8 of the General Conditions – DISPUTE RESOLUTION and has carried out the instructions as provided in paragraph 8.1.3 of GC 8.1 – AUTHORITY OF THE CONSULTANT.
- 8.3.2 Nothing in Part 8 of the General Conditions – DISPUTE RESOLUTION shall be construed in any way to limit a party from asserting any statutory right to a lien under applicable lien legislation of the jurisdiction of the *Place of the Work* and the assertion of such right by initiating judicial proceedings is not to be construed as a waiver of any right that party may have under paragraph 8.2.6 of GC 8.2 – NEGOTIATION, MEDIATION AND ARBITRATION to proceed by way of arbitration to adjudicate the merits of the claim upon which such a lien is based.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

- 9.1.1 The *Construction Manager* shall protect the *Work* and the *Owner's* property and property adjacent to the *Place of the Work* from damage which may arise as the result of the *Construction Manager's* operations under this *Contract*, and shall be responsible for such damage, except damage which occurs as the result of:
- .1 errors in the *Contract Documents*;
 - .2 acts or omissions by the *Owner*, the *Consultant*, other contractors, or their respective agents and employees.
- 9.1.2 Before commencing any work, the *Construction Manager* shall locate on site all underground utilities and structures that are indicated in the *Contract Documents* or information provided by the *Owner*, or that are reasonably apparent in an inspection of the *Place of the Work*.
- 9.1.3 Should the *Construction Manager* in the performance of the *Contract* damage the *Work*, the *Owner's* property or property adjacent to the *Place of the Work*, the *Construction Manager* shall be responsible for making good such damage at the *Construction Manager's* expense.
- 9.1.4 Should damage occur to the *Work* or *Owner's* property for which the *Construction Manager* is not responsible, as provided in paragraph 9.1.1, the *Construction Manager* shall make good such damage to the *Work* and, if the *Owner* so directs, to the *Owner's* property. The *Construction Manager's Fee*, the *Guaranteed Maximum Price* and the *Contract Time* shall be adjusted as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- 9.2.1 For the purposes of applicable legislation, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.
- 9.2.2 Prior to the *Construction Manager* commencing the *Work*, the *Owner* shall,
- .1 take all reasonable steps to determine whether any toxic or hazardous substances are present at the *Place of the Work*, and
 - .2 provide the *Consultant* and the *Construction Manager* with a written list of any such substances that are known to exist and their locations.
- 9.2.3 The *Owner* shall take all reasonable steps to ensure that no person's exposure to any toxic or hazardous substance exceeds the time weighted levels prescribed by applicable legislation at the *Place of the Work* and that no property is damaged or destroyed as a result of exposure to, or the presence of, toxic or hazardous substances which were at the *Place of the Work* prior to the *Construction Manager* commencing the *Work*.
- 9.2.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to dispose of, store or otherwise render harmless toxic or hazardous substances which were present at the *Place of the Work* prior to the *Construction Manager* commencing the *Work*.

- 9.2.5 If the *Construction Manager*
- .1 encounters toxic or hazardous substances at the *Place of the Work*, or
 - .2 has reasonable grounds to believe that toxic or hazardous substances are present at the *Place of the Work*, which were not brought to the *Place of the Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible and which were not disclosed by the *Owner* or which were disclosed but have not been dealt with as required under paragraph 9.2.4, the *Construction Manager* shall
 - .3 take all reasonable steps, including stopping the *Work*, to ensure that no person's exposure to any toxic or hazardous substances exceeds any applicable time weighted levels prescribed by applicable legislation at the *Place of the Work*, and
 - .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.
- 9.2.6 If the *Owner* and *Construction Manager* do not agree on the existence or significance of toxic or hazardous substances, or whether the toxic or hazardous substances were brought onto the *Place of the Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Construction Manager*.
- 9.2.7 If the *Owner* and *Construction Manager* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were not brought onto the place of the *Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible, the *Owner* shall promptly at the *Owner's* own expense:
- .1 take all steps as required under paragraph 9.2.4;
 - .2 adjust the *Construction Manager's Fee* and the *Guaranteed Maximum Price* by a reasonable amount for overhead costs incurred by the *Construction Manager* in taking the steps pursuant to paragraph 9.2.5;
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager* and the expert referred to in paragraph 9.2.6 and adjust the *Construction Manager's Fee* and the *Guaranteed Maximum Price* by a reasonable amount for costs incurred by the *Construction Manager* as a result of the delay; and
 - .4 indemnify the *Construction Manager* as required by GC 12.1 – INDEMNIFICATION.
- 9.2.8 If the *Owner* and *Construction Manager* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were brought onto the *Place of the Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible, the *Construction Manager* shall promptly at the *Construction Manager's* own expense:
- .1 take all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to safely remove and dispose the toxic or hazardous substance;
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.2.6; and
 - .4 indemnify the *Owner* as required by GC 12.1 – INDEMNIFICATION.
- 9.2.9 If either party does not accept the expert's findings under paragraph 9.2.6, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraph 9.2.7 or 9.2.8 it being understood that by so doing, neither party will jeopardize any claim that party may have to be reimbursed as provided by GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

GC 9.3 ARTIFACTS AND FOSSILS

- 9.3.1 Fossils, coins, articles of value or antiquity, structures and other remains or things of scientific or historic interest discovered at the *Place of the Work* shall, as between the *Owner* and the *Construction Manager*, be deemed to be the absolute property of the *Owner*.
- 9.3.2 The *Construction Manager* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.3.1, and shall advise the *Consultant* upon discovery of such items
- 9.3.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.3.1. If conditions are found that would change the *Construction Manager's Fee*, the *Guaranteed Maximum Price* or the *Construction Manager's* time to perform the *Work*, the *Consultant*, with the *Owner's* approval, will issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

GC 9.4 CONSTRUCTION SAFETY

- 9.4.1 Subject to paragraph 3.2.2.2 of GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, the *Construction Manager* shall be responsible for
- .1 construction health and safety at the *Place of the Work* in compliance with the rules, regulations and practices required by the applicable construction health and safety legislation, and
 - .2 establishing, initiating, maintaining and supervising all health and safety precautions and programs in connection with the performance of the *Work*.

GC 9.5 MOULD

- 9.5.1 If the *Construction Manager* or *Owner* observes or reasonably suspects the presence of mould at the *Place of the Work*, the remediation of which is not expressly part of the *Work*,
- .1 the observing party shall promptly report the circumstances to the other party in writing;
 - .2 the *Construction Manager* shall promptly take all reasonable steps, including stopping the *Work* if necessary, to ensure that no person suffers injury, sickness or death and that no property is damaged as a result of exposure to or the presence of the mould; and
 - .3 if the *Owner* and *Construction Manager* do not agree on the existence, significance or cause of the mould or as to what steps need be taken to deal with it, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and *Construction Manager*.
- 9.5.2 If the *Owner* and *Construction Manager* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was caused by the *Construction Manager's* operations under the *Contract*, the *Construction Manager* shall promptly, at the *Construction Manager's* own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould, and
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY, and
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.5.1.3, and
 - .4 indemnify the *Owner* as required by GC 12.1 – INDEMNIFICATION.
- 9.5.3 If the *Owner* and *Construction Manager* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was not caused by the *Construction Manager's* operations under the *Contract*, the *Owner* shall promptly, at the *Owner's* own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould;
 - .2 adjust the *Construction Manager's Fee* and the *Guaranteed Maximum Price* by a reasonable amount for overhead costs incurred by the *Construction Manager* in taking the steps pursuant to paragraph 9.5.1.2 and making good any damage to the *Work* as provided in paragraph 9.1.4 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager* and the expert referred to in paragraph 9.5.1.3 and adjust the *Construction Manager's Fee* and the *Guaranteed Maximum Price* by a reasonable amount for costs incurred by the *Construction Manager* as a result of the delay; and
 - .4 indemnify the *Construction Manager* as required by GC 12.1 – INDEMNIFICATION.
- 9.5.4 If either party does not accept the expert's finding under paragraph 9.5.1.3, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraphs 9.5.2 or 9.5.3, it being understood that by so doing neither party will jeopardize any claim the party may have to be reimbursed as provided by GC 9.5 – MOULD.

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

- 10.1.1 The *Construction Manager* shall pay all customs, taxes and duties in effect during the performance of the *Work*. The amount incurred shall be included in the *Cost of the Work* as in accordance with paragraph 7.1.14 of the Agreement A-7 – COST OF THE WORK.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- 10.2.1 The laws of the *Place of the Work* shall govern the *Work*.
- 10.2.2 The *Owner* shall obtain and pay for development approvals, building permit, permanent easements, rights of servitude, and all other necessary approvals and permits, except for the permits and fees referred to in paragraph 10.2.3 or for which the *Contract Documents* specify as the responsibility of the *Construction Manager*.
- 10.2.3 The *Construction Manager* shall be responsible for the procurement of permits, licences, inspections, and certificates, which are necessary for the performance of the *Work* and customarily obtained by contractors in the jurisdiction of the *Place of the Work* after the issuance of the building permit. The *Cost of the Work* includes the cost of these permits, licences, inspections, and certificates, and their procurement.
- 10.2.4 The *Construction Manager* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the preservation of the public health, and to construction safety.
- 10.2.5 The *Construction Manager* shall not be responsible for verifying that the *Contract Documents* are in compliance with the applicable laws, ordinances, rules, regulations, or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the applicable laws, ordinances, rules, regulations, or codes which require modification to the *Contract Documents*, the *Construction Manager* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will make the changes required to the *Contract Documents* as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 10.2.6 If the *Construction Manager* fails to advise the *Consultant* in writing, fails to obtain direction as required in paragraph 10.2.5, and performs work knowing it to be contrary to any laws, ordinances, rules, regulations or codes; the *Construction Manager* shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations, or codes.

GC 10.3 PATENT FEES

- 10.3.1 The *Construction Manager* shall pay the royalties and patent licence fees required for the performance of the *Contract*. The amount incurred shall be included in the *Cost of the Work* in accordance with paragraph 7.1.12 of the Agreement A-7 – COST OF THE WORK. The *Construction Manager* shall hold the *Owner* harmless from and against claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the *Construction Manager's* performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention by the *Construction Manager* or anyone for whose acts the *Construction Manager* may be liable.
- 10.3.2 The *Owner* shall hold the *Construction Manager* harmless against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Construction Manager's* performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention in executing anything for the purpose of the *Contract*, or any model, plan or design which was supplied to the *Construction Manager* as part of the *Contract*.

GC 10.4 WORKERS' COMPENSATION

- 10.4.1 Prior to commencing the *Work*, again with the *Construction Manager's* application for payment of the holdback amount following *Substantial Performance of the Work* and again with the *Construction Manager's* application for final payment, the *Construction Manager* shall provide evidence of compliance with workers' compensation legislation at the *Place of the Work*, including payments due thereunder.
- 10.4.2 At any time during the term of the *Contract*, when requested by the *Owner*, the *Construction Manager* shall provide such evidence of compliance by the *Construction Manager* and *Subcontractors*.

PART 11 INSURANCE — CONTRACT SECURITY

GC 11.1 INSURANCE

- 11.1.1 Without restricting the generality of GC 12.1 – INDEMNIFICATION, the *Construction Manager* shall provide, maintain and pay for the following insurance coverages, the minimum requirements of which are specified in CCDC 41 – INSURANCE REQUIREMENTS in effect at the time of bid closing except as hereinafter provided:
- .1 General liability insurance in the name of the *Construction Manager* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Construction Manager* with regard to the *Work*. General liability insurance shall be maintained from the date of commencement of the *Services* until one year from the date of *Substantial Performance of the Work*. Liability coverage shall be provided 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*.
 - .2 Automobile Liability Insurance from the date of commencement of the *Services* until one year after the date of *Substantial Performance of the Work*.
 - .3 Aircraft or Watercraft Liability Insurance when owned or non-owned aircraft or watercraft are used directly or indirectly in the performance of the *Work*.
 - .4 "Broad form" property insurance in the joint names of the *Construction Manager*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The "broad form" property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
 - (1) 10 calendar days after the date of *Substantial Performance of the Work*;
 - (2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*;
 - (3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
 - .5 Boiler and machinery insurance in the joint names of the *Construction Manager*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Substantial Performance of the Work*.
 - .6 The "Broad form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Construction Manager* as their respective interests may appear. In the event of loss or damage:
 - (1) the *Construction Manager* 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 *Construction Manager* 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 *Construction Manager* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Construction Manager*;
 - (2) the *Construction Manager* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount 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 in accordance with the progress payment provisions. In addition the *Construction Manager* shall be entitled to receive from the payments made by the insurer the amount of the *Construction Manager's* interest in the restoration of the *Work*; and
 - (3) to the *Work* arising from the work of the *Owner*, the *Owner's* own forces or another contractor, the *Owner* shall, in accordance with the *Owner's* obligations under the provisions relating to construction by *Owner* or other contractors, pay the *Construction Manager* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.
 - .7 Contractors' Equipment Insurance from the date of commencement of the *Work* until one year after the date of *Substantial Performance of the Work*.
- 11.1.2 Prior to commencement of the *Services* and upon the placement, renewal, amendment or extension of all or any part of the insurance, the *Construction Manager* 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 applicable to this *Contract*.

- 11.1.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the *Contract*.
- 11.1.4 If the *Construction Manager* 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 give evidence to the *Construction Manager* and the *Consultant*. The *Construction Manager* shall pay the cost thereof to the *Owner* on demand or the *Owner* may deduct the cost from the amount which is due or may become due to the *Construction Manager*.
- 11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*.
- 11.1.6 If a revised version of CCDC 41 – INSURANCE REQUIREMENTS is published, which specifies reduced insurance requirements, the parties shall address such reduction, prior to the *Construction Manager's* insurance policy becoming due for renewal, and record any agreement in a *Change Order*.
- 11.1.7 If a revised version of CCDC 41 – INSURANCE REQUIREMENTS is published, which specifies increased insurance requirements, the *Owner* may request the increased coverage from the *Construction Manager* by way of a *Change Order*.
- 11.1.8 A *Change Directive* shall not be used to direct a change in the insurance requirements in response to the revision of CCDC 41 – INSURANCE REQUIREMENTS.

GC 11.2 CONTRACT SECURITY

- 11.2.1 The *Construction Manager* shall, prior to commencement of the *Work* or within the specified time, provide to the *Owner* any *Contract* security required by this *Contract* as in accordance with paragraph 7.1.13 of the Agreement A-7 – COST OF THE WORK.
- 11.2.2 If this *Contract* requires surety bonds to be provided, such bonds shall be issued by a duly licensed surety company 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 fulfilment of this *Contract*. The form of such bonds shall be in accordance with the latest edition of the CCDC approved bond forms.

PART 12 INDEMNIFICATION, WAIVER OF CLAIMS AND WARRANTY

GC 12.1 INDEMNIFICATION

- 12.1.1 Without restricting the parties' obligation to indemnify as described in paragraphs 12.1.4 and 12.1.5, the *Owner* and the *Construction Manager* shall each indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by them or in respect to claims by third parties that arise out of, or are attributable in any respect to, their involvement as parties to this *Contract*, provided such claims are:
 - .1 caused by:
 - (1) the negligent acts or omissions of the party from whom indemnification is sought or anyone for whose acts or omissions that party is liable, or
 - (2) a failure of the party to the *Contract* from whom indemnification is sought to fulfill its terms or conditions; and
 - .2 made by *Notice in Writing* within a period of 6 years from the date of *Substantial Performance of the Work* as set out in the certificate of *Substantial Performance of the Work* issued pursuant to paragraph 5.5.2.2 of GC 5.5 – SUBSTANTIAL PERFORMANCE OF THE WORK or within such shorter period as may be prescribed by any limitation statute of the province or territory of the *Place of the Work*.

The parties expressly waive the right to indemnity for claims other than those provided for in this *Contract*.
- 12.1.2 The obligation of either party to indemnify as set forth in paragraph 12.1.1 shall be limited as follows:
 - .1 In respect to losses suffered by the *Owner* and the *Construction Manager* for which insurance is to be provided by either party pursuant to GC 11.1 – INSURANCE, the insurance limit in effect at the time of bid closing.
 - .2 In respect to losses suffered by the *Owner* and the *Construction Manager* for which insurance is not required to be provided by either party in accordance with GC 11.1 – INSURANCE, the greater of the *Price of the Work* or \$2,000,000, but in no event shall the sum be greater than \$20,000,000.

- .3 In respect to claims by third parties for direct loss resulting from bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, the obligation to indemnify is without limit. In respect to all other claims for indemnity as a result of claims advanced by third parties, the limits of indemnity set forth in paragraphs 12.1.2.1 and 12.1.2.2 shall apply.
- 12.1.3 The obligation of either party to indemnify the other as set forth in paragraphs 12.1.1 and 12.1.2 shall be inclusive of interest and all legal costs.
- 12.1.4 The *Owner* and the *Construction Manager* shall indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of their obligations described in GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.
- 12.1.5 The *Owner* shall indemnify and hold harmless the *Construction Manager* from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings:
- .1 as described in GC 10.3 – PATENT FEES, and
- .2 arising out of the *Construction Manager's* performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.
- 12.1.6 In respect to any claim for indemnity or to be held harmless by the *Owner* or the *Construction Manager*:
- .1 *Notice in Writing* of such claim shall be given within a reasonable time after the facts upon which such claim is based became known;
- .2 should either party be required as a result of its obligation to indemnify the other pay or satisfy a final order, judgment or award made against the party entitled by this contract to be indemnified, then the indemnifying party upon assuming all liability for any costs that might result shall have the right to appeal in the name of the party against whom such final order or judgment has been made until such rights of appeal have been exhausted.

- 12.2.1 Subject to any lien legislation applicable to the *Place of the Work*, as of the fifth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the *Construction Manager* waives and releases the *Owner* from all claims which the *Construction Manager* has or reasonably ought to have knowledge of that could be advanced by the *Construction Manager* against the *Owner* arising from the *Construction Manager's* involvement in the *Work*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the date of *Substantial Performance of the Work*, except as follows:
- .1 claims arising prior to or on the date of *Substantial Performance of the Work* for which *Notice in Writing* of claim has been received by the *Owner* from the *Construction Manager* no later than the sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*;
 - .2 indemnification for claims advanced against the *Construction Manager* by third parties for which a right of indemnification may be asserted by the *Construction Manager* against the *Owner* pursuant to the provisions of this *Contract*;
 - .3 claims for which a right of indemnity could be asserted by the *Construction Manager* pursuant to the provisions of paragraphs 12.1.4 or 12.1.5 of GC 12.1 – INDEMNIFICATION; and
 - .4 claims resulting from acts or omissions which occur after the date of *Substantial Performance of the Work*.
- 12.2.2 The *Construction Manager* waives and releases the *Owner* from all claims referenced in paragraph 12.2.1.4 except for those referred in paragraphs 12.2.1.2 and 12.2.1.3 and claims for which *Notice in Writing* of claim has been received by the *Owner* from the *Construction Manager* within 395 calendar days following the date of *Substantial Performance of the Work*.
- 12.2.3 Subject to any lien legislation applicable to the *Place of the Work*, as of the fifth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the *Owner* waives and releases the *Construction Manager* from all claims which the *Owner* has or reasonably ought to have knowledge of that could be advanced by the *Owner* against the *Construction Manager* arising from the *Owner's* involvement in the *Work*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the date of *Substantial Performance of the Work*, except as follows:
- .1 claims arising prior to or on the date of *Substantial Performance of the Work* for which *Notice in Writing* of claim has been received by the *Construction Manager* from the *Owner* no later than the sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*;

- .2 indemnification for claims advanced against the *Owner* by third parties for which a right of indemnification may be asserted by the *Owner* against the *Construction Manager* pursuant to the provisions of this *Contract*;
 - .3 claims for which a right of indemnity could be asserted by the *Owner* against the *Construction Manager* pursuant to the provisions of paragraph 12.1.4 of GC 12.1 – INDEMNIFICATION;
 - .4 damages arising from the *Construction Manager*'s actions which result in substantial defects or deficiencies in the *Work*. "Substantial defects or deficiencies" mean those defects or deficiencies in the *Work* which affect the *Work* to such an extent or in such a manner that a significant part or the whole of the *Work* is unfit for the purpose intended by the *Contract Documents*;
 - .5 claims arising pursuant to GC 12.3 – WARRANTY; and
 - .6 claims arising from acts or omissions which occur after the date of *Substantial Performance of the Work*.
- 12.2.4 The *Owner* waives and releases the *Construction Manager* from all claims referred to in paragraph 12.2.3.4 except claims for which *Notice in Writing* of claim has been received by the *Construction Manager* from the *Owner* within a period of six years from the date of *Substantial Performance of the Work* should any limitation statute of the Province or Territory of the *Place of the Work* permit such agreement. If the applicable limitation statute does not permit such agreement, within such shorter period as may be prescribed by:
- .1 any limitation statute of the Province or Territory of the *Place of the Work*; or
 - .2 the Civil Code of Quebec, if the *Place of the Work* is the Province of Quebec.
- 12.2.5 The *Owner* waives and releases the *Construction Manager* from all claims referenced in paragraph 12.2.3.6 except for those referred in paragraph 12.2.3.2, 12.2.3.3 and those arising under GC 12.3 – WARRANTY and claims for which *Notice in Writing* has been received by the *Construction Manager* from the *Owner* within 395 calendar days following the date of *Substantial Performance of the Work*.
- 12.2.6 "Notice in Writing of claim" as provided for in GC 12.2 – WAIVER OF CLAIMS to preserve a claim or right of action which would otherwise, by the provisions of GC 12.2 – WAIVER OF CLAIMS, be deemed to be waived, must include the following
- .1 a clear and unequivocal statement of the intention to claim;
 - .2 a statement as to the nature of the claim and the grounds upon which the claim is based; and
 - .3 a statement of the estimated quantum of the claim.
- 12.2.7 The party giving "Notice in Writing of claim" as provided for in GC 12.2 – WAIVER OF CLAIMS shall submit within a reasonable time a detailed account of the amount claimed.
- 12.2.8 Where the event or series of events giving rise to a claim made under paragraphs 12.2.1 or 12.2.3 has a continuing effect, the detailed account submitted under paragraph 12.2.7 shall be considered to be an interim account and the party making the claim shall submit further interim accounts, at reasonable intervals, giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 12.2.9 If a *Notice in Writing* of claim pursuant to paragraph 12.2.1.1 is received on the seventh or sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the period within which *Notice in Writing* of claim shall be received pursuant to paragraph 12.2.3.1 shall be extended to two calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*.
- 12.2.10 If a *Notice in Writing* of claim pursuant to paragraph 12.2.3.1 is received on the seventh or sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the period within which *Notice in Writing* of claim shall be received pursuant to paragraph 12.2.1.1 shall be extended to two calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*.

GC 12.3 WARRANTY

- 12.3.1 Except for extended warranties as described in paragraph 12.3.7, the warranty period under this *Contract* is one year from the date of *Substantial Performance of the Work*.
- 12.3.2 The *Construction Manager* shall be responsible for the proper performance of the *Work* to the extent that the design and *Contract Documents* permit such performance.
- 12.3.3 The *Owner*, through the *Consultant*, shall promptly give the *Construction Manager* *Notice in Writing* of observed defects and deficiencies which occur during the one year warranty period.
- 12.3.4 Subject to paragraph 12.3.2, the *Construction Manager* shall correct promptly, at the *Construction Manager's* expense, defects or deficiencies in the *Work* which appear prior to and during the one year warranty period.

- 12.3.5 The *Construction Manager* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.
- 12.3.6 The *Construction Manager* shall enforce the warranty obligations of the *Subcontractors* and *Suppliers* which shall include the following provisions:
- .1 the *Subcontractor* or the *Supplier* shall correct promptly at its expense defects or deficiencies in the work which appear prior to and during the warranty periods specified in the *Contract Documents*; and .
 - .2 the *Subcontractor* or the *Supplier* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.
- 12.3.7 Any extended warranties required beyond the one year warranty period as described in paragraph 12.3.1 shall be as specified in the *Contract Documents*. Extended warranties shall be issued by the warrantor to the benefit of the *Owner*. The *Construction Manager*'s responsibility with respect to extended warranties shall be limited to obtaining any such extended warranties from the warrantor. The obligations under such extended warranties are solely the responsibilities of the warrantor.

APPENDIX – STIPULATED PRICE OPTION

The *Owner* and the *Construction Manager* may agree to exercise the stipulated price option at any time during the term of the *Contract* as in accordance with Article A-8 of the Agreement – OPTIONS. Upon the issuance of the *Change Order* exercising the stipulated price option, the following Articles of the Agreement, Definitions and General Conditions shall be deemed deleted, amended or added, as the case may be, and the *Contract* so revised shall be deemed to govern the rights and obligations of the parties with respect to the *Services* and *Work* to be provided from and after the date of the *Change Order*, unless stipulated otherwise in the *Change Order*.

ARTICLES OF THE AGREEMENT

1. **Article A-1**

New paragraph 1.4

insert new paragraph as follows:

1.4 subject to adjustment in *Contract Time* as provided for in the *Contract Documents*, attain *Substantial Performance of the Work*, by the _____ day of _____ in the year _____.

2. **Article A-5**

Delete this Article in its entirety.

3. **Article A-6**

Delete this Article in its entirety.

4. **Article A-7**

Delete this Article and replace with the following:

ARTICLE A-7 COST OF WORK

7.1 The cost of performing the work attributable to any *Change Directive* shall include:

- .1 salaries, wages and benefits paid to personnel in the direct employ of the *Construction Manager* under a salary or wage schedule agreed upon by the *Owner* and the *Construction Manager*, or in the absence of such a schedule, actual salaries, wages and benefits paid under applicable bargaining agreement, and in the absence of a salary or wage schedule and bargaining agreement, actual salaries, wages and benefits paid by the *Construction Manager*, for personnel
 - (1) stationed at the *Place of the Work*, in whatever capacity employed;
 - (2) engaged in expediting the production or transportation of material or equipment, at shops or on the road;
 - (3) engaged in the preparation or review of *Shop Drawings*, fabrication drawings and coordination drawings;or
 - (4) engaged in the processing of changes in the *Work*.
- .2 contributions, assessments or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan, insofar as such cost is based on wages, salaries or other remuneration paid to employees of the *Construction Manager* and included in the cost of the *Work* as provided in paragraph 7.1.1;
- .3 travel and subsistence expenses of the *Construction Manager's* personnel described in paragraph 7.1.1;
- .4 all *Products* including cost of transportation thereof;
- .5 materials, supplies, *Construction Equipment*, *Temporary Work*, and hand tools not owned by the workers, including transportation and maintenance thereof, which are consumed in the performance of the *Work*; and cost less salvage value on such items used but not consumed, which remain the property of the *Construction Manager*;
- .6 all tools and *Construction Equipment*, exclusive of hand tools used in the performance of the *Work*, whether rented from or provided by the *Construction Manager* or others, including installation, minor repairs and replacements, dismantling, removal, transportation, and delivery cost thereof;
- .7 the *Construction Manager's* field office;

- .8 deposits lost provided that they are not caused by negligent acts or omissions of the *Construction Manager* and the *Services* are performed in accordance with this *Contract*;
- .9 the amount of all subcontracts;
- .10 quality assurance such as independent inspection and testing services;
- .11 charges levied by authorities having jurisdiction at the *Place of the Work*;
- .12 royalties, patent license fees and damages for infringement of patents and cost of defending suits therefor subject always to the *Construction Manager's* obligations to indemnify the *Owner* as provided in paragraph 10.3.1 of GC 10.3 – PATENT FEES;
- .13 any adjustment in premiums for all contract securities and insurance that the *Construction Manager* is required, by the *Contract Documents*, to purchase and maintain;
- .14 any adjustment in taxes, other than *Value Added Taxes*, and duties relating to the *Work* for which the *Construction Manager* is liable;
- .15 charges for long distance communications, courier services, expressage, printing, and reproduction incurred in relation to the performance of the *Work*;
- .16 removal and disposal of waste products and debris;
- .17 the cost of safety measures and requirements;
- .18 other costs incurred in the performance of the *Work* as listed below:

6. **Article A-8**

Delete this Article and replace with the following:

ARTICLE A-8 CONTRACT PRICE

- 8.1 The *Contract Price*, which excludes *Value Added Taxes*, is: _____ /100 dollars \$ _____
- 8.2 *Value Added Taxes* (of _____ %) payable by the *Owner* to the *Construction Manager* are: _____ /100 dollars \$ _____
- 8.3 Total amount payable by the *Owner* to the *Construction Manager* for the construction of the *Work* is: _____ /100 dollars \$ _____
- 8.4 These amounts shall be subject to adjustments as provided in the *Contract Documents*.
- 8.5 All amounts are in Canadian funds.

7. **Article A-9**

paragraph 9.1

Delete and replace with the following:

- 9.1 Where required by provincial or territorial legislation, payments shall be subject to the lien legislation applicable to the *Place of the Work*. The *Owner* shall pay the *Construction Manager*:
 - .1 payments on account of the *Contract Price* when due in the amount certified by the *Consultant* together with such *Value Added Taxes* as may be applicable to such payments,
 - .2 upon *Substantial Performance of the Work*, the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment, and
 - .3 upon the issuance of the final certificate for payment, the unpaid balance of the *Construction Manager's Fee* for the *Services* and the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payment.

8. **Schedule, A1**

Delete this Schedule in its entirety.

9. **Schedule A2**
Delete this Schedule in its entirety.

10. **Schedule B**
Delete this Schedule in its entirety.

DEFINITIONS

11. **Definition 5 – CHANGE DIRECTIVE**
Delete and replace with the following:

5. Change Directive

A *Change Directive* is a written instruction prepared by the *Consultant* and signed by the *Owner* directing the *Construction Manager* to proceed with a change in the *Work* within the general scope of this *Contract* prior to the *Owner* and the *Construction Manager* agreeing upon adjustments in the *Contract Price* and the *Contract Time*.

12. **Definition 6 – CHANGE ORDER**
Delete and replace with the following:

6. Change Order

A *Change Order* is a written amendment to this *Contract* prepared by the *Consultant* and signed by the *Owner* and the *Construction Manager* stating their agreement upon:

- a change in the *Services*;
- a change in the *Work*;
- the method of adjustment or the amount of the adjustment in the *Contract Price*, if any; and
- the extent of the adjustment in the *Contract Time*, if any.

13. **Definition 32 – SUPPLEMENTAL INSTRUCTION**
Delete and replace with the following:

Supplemental Instruction

A *Supplemental Instruction* is an instruction, not involving adjustment in the *Contract Price* or *Contract Time*, in the form of *Specifications*, *Drawings*, schedules, samples, models or written instructions, consistent with the intent of the *Contract Documents*. It is to be issued by the *Consultant* to supplement the *Contract Documents*, as required for the performance of the *Work*.

14. **New Definition 38 – CONTRACT PRICE**
Insert new Definition as follows:

Contract Price

The *Contract Price*, which excludes *Value Added Taxes*, is the amount specified in Article A-8 – CONTRACT PRICE to complete the *Services* and the *Work*.

GENERAL CONDITIONS

15. GC 2.3
Delete and replace with the following:
- 2.3.1 The *Consultant* will provide administration of the *Work* as described in the *Contract Documents*.
- 2.3.2 The *Consultant* will visit the *Place of the Work* at intervals appropriate to the progress of construction to become familiar with the progress and quality of the work and to determine if the *Work* is proceeding in general conformity with the *Contract Documents*.
- 2.3.3 If the *Owner* and the *Consultant* agree, the *Consultant* will provide at the *Place of the Work*, one or more project representatives to assist in carrying out the *Consultant's* responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing to the *Construction Manager*.
- 2.3.4 The *Consultant* will promptly inform the *Owner* of the date of receipt of the *Construction Manager's* applications for payment for the *Work* performed as provided in paragraph 5.4.7.1 of GC 5.4 – PROGRESS PAYMENT FOR THE WORK.

- 2.3.5 Based on the *Consultant's* observations and evaluation of the *Construction Manager's* applications for payment for the *Work* performed, the *Consultant* will determine the amounts owing to the *Construction Manager* for the *Contract Price* and will issue certificates for payment as provided in Article A-9 of the Agreement – PAYMENT, GC 5.4 – PROGRESS PAYMENT FOR THE WORK and GC 5.8 – FINAL PAYMENT FOR THE WORK.
- 2.3.6 The *Consultant* will not be responsible for and will not have control, charge or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the *Work* in accordance with the applicable construction safety legislation, other regulations or general construction practice. The *Consultant* will not be responsible for the *Construction Manager's* failure to carry out the *Work* in accordance with the *Contract Documents*. The *Consultant* will not have control over, charge of or be responsible for the acts or omissions of the *Construction Manager*, *Subcontractors*, *Suppliers*, or their agents, employees, or any other persons performing portions of the *Work*.
- 2.3.7 Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, the *Consultant* will be, in the first instance, the interpreter of the requirements of the *Work*.
- 2.3.8 Matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents*, except with respect to the scope, fee and reimbursable expenses of the *Services*, shall be initially referred in writing to the *Consultant* by the party raising the question for interpretations and findings and copied to the other party.
- 2.3.9 Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents* as they relate to the *Work*. In making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Construction Manager*.
- 2.3.10 The *Consultant's* interpretations and findings will be given in writing to the parties within a reasonable time.
- 2.3.11 With respect to claims for a change in the *Contract Price*, the *Consultant* will make findings as set out in GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE
- 2.3.12 The *Consultant* will have authority to reject work which in the *Consultant's* opinion does not conform to the requirements of the *Contract Documents*. Whenever the *Consultant* considers it necessary or advisable, the *Consultant* will have authority to require inspection or testing of work, whether or not such work is fabricated, installed or completed. However, neither the authority of the *Consultant* to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the *Consultant* to the *Construction Manager*, *Subcontractor*, *Suppliers*, or their agents, employees, or other persons performing any of the *Work*.
- 2.3.13 During the progress of the *Work* the *Consultant* will furnish *Supplemental Instructions* to the *Construction Manager* with reasonable promptness or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Construction Manager*.
- 2.3.14 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other *Construction Manager's* submittals which are provided in accordance with the *Construction Documents*.
- 2.3.15 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 2.3.16 The *Consultant* will conduct reviews of the *Work* to determine the date of *Substantial Performance of the Work* as provided in GC 5.5 – SUBSTANTIAL PERFORMANCE OF THE WORK.
- 2.3.17 All certificates issued by the *Consultant* will be to the best of the *Consultant's* knowledge, information and belief. By issuing any certificate, the *Consultant* does not guarantee the *Work* is correct or complete.
- 2.3.18 The *Consultant* will receive and review written warranties and related documents required by the *Contract* and provided by the *Construction Manager* and will forward such warranties and documents to the *Owner* for the *Owner's* acceptance.

16. GC 2.4

Delete and replace with the following:

- 2.4.1 The *Construction Manager* shall provide the *Owner* and the *Consultant* access to the *Work* at all times. The *Construction Manager* shall provide sufficient, safe and proper facilities at all times for the review of the *Work* by the *Consultant* and the inspection of the *Work* by authorized agencies. If parts of the *Work* are in preparation at locations other than the *Place of the Work*, the *Owner* and the *Consultant* shall be given access to such work whenever it is in progress.

- 2.4.2 If work is designated for tests, inspections or approvals in the *Contract Documents*, or by the *Consultant's* instructions, or by the laws or ordinances of the *Place of the Work*, the *Construction Manager* shall give the *Consultant* reasonable notification of when the work will be ready for review and inspection. The *Construction Manager* shall arrange for and shall give the *Consultant* reasonable notification of the date and time of inspections by other authorities.
- 2.4.3 The *Construction Manager* shall furnish promptly to the *Consultant* two copies of certificates and inspection reports relating to the *Work*.
- 2.4.4 If the *Construction Manager* covers, or permits to be covered, work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, the *Construction Manager* shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed, and make good covering work at the *Construction Manager's* expense.
- 2.4.5 The *Consultant* may order any portion or portions of the *Work* to be examined to confirm that such work is in accordance with the requirements of the *Contract Documents*. If the work is not in accordance with the requirements of the *Contract Documents*, the *Construction Manager* shall correct the work and pay the cost of examination and correction at the *Construction Manager's* expense. If the work is in accordance with the requirements of the *Contract Documents*, the *Owner* shall pay the cost of examination and restoration.
- 2.4.6 The *Construction Manager* shall pay the cost of making any test or inspection, including the cost of samples required for such test or inspection, if such test or inspection is designated in the *Contract Documents* to be performed by the *Construction Manager* or is designated by the laws or ordinances applicable to the *Place of the Work*.
- 2.4.7 The *Construction Manager* shall pay the cost of samples required for any test or inspection to be performed by the *Consultant* or the *Owner* if such test or inspection is designated in the *Contract Documents*.

17. **GC 2.5**

Delete and replace with the following:

- 2.5.1 The *Construction Manager* shall promptly correct defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work has been incorporated in the *Work* and whether or not the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Construction Manager*. The correction of defective work shall be at the *Construction Manager's* expense.
- 2.5.2 The *Construction Manager* shall make good promptly other contractors' work destroyed or damaged by such removals or replacements. The correction of destroyed or damaged work shall be at the *Construction Manager's* expense.
- 2.5.3 If in the opinion of the *Consultant* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Construction Manager* the difference in value between the work as performed and that called for by the *Contract Documents*. If the *Owner* and the *Construction Manager* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a finding.

18. **GC 3.7**

Delete and replace with the following:

- 3.7.1 The *Construction Manager* shall preserve and protect the rights of the parties under the *Contract* with respect to work to be performed under subcontract, and shall:
 - .1 enter into contracts or written agreements with *Subcontractors* and *Suppliers* to require them to perform their work as provided in the *Contract Documents*;
 - .2 incorporate the terms and conditions of the *Contract Documents* into all contracts or written agreements with *Subcontractors* and *Suppliers*; and
 - .3 be as fully responsible to the *Owner* for acts and omissions of *Subcontractors*, *Suppliers* and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Construction Manager*.
- 3.7.2 The *Construction Manager* shall, before entering into contracts or written agreements with *Subcontractors* and *Suppliers*, submit to the *Owner* all bids received for the various parts of the *Work* to be subcontracted and obtain the *Owner's* acceptance of the *Subcontractors* and *Suppliers* selected.

- 3.7.3 The *Construction Manager* shall cause to be obtained contract security from *Subcontractors* to the extent and for the amounts approved by the *Owner*.
- 3.7.4 The *Construction Manager* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Construction Manager* may reasonably object.
- 3.7.5 The *Owner*, through the *Consultant*, may provide to a *Subcontractor* or *Supplier* information as to the percentage of the *Subcontractor's* or *Supplier's* work which has been certified for payment.

19. **GC 3.8**

Delete and replace with the following:

- 3.8.1 The *Construction Manager* shall maintain good order and discipline among the *Construction Manager's* employees engaged on the *Work* and shall not employ on the *Work* anyone not skilled in the tasks assigned.
- 3.8.2 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*.
- 3.8.3 The *Construction Manager* shall provide and pay for labour, *Products*, tools, *Construction Equipment*, water, heat, light, power, transportation, and other facilities and services necessary for the performance of the *Work* in accordance with the *Contract*.

20. **New GC 3.14 – SERVICES**

Insert new General Condition as follows:

GC 3.14 SERVICES

- 3.14.1 The *Construction Manager* shall:
 - .1 chair and minute regular *Project* meetings with the *Owner* and the *Consultant*,
 - .2 prepare and update the cash flow forecasts in accordance with the *Project* budget that are specified in the *Contract* or otherwise agreed with the *Owner*;
 - .3 provide reasonable assistance and information to permit recovery of all tax rebates where applicable, and
 - .4 assist the *Owner* in conducting post-construction occupancy review.

21. **GC 4.1**

Delete and replace with the following:

- 4.1.1 The *Contract Price*, and not the cash allowances, includes the *Construction Manager's* overhead and profit in connection with such cash allowances.
- 4.1.2 The *Contract Price* includes the cash allowances, if any, stated in this *Contract*. The scope of work or costs included in such cash allowances shall be as described in this *Contract*.
- 4.1.3 Expenditures under cash allowances shall be authorized by the *Owner* through the *Consultant*.
- 4.1.4 Where costs under any cash allowance exceed the amount of the allowance, the *Construction Manager* shall be compensated for the excess incurred and substantiated plus an amount for overhead and profit on the excess as set out in the *Contract Documents*. Where costs under any cash allowance are less than the amount of the allowance, the *Owner* shall be credited for the unexpended portion of the cash allowance, but not for the *Construction Manager's* overhead and profit on such amount. Multiple cash allowances shall not be combined for the purpose of calculating the foregoing.
- 4.1.5 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between each cash allowance and its actual cost.
- 4.1.6 The value of the *Work* performed under a cash allowance is eligible to be included in progress payments.
- 4.1.7 The *Construction Manager* and the *Consultant* shall jointly prepare a schedule that shows when the *Consultant* and the *Owner* must authorize ordering of items called for under cash allowances to avoid delaying the progress of the *Work*.

22. **GC 5.2**

Delete and replace with the following:

- 5.2.1 The *Construction Manager* shall keep full and detailed accounts and records necessary for the documentation of and the cost of performing the work attributable to the *Change Directive*.

- 5.2.2 For 60 calendar days after the application for final payment or for such other period specified in the *Contract*, the *Owner* shall be afforded reasonable access to all of the *Construction Manager's* books, records, correspondence, instructions, drawings, receipt vouchers, *Subcontractor* and *Supplier* invoices, and memoranda relating to the cost of performing the work attributable to the *Change Directive*, and for this purpose the *Construction Manager* shall preserve all such records..
23. **GC 5.3**
Delete this General Condition in its entirety.
24. **GC 5.4**
Delete and replace with the following:
- 5.4.1 Applications for payment on account as provided in Article A-9 of the Agreement – PAYMENT may be made monthly as the *Work* progresses.
- 5.4.2 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.
- 5.4.3 The amount claimed shall be for the value, proportionate to the *Contract Price*, of *Work* performed and *Products* delivered to the *Place of the Work* as of the last day of the payment period
- 5.4.4 The *Construction Manager* shall submit to the *Consultant*, at least 15 calendar days before the first application for payment after exercising the stipulated price option, a schedule of values for the parts of the *Work*, aggregating the total amount of the *Contract Price*, so as to facilitate evaluation of applications for payment.
- 5.4.5 The schedule of values shall be made out in such form and supported by such evidence as the *Consultant* may reasonably direct and when accepted by the *Consultant*, shall be used as the basis for applications for payment, unless it is found to be in error.
- 5.4.6 Applications for payment for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall be supported by such evidence as the *Consultant* may reasonably require to establish the value and delivery of the *Products*.
- 5.4.7 After receipt by the *Consultant* of an application for payment for the *Work* submitted by the *Construction Manager* in accordance with paragraphs 5.4.1 to 5.4.6:
- .1 the *Consultant* will promptly inform the *Owner* of the date of receipt of the *Construction Manager's* application for payment;
 - .2 the *Consultant* will issue to the *Owner* and copy to the *Construction Manager*, no later than 10 calendar days after the receipt of the application for payment, a certificate for payment in the amount applied for, or in such other amount as the *Consultant* determines to be properly due. If the *Consultant* amends the application, the *Consultant* will promptly advise the *Construction Manager* in writing giving reasons for the amendment; and
 - .3 the *Owner* shall make payment to the *Construction Manager* on account as provided in Article A-9 of the Agreement – PAYMENT on or before 20 calendar days after the later of:
 - receipt by the *Consultant* of the application for payment, or
 - the last day of the monthly payment period for which the application for payment is made.
- 5.4.8 The *Construction Manager* shall include a statement based on the schedule of values with each application for payment.
25. **GC 6.2**
Delete and replace with the following:
- 6.2.1 When a change in the *Work* is proposed or required, the *Consultant* shall provide the *Construction Manager* with a written description of the proposed change in the *Work*. The *Construction Manager* shall promptly present, in a form acceptable to the *Consultant*, a method of adjustment or an amount of adjustment for the *Contract Price* and the adjustment in the *Contract Time*, as applicable, for the proposed change in the *Work*.
- 6.2.2 When the *Owner* and *Construction Manager* agree to the adjustments in the *Contract Price* and the *Contract Time*, or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*. The value of the work performed as the result of a *Change Order* shall be included in applications for progress payment

26. **GC 6.3**

Delete and replace with the following:

- 6.3.1 If the *Owner* requires the *Construction Manager* to proceed with a change in the *Work* prior to the *Owner* and the *Construction Manager* agreeing upon any corresponding adjustment in the *Contract Price* and the *Contract Time*, the *Owner*, through the *Consultant*, shall issue a *Change Directive*.
- 6.3.2 A *Change Directive* shall only be used to direct a change in the *Work* which is within the general scope of the *Contract Documents*.
- 6.3.3 A *Change Directive* shall not be used to direct a change in the *Contract Time* only.
- 6.3.4 Upon receipt of a *Change Directive*, the *Construction Manager* shall proceed promptly with the change in the *Work*.
- 6.3.5 For the purpose of valuing *Change Directives*, changes in the *Work* that are not substitutions or otherwise related to each other shall not be grouped together in the same *Change Directive*.
- 6.3.6 The adjustment in the *Contract Price* for a change carried out by way of a *Change Directive* shall be determined on the basis of the cost of the *Construction Manager's* actual expenditures and savings attributable to the *Change Directive*, valued in accordance with Article A-7 of the Agreement – COST OF WORK and as follows:
 - .1 If the change results in a net increase in the *Construction Manager's* cost, the *Contract Price* shall be increased by the amount of the net increase in the *Construction Manager's* cost, plus the *Construction Manager's* percentage fee on such net increase.
 - .2 If the change results in a net decrease in the *Construction Manager's* cost, the *Contract Price* shall be decreased by the amount of the net decrease in the *Construction Manager's* cost, without adjustment for the *Construction Manager's* percentage fee.
 - 3 The *Construction Manager's* fee shall be as specified in the *Contract Documents* or as otherwise agreed by the parties.
- 6.3.7 If the *Owner* and the *Construction Manager* do not agree on the proposed adjustment in the *Contract Price*, the *Contract Time*, or in the method of determining them, the adjustment shall be referred to the *Consultant* for a finding.
- 6.3.8 When the *Owner* and the *Construction Manager* reach agreement on the adjustment to the *Contract Price* and the *Contract Time*, this agreement shall be recorded in a *Change Order*.
- 6.3.9 Pending determination of the final amount of a *Change Directive*, the undisputed value of the work performed as the result of a *Change Directive* is eligible to be included in progress payments.

27. **GC 6.4**

Delete and replace with the following:

- 6.4.1 If the *Owner* or the *Construction Manager* discover conditions at the *Place of the Work* which are:
 - .1 subsurface or otherwise concealed physical conditions which existed before the commencement of the *Work* which differ materially from those indicated in the *Contract Documents*; or
 - .2 physical conditions, other than conditions due to weather, that are of a nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the *Contract Documents*,then the observing party shall give *Notice in Writing* to the other party of such conditions before they are disturbed and in no event later than 5 *Working Days* after first observance of the conditions.
- 6.4.2 The *Consultant* will promptly investigate such conditions and make a finding. If the finding is that the conditions differ materially and this would justify an increase or decrease in the *Contract Price* or the *Contract Time*, the *Consultant*, with the *Owner's* approval, will issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.
- 6.4.3 If the *Consultant* finds that the conditions at the *Place of the Work* are not materially different or that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* will report the reasons for this finding to the *Owner* and the *Construction Manager* in writing.
- 6.4.4 If such concealed or unknown conditions relate to toxic and hazardous substances and materials, artifacts and fossils, or mould, the parties will be governed by the provisions of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, GC 9.3 – ARTIFACTS AND FOSSILS and GC 9.5 – MOULD.

28. **GC 6.5**

Delete and replace with the following:

- 6.5.1 If the *Construction Manager* is delayed in the performance of the *Work* by an action or omission of the *Owner*, *Consultant* or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager*. The *Contract Price* shall be adjusted by a reasonable amount for costs incurred by the *Construction Manager* as the result of such delay.
- 6.5.2 If the *Construction Manager* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Construction Manager* or any person employed or engaged by the *Construction Manager* directly or indirectly, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager*. The *Contract Price* shall be adjusted by a reasonable amount for costs incurred by the *Construction Manager* as the result of such delay.
- 6.5.3 If the *Construction Manager* is delayed in the performance of the *Work* by:
- .1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors' association, of which the *Construction Manager* is a member or to which the *Construction Manager* is otherwise bound),
 - .2 fire, unusual delay by common carriers or unavoidable casualties,
 - .3 abnormally adverse weather conditions, or
 - .4 any cause beyond the *Construction Manager*'s control other than one resulting from a default or breach of *Contract* by the *Construction Manager*,
- then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Construction Manager* agrees to a shorter extension. The *Construction Manager* shall not be entitled to payment for costs incurred by such delays unless such delays result from actions by the *Owner*, *Consultant* or anyone employed or engaged by them directly or indirectly.
- 6.5.4 No extension shall be made for delay unless *Notice in Writing* of the cause of the delay is given to the *Consultant* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.
- 6.5.5 If no schedule is made under paragraph 2.3.13 of GC 2.3 – CONSULTANT'S RESPONSIBILITIES or paragraph 3.5.1 of GC 3.5 – CONSTRUCTION SCHEDULE, then no request for extension shall be made because of failure of the *Consultant* to furnish instructions until 10 *Working Days* after demand for such instructions has been made.

29. **GC 6.6**

Delete and replace with the following:

GC 6.6. CLAIMS FOR A CHANGE IN CONTRACT PRICE

- 6.6.1 If the *Construction Manager* intends to make a claim for an increase to the *Contract Price*, or if the *Owner* intends to make a claim against the *Construction Manager* for a credit to the *Contract Price*, the party that intends to make the claim shall give timely *Notice in Writing* of intent to claim to the other party with a copy to the *Consultant*.

30. **GC 7.1**

Delete and replace with the following:

- 7.1.1 If the *Construction Manager* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Construction Manager*'s insolvency, or if a receiver is appointed because of the *Construction Manager*'s insolvency, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, terminate the *Construction Manager*'s right to continue with the *Work*, by giving the *Construction Manager* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.

- 7.1.2 If the *Construction Manager* neglects to prosecute the *Work* properly or otherwise fails to comply with the requirements of the *Contract Documents* to a substantial degree, and if the *Consultant* has given a written statement to the *Owner* and *Construction Manager* that sufficient cause exists to justify such action, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Construction Manager Notice in Writing* that the *Construction Manager* is in default of the *Construction Manager's* contractual obligations and instruct the *Construction Manager* to correct the default in the 5 *Working Days* immediately following the receipt of such *Notice in Writing*.
- 7.1.3 If the default cannot be corrected in the 5 *Working Days* specified or in such other time period as may be subsequently agreed in writing by the parties, the *Construction Manager* shall be in compliance with the *Owner's* instructions if the *Construction Manager*:
- .1 commences the correction of the default within the specified time, and
 - .2 provides the *Owner* with an acceptable schedule for such correction, and
 - .3 corrects the default in accordance with the *Contract* terms and with such schedule.
- 7.1.4 If the *Construction Manager* fails to correct the default in the time specified or in such other time period as may be subsequently agreed in writing by the parties, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may:
- .1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Construction Manager* provided the *Consultant* has certified such cost to the *Owner* and the *Construction Manager*, or
 - .2 terminate the *Construction Manager's* right to continue with the *Work* in whole or in part or terminate the *Contract*.
- 7.1.5 If the *Owner* terminates the *Construction Manager's* right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Owner* shall be entitled to:
- .1 take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* at the *Place of the Work*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense, and
 - .2 withhold further payment to the *Construction Manager* until a final certificate for payment is issued, and
 - .3 charge the *Construction Manager* the amount by which the full cost of finishing the *Work* as certified by the *Consultant*, including compensation to the *Consultant* for the *Consultant's* additional services and a reasonable allowance as determined by the *Consultant* to cover the cost of corrections to work performed by the *Construction Manager* that may be required under GC 12.3 – WARRANTY, exceeds the unpaid balance of the *Price of the Work*; however, if such cost of finishing the *Work* is less than the unpaid balance of the *Price of the Work*, the *Owner* shall pay the *Construction Manager* the difference, and
 - .4 on expiry of the warranty period, charge the *Construction Manager* the amount by which the cost of corrections to the *Construction Manager's* work under GC 12.3 – WARRANTY exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the *Construction Manager* the difference.
- 7.1.6 The *Construction Manager's* obligation under the *Contract* as to quality, correction and warranty of the work performed by the *Construction Manager* up to the time of termination shall continue in force after such termination of the *Contract*.

31. GC 9.1

Delete and replace with the following:

- 9.1.1 The *Construction Manager* shall protect the *Work* and the *Owner's* property and property adjacent to the *Place of the Work* from damage which may arise as the result of the *Construction Manager's* operations under this *Contract*, and shall be responsible for such damage, except damage which occurs as the result of:
- .1 errors in the *Contract Documents*;
 - .2 acts or omissions by the *Owner*, the *Consultant*, other contractors, or their respective agents and employees.
- 9.1.2 Before commencing any work, the *Construction Manager* shall locate on site all underground utilities and structures that are indicated in the *Contract Documents* or information provided by the *Owner*, or that are reasonably apparent in an inspection of the *Place of the Work*.
- 9.1.3 Should the *Construction Manager* in the performance of the *Contract* damage the *Work*, the *Owner's* property or property adjacent to the *Place of the Work*, the *Construction Manager* shall be responsible for making good such damage at the *Construction Manager's* expense.

- 9.1.4 Should damage occur to the *Work* or *Owner's* property for which the *Construction Manager* is not responsible, as provided in paragraph 9.1.1, the *Construction Manager* shall make good such damage to the *Work* and, if the *Owner* so directs, to the *Owner's* property. The *Contract Price* and the *Contract Time* shall be adjusted as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

32. **GC 9.2**

Delete and replace with the following:

- 9.2.1 For the purposes of applicable legislation, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.
- 9.2.2 Prior to the *Construction Manager* commencing the *Work*, the *Owner* shall,
- .1 take all reasonable steps to determine whether any toxic or hazardous substances are present at the *Place of the Work*, and
 - .2 provide the *Consultant* and the *Construction Manager* with a written list of any such substances that are known to exist and their locations.
- 9.2.3 The *Owner* shall take all reasonable steps to ensure that no person's exposure to any toxic or hazardous substance exceeds the time weighted levels prescribed by applicable legislation at the *Place of the Work* and that no property is damaged or destroyed as a result of exposure to, or the presence of, toxic or hazardous substances which were at the *Place of the Work* prior to the *Construction Manager* commencing the *Work*.
- 9.2.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to dispose of, store or otherwise render harmless toxic or hazardous substances which were present at the *Place of the Work* prior to the *Construction Manager* commencing the *Work*.
- 9.2.5 If the *Construction Manager*
- .1 encounters toxic or hazardous substances at the *Place of the Work*, or
 - .2 has reasonable grounds to believe that toxic or hazardous substances are present at the *Place of the Work*, which were not brought to the *Place of the Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible and which were not disclosed by the *Owner* or which were disclosed but have not been dealt with as required under paragraph 9.2.4, the *Construction Manager* shall
 - .3 take all reasonable steps, including stopping the *Work*, to ensure that no person's exposure to any toxic or hazardous substances exceeds any applicable time weighted levels prescribed by applicable legislation at the *Place of the Work*, and
 - .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.
- 9.2.6 If the *Owner* and *Construction Manager* do not agree on the existence or significance of toxic or hazardous substances, or whether the toxic or hazardous substances were brought onto the *Place of the Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Construction Manager*.
- 9.2.7 If the *Owner* and *Construction Manager* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were not brought onto the place of the *Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible, the *Owner* shall promptly at the *Owner's* own expense:
- .1 take all steps as required under paragraph 9.2.4;
 - .2 reimburse the *Construction Manager* for the costs of all steps taken pursuant to paragraph 9.2.5;
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager* and the expert referred to in paragraph 9.2.6 and reimburse the *Construction Manager* for reasonable costs incurred as a result of the delay; and
 - .4 indemnify the *Construction Manager* as required by GC 12.1 – INDEMNIFICATION.
- 9.2.8 If the *Owner* and *Construction Manager* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were brought onto the *Place of the Work* by the *Construction Manager* or anyone for whom the *Construction Manager* is responsible, the *Construction Manager* shall promptly at the *Construction Manager's* own expense:
- .1 take all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to safely remove and dispose the toxic or hazardous substance;

- .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the place of the *Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
- .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.2.6; and
- .4 indemnify the *Owner* as required by GC 12.1 – INDEMNIFICATION.

9.2.9 If either party does not accept the expert's findings under paragraph 9.2.6, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraph 9.2.7 or 9.2.8 it being understood that by so doing, neither party will jeopardize any claim that party may have to be reimbursed as provided by GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

33. GC 9.3

Delete and replace with the following:

- 9.3.1 Fossils, coins, articles of value or antiquity, structures and other remains or things of scientific or historic interest discovered at the *Place of the Work* shall, as between the *Owner* and the *Construction Manager*, be deemed to be the absolute property of the *Owner*.
- 9.3.2 The *Construction Manager* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.3.1, and shall advise the *Consultant* upon discovery of such items
- 9.3.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.3.1. If conditions are found that would cause an increase or decrease in the *Construction Manager's* cost or time to perform the *Work*, the *Consultant*, with the *Owner's* approval, will issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

34. GC 9.5

Delete and replace with the following:

- 9.5.1 If the *Construction Manager* or *Owner* observes or reasonably suspects the presence of mould at the *Place of the Work*, the remediation of which is not expressly part of the *Work*,
 - .1 the observing party shall promptly report the circumstances to the other party in writing;
 - .2 the *Construction Manager* shall promptly take all reasonable steps, including stopping the *Work* if necessary, to ensure that no person suffers injury, sickness or death and that no property is damaged as a result of exposure to or the presence of the mould; and
 - .3 if the *Owner* and *Construction Manager* do not agree on the existence, significance or cause of the mould or as to what steps need be taken to deal with it, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and *Construction Manager*.
- 9.5.2 If the *Owner* and *Construction Manager* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was caused by the *Construction Manager's* operations under the *Contract*, the *Construction Manager* shall promptly, at the *Construction Manager's* own expense:
 - .1 take all reasonable and necessary steps to safely remediate or dispose of the mould, and
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY, and
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.5.1.3, and
 - .4 indemnify the *Owner* as required by GC 12.1 – INDEMNIFICATION.
- 9.5.3 If the *Owner* and *Construction Manager* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was not caused by the *Construction Manager's* operations under the *Contract*, the *Owner* shall promptly, at the *Owner's* own expense:
 - .1 take all reasonable and necessary steps to safely remediate or dispose of the mould;
 - .2 reimburse the *Construction Manager* for the cost of taking the steps under 9.5.1.2 and making good any damage to the *Work* as provided in paragraph 9.1.4 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Construction Manager* and the expert referred to in paragraph 9.5.1.3 and reimburse the *Construction Manager* for reasonable costs incurred as a result of the delay; and
 - .4 indemnify the *Construction Manager* as required by GC 12.1 – INDEMNIFICATION.

- 9.5.4 If either party does not accept the expert's finding under paragraph 9.5.1.3, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraphs 9.5.2 or 9.5.3, it being understood that by so doing neither party will jeopardize any claim the party may have to be reimbursed as provided by GC 9.5 – MOULD.

35. **GC 10.1**

Delete and replace with the following:

- 10.1.1 The *Contract Price* shall include all taxes and customs duties in effect at the time of the bid closing except for *Value Added Taxes* payable by the *Owner* to the *Construction Manager* as stipulated in Article A-8 of the Agreement – CONTRACT PRICE.
- 10.1.2 Any increase or decrease in costs to the *Construction Manager* due to changes in such included taxes and duties after exercising the stipulated price option shall increase or decrease the *Contract Price* accordingly.

36. **GC 10.2**

Delete and replace with the following:

- 10.2.1 The laws of the *Place of the Work* shall govern the *Work*.
- 10.2.2 The *Owner* shall obtain and pay for development approvals, building permit, permanent easements, rights of servitude, and all other necessary approvals and permits, except for the permits and fees referred to in paragraph 10.2.3 or which the *Contract Documents* specify as the responsibility of the *Construction Manager*.
- 10.2.3 The *Construction Manager* shall be responsible for the procurement of permits, licences, inspections and certificates which are necessary for the performance of the *Work* and customarily obtained by contractors in the jurisdiction of the *Place of the Work* after the issuance of the building permit. The *Contract Price* includes the cost of these permits, licences, inspections and certificates, and their procurement.
- 10.2.4 The *Construction Manager* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the preservation of the public health, and to construction safety.
- 10.2.5 The *Construction Manager* shall not be responsible for verifying that the *Contract Documents* are in compliance with the applicable laws, ordinances, rules, regulations or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the applicable laws, ordinances, rules, regulations or codes which require modification to the *Contract Documents*, the *Construction Manager* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will make the changes required to the *Contract Documents* as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 10.2.6 If the *Construction Manager* fails to advise the *Consultant* in writing, fails to obtain direction as required in paragraph 10.2.5, and performs work knowing it to be contrary to any laws, ordinances, rules, regulations or codes; the *Construction Manager* shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations or codes.

37. **GC 10.3**

Delete and replace with the following:

- 10.3.1 The *Construction Manager* shall pay the royalties and patent licence fees required for the performance of the *Contract*. The *Construction Manager* shall hold the *Owner* harmless from and against claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the *Construction Manager's* performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention by the *Construction Manager* or anyone for whose acts the *Construction Manager* may be liable.
- 10.3.2 The *Owner* shall hold the *Construction Manager* harmless against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Construction Manager's* performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention in executing anything for the purpose of the *Contract*, or any model, plan or design which was supplied to the *Construction Manager* as part of the *Contract*.

38. **GC 11.2**

Delete and replace with the following:

11.2.1 The *Construction Manager* shall, prior to commencement of the *Work* or within the specified time, provide to the *Owner* any *Contract* security required by this *Contract*.

11.2.2 If this *Contract* requires surety bonds to be provided, such bonds shall be issued by a duly licensed surety company 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 fulfilment of this *Contract*. The form of such bonds shall be in accordance with the latest edition of the CCDC approved bond forms.

39. **GC 12.1**

Delete and replace with the following:

12.1.1 Without restricting the parties' obligation to indemnify as described in paragraphs 12.1.4 and 12.1.5, the *Owner* and the *Construction Manager* shall each indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by them or in respect to claims by third parties that arise out of, or are attributable in any respect to, their involvement as parties to this *Contract*, provided such claims are:

.1 caused by:

(1) the negligent acts or omissions of the party from whom indemnification is sought or anyone for whose acts or omissions that party is liable, or

(2) a failure of the party to the *Contract* from whom indemnification is sought to fulfill its terms or conditions; and

.2 made by *Notice in Writing* within a period of 6 years from the date of *Substantial Performance of the Work* as set out in the certificate of *Substantial Performance of the Work* issued pursuant to paragraph 5.5.2.2 of GC 5.5 – SUBSTANTIAL PERFORMANCE OF THE WORK or within such shorter period as may be prescribed by any limitation statute of the province or territory of the *Place of the Work*.

The parties expressly waive the right to indemnify for claims other than those provided for in this *Contract*.

12.1.2 The obligation of either party to indemnify as set forth in paragraph 12.1.1 shall be limited as follows:

.1 In respect to losses suffered by the *Owner* and the *Construction Manager* for which insurance is to be provided by either party pursuant to GC 11.1 – INSURANCE, the insurance limit for the loss so covered as prescribed in GC 11.1 – INSURANCE.

.2 In respect to losses suffered by the *Owner* and the *Construction Manager* for which insurance is not required to be provided by either party in accordance with GC 11.1 – INSURANCE, the greater of the *Contract Price* or \$2,000,000, but in no event shall the sum be greater than \$20,000,000.

.3 In respect to claims by third parties for direct loss resulting from bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, the obligation to indemnify is without limit. In respect to all other claims for indemnity as a result of claims advanced by third parties, the limits of indemnity set forth in paragraphs 12.1.2.1 and 12.1.2.2 shall apply.

12.1.3 The obligation of either party to indemnify the other as set forth in paragraphs 12.1.1 and 12.1.2 shall be inclusive of interest and all legal costs.

12.1.4 The *Owner* and the *Construction Manager* shall indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of their obligations described in GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

12.1.5 The *Owner* shall indemnify and hold harmless the *Construction Manager* from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings:

.1 as described in GC 10.3 – PATENT FEES, and

.2 arising out of the *Construction Manager's* performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.

12.1.6 In respect to any claim for indemnity or to be held harmless by the *Owner* or the *Construction Manager*:

.1 *Notice in Writing* of such claim shall be given within a reasonable time after the facts upon which such claim is based became known;

.2 should either party be required as a result of its obligation to indemnify the other pay or satisfy a final order, judgment or award made against the party entitled by this contract to be indemnified, then the indemnifying party upon assuming all liability for any costs that might result shall have the right to appeal in the name of the party against whom such final order or judgment has been made until such rights of appeal have been exhausted.

40. **GC 12.3**

Delete and replace with the following:

- 12.3.1 Except for extended warranties as described in paragraph 12.3.6, the warranty period under this *Contract* is one year from the date of *Substantial Performance of the Work*.
- 12.3.2 The *Construction Manager* shall be responsible for the proper performance of the *Work* to the extent that the design and the *Contract Documents* permit such performance.
- 12.3.3 The *Owner*, through the *Consultant*, shall promptly give the *Construction Manager Notice in Writing* of observed defects and deficiencies which occur during the one year warranty period.
- 12.3.4 Subject to paragraph 12.3.2, the *Construction Manager* shall correct promptly, at the *Construction Manager's* expense, defects or deficiencies in the *Work* which appear prior to and during the one year warranty period.
- 12.3.5 The *Construction Manager* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.
- 12.3.6 Any extended warranties required beyond the one year warranty period as described in paragraph 12.3.1, shall be as specified in the *Contract Documents*. Extended warranties shall be issued by the warrantor to the benefit of the *Owner*. The *Construction Manager's* responsibility with respect to extended warranties shall be limited to obtaining any such extended warranties from the warrantor. The obligations under such extended warranties are solely the responsibilities of the warrantor.

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Martha Rogers
Director of Education

APPENDIX B

Amendments and Supplementary General Conditions for Construction Management Contract for Services and Construction, CCDC 5B, 2010

Where these amendments, additions, and modifications specifically reference a change to the Agreement, Definitions, General Conditions, these amendments, additions and modifications shall govern.

AMENDMENTS TO ARTICLES

ARTICLE A-4 – CONTRACT DOCUMENTS

- Add to paragraph 4.1
- Upper Grand District School Board General Instructions Project Number BDM-2017-101, Issued January 30, 2017 including attachments
- Upper Grand District School Board Request for Proposal RFP Number 000-000-000 (where applicable)

ARTICLE A-5 – CONSTRUCTION MANAGER'S FEE

- Delete paragraph 5.1 and replace with new paragraph 5.1:

5.1 The *Construction Manager's Fee* for the *Services* and the *Work* will be comprised of a single percentage fee applied to the *Cost of the Work* (Article A-7) earned as the *Cost of the Work* accrues, plus an amount based upon the time based rates for on-site personnel in the direct employ of the *Construction Manager*.

- Delete paragraph 5.2. The *Construction Manager's Fee* for *Services* is to be included in the *Construction Manager's Fee* for the *Services* and *Work* (paragraph 5.3).

- Delete paragraph 5.3 and replace with new paragraph 5.3:

5.3 The *Construction Manager's Fee* for the *Services* and *Work* is comprised of:

.1 A percentage fee of _____ percent (____%) of the *Cost of the Work* earned as the *Cost of the Work* accrues; and

.2 An amount based on the time based rates for on-site personnel employed by the *Construction Manager* as described in Schedule B to the agreement and engaged in performing the *Work*.

- Delete paragraph 5.4 and replace with new paragraph 5.4:

5.4 The *Construction Manager's Fee* shall not be subject to adjustment. Any reference in the *Agreement* to an adjustment of the *Construction Manager's Fee* is



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hereby stricken including GC 6.2 Change Order, GC 6.3 Change Directive, GC 6.4, GC 6.5, GC 6.6, GC 9.2

ARTICLE A-6 – REIMBURSIBLE EXPENSES FOR THE SERVICES

- Revise paragraph 6.1 by inserting “zero” before the word percent and by inserting “0” before the symbol %.

ARTICLE A-7 – COST OF THE WORK

- Delete paragraph 7.1.1 and replace with new paragraph 7.1.1:

7.1.1 Salaries, wages, and benefits including contributions, assessments or taxes for the *Construction Manager’s* head office personnel, in whatever capacity employed, are included in the *Construction Manager’s Fee for Services and Work* (Article A-5).

The cost for the *Construction Manager’s* full time qualified site superintendent, site labourers, and site carpenters stationed at the *Place of the Work* will be reimbursed to the *Construction Manager* as a *Cost of the Work* based upon the following unit rates:

Site Superintendent	\$55.00 per hour
Site Labourer	\$45.00 per hour
Site Carpenter	\$49.00 per hour

The *Construction Manager’s* site superintendent shall be appointed for the duration of the *Project* and shall not be removed without the written consent of the *Owner*.

- Delete paragraph 7.1.2. All such costs are to be included in the *Construction Manager’s Fee for the Services and Work* and/or the time based rates for personnel stationed at the *Place of the Work*.

- Delete paragraphs 7.1.13 and replace with new paragraph 7.1.13:

7.1.13 premiums for all contract securities and ‘Broad Form’ project specific insurance that the *Construction Manager* is required, by the *Contract Documents*, to purchase and maintain. Premiums for general liability and automobile insurance are included in the *Construction Manager’s Fee for Services and Work* (Article A-5).

- Delete paragraphs 7.1.3, 7.1.7, 7.1.15, 7.1.17, 7.1.19, 7.1.21. All such costs are to be included in the *Construction Manager’s Fee for the Services and Work*.



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ARTICLE A-9 – PAYMENT

- Delete paragraph 9.3.1 and replace with new paragraph 9.3.1:

9.3.1 Interest

Should either party fail to make payments as they become due under the terms of this contract or in an award by arbitration or court, interest at the following rate on such unpaid amounts shall also become due and payable until payment: 1% per annum above the prime rate quoted by the Royal Bank of Canada for prime business loans. Such interest shall be compounded on a semi-annual basis.

ARTICLE A-10 – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

- Delete the words 'or other form of electronic communication' after the words 'or by facsimile' in paragraphs 10.2 and 10.4.

AMENDMENTS TO SCHEDULES

SCHEDULE A1 TO THE AGREEMENT – SERVICES AND COMPENSATION

- Delete references to *Class D*, *Class C*, *Class B*, and *Class A* cost estimates. The *Construction Manager* shall prepare and update an elemental construction budget throughout the Preconstruction phase of the project.

- All Services listed in Schedule A1 are to be performed by the *Construction Manager*. The compensation for all *Services* in Schedule A1 will be "F2" – included in the *Construction Manager's Fee* percentage amount for the *Services* and *Work* described in amended Article A-5, paragraph 5.3.

SCHEDULE A2 – REIMBURSIBLE EXPENSES APPLICABLE TO SCHEDULE A1

- Costs for expense items 1., 2., and 3., listed in Schedule A2 are included in the *Construction Manager's Fee* for the *Services* and *Work* (A-5.3).

SCHEDULE B – TIME BASED RATES FOR PERSONNEL EMPLOYED BY THE CONSTRUCTION MANAGER

- Revise to read... "All personnel in whatever capacity employed by the *Construction Manager* in the performance of the *Services* are included in the *Construction Manager's Fee* for the *Services* and *Work* (Article A-5.3). Head office personnel employed by the *Construction Manager* in the performance of the *Work* are included in the *Construction Manager's Fee* for the *Services* and *Work* (Article A-5.3). Costs for the site superintendent, site labourers and/or site carpenters employed by the *Construction Manager* in the performance of the *Work* and stationed at the *Place of the*



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Work will be reimbursed to the *Construction Manager* as part of the *Cost of the Work* in accordance with amended Article A-7 above. The time based unit rates for the site superintendent, site labourers and/or site carpenters employed by the *Construction Manager* and stationed at the *Place of the Work* are identified above under Amended Article A-7.

AMENDMENTS TO DEFINITIONS

DEFINITIONS

Add the following definition:

Submittals

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

- *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
- As-built drawings and manuals to provide instructions to the operation and maintenance of the *Work*.

SUPPLEMENTARY CONDITIONS

GC 1.1 CONTRACT DOCUMENTS

- Add to the end of sub-paragraph 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 12.1.1.3.’

GC 1.3 RIGHTS AND REMEDIES

- Delete the words ‘either of the parties to this *Contract*’ in the second line of paragraph 1.3.2 and add the words ‘any of them under this *Contract*’ after the words ‘or duty afforded.’

GC 2.2 AUTHORITY OF THE CONSULTANT

- In paragraph 2.2.2 after the words ‘of the *Construction Manager*’, delete the words ‘following consultation with the *Consultant*’ and add the words ‘*Owner* and *Consultant*.’



GC 2.3 CONSULTANT'S RESPONSIBILITIES

- Add at the end of paragraph 2.3.9 'The *Owner* and the *Construction Manager* waive any claims against the *Consultant* arising out of the making of such interpretations and findings made in accordance with paragraphs 2.3.7, 2.3.8 and 2.3.9.'

GC 2.5 DEFECTIVE WORK

- Add new subparagraphs 2.5.1.1 and 2.5.1.2:

.1 The *Construction Manager* 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 The *Construction Manager* shall prioritize the correction of any defective work which, in the sole discretion of the *Owner*, adversely affects the day to day operation of the *Owner*.

GC 3.1 CONTROL OF THE WORK

- Add new paragraph 3.1.3:

3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the *Construction Manager* 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 *Construction Manager* shall immediately notify the *Consultant* in writing and obtain written instructions from the *Consultant* before proceeding with any part of the affected work.

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

- Delete paragraph 3.2.1 in its entirety and substitute new paragraph 3.2.1:

3.2.1 The *Owner* will not award separate contracts in connection with other parts of the *Project* to other contractors or perform work with own forces.

- Delete paragraph 3.2.2 in its entirety.

- Delete paragraph 3.2.3 in its entirety and substitute new paragraph 3.2.3:



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3.2.3 With the exception of *Work* in a school occupied by school staff and students, it is understood the *Construction Manager* will have total control of the *Work* and be solely responsible for all construction and health and safety. If a third party contractor or *Owner* own forces attend the *Project* with the intention of performing *Work* within the defined *Project* site, the *Construction Manager* shall refuse entry to the *Project* unless the *Work* has been pre-scheduled and coordinated with the *Owner* in accordance with paragraph 3.2.4.

- Delete paragraph 3.2.4 in its entirety and substitute new paragraph 3.2.4:

3.2.4 The *Construction Manager* will be the “Constructor” as defined by the OHSA, Regulations for Construction Projects (O. Reg. 213/91). The *Construction Manager* will clearly define the *Project* work area with barriers and signage as required. The *Construction Manager* will be responsible for Health & Safety for the duration of the *Project* and will control all site activities.

The *Owner* may have other activities scheduled at the *Place of Work* during construction such as, grounds maintenance, custodial work, information/technology work, fire alarm inspections/verifications, boiler service, etc. To complete these activities, personnel not in the direct employ of the *Construction Manager* may require access to the *Place of Work*. Access to the *Place of Work* will be at the sole discretion of the *Construction Manager* and all construction safety protocols required by the *Construction Manager* must be strictly followed or access is not to be granted.

Where the *Contract Documents* identify *Work* to be performed at the *Place of the Work* by other contractors or *Owner*’s own forces, the *Construction Manager* shall coordinate and schedule the *Work* with the *Owner*. Access to the *Place of Work* will be at the sole discretion of the *Construction Manager* and all construction safety protocols required by the *Construction Manager* must be strictly followed or access is not to be granted.

The *Construction Manager* must understand that coordinating appropriate and occasional entry to the *Place of Work* is part of the scope of work and shall not be unreasonably withheld while ensuring the *Owner* does not become the “constructor” under any circumstance.

GC 3.4 REVIEW OF DRAWINGS, SPECIFICATIONS AND MATERIAL AND FINISH SCHEDULES

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

3.4.1 The *Construction Manager* shall review the *Contract Documents* and shall report promptly to the *Consultant* any error, inconsistency or omission the *Construction Manager* may discover. If the *Construction Manager* does discover any error,



inconsistency or omission in the *Contract Documents*, the *Construction Manager* shall not proceed with the work affected until the *Construction Manager* has received corrected or missing information from the *Consultant*.

- Delete paragraph 3.4.2 in its entirety and substitute new paragraph 3.4.2:

3.4.2 Such review by the *Construction Manager* 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 *Construction Manager* does not assume any responsibility to the *Owner* or to the *Consultant* for the accuracy of the *Contract Documents*. The *Construction Manager* shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the *Contract Documents*, which the *Construction Manager* could not reasonably have discovered.

GC 3.8 LABOUR AND PRODUCTS

- Add new paragraph 3.8.3:

3.8.3 The *Construction Manager* 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*.

GC 3.10 SHOP DRAWINGS

- Add the words 'AND OTHER SUBMITTALS' to the Title after SHOP DRAWINGS.

- Add 'and *Submittals*' after the words '*Shop Drawings*' in paragraphs 3.10.1, 3.10.2, 3.10.4, 3.10.7, 3.10.8, 3.10.8.2, 3.10.9, 3.10.10, 3.10.11 and 3.10.12.

- Delete 3.10.3 in its entirety and substitute new paragraph 3.10.3:

3.10.3 Prior to the first application for payment, the *Construction Manager* and the *Consultant* shall jointly prepare a schedule of the dates for submission and return of *Shop Drawings* and any *Submittals*.

- Delete the words 'with reasonable promptness so as to cause no delay in the performance of the *Work*' and replace with 'within 10 working days or such longer period as may be reasonably required' in paragraph 3.10.12.



GC 3.14 PERFORMANCE BY THE CONSTRUCTION MANAGER

- Add new General Condition 3.14.1

3.14.1 In performing its services and obligations under the *Contract*, the *Construction Manager* shall exercise a standard of care, skill and diligence that would normally be provided by an experienced and prudent *Construction Manager* supplying similar services for similar projects. The *Construction Manager* acknowledges and agrees that throughout the *Contract*, the *Construction Manager's* obligations, duties and responsibilities shall be interpreted in accordance with this standard. The *Construction Manager* 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*.

- Add new General Condition 3.14.2

3.14.2 The *Construction Manager* 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 its designated supervisor and project manager, subject to the *Owner's* approval, in the event of death, incapacity, removal or resignation.

GC 4.1 CASH ALLOWANCES

- Delete paragraph 4.1.4 in its entirety and substitute new paragraph 4.1.4:

4.1.4 Where costs under a cash allowance exceed the amount of the allowance, unexpended amounts from other cash allowances shall be reallocated at the *Consultant's* direction to cover the shortfall. 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*.

- Delete paragraph 4.1.7 in its entirety and substitute new paragraph 4.1.7:

4.1.7 At the commencement of the *Work*, the *Construction Manager* shall prepare for the review and acceptance of the *Owner* and the *Consultant*, a schedule indicating the times, within the construction schedule referred to in GC 3.5, that items called for under cash allowances and items that are specified to be *Owner* purchased and *Construction Manager* installed or hooked up are required at the site to avoid delaying the progress of the *Work*.

- Add new paragraph 4.1.8:



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

GC 5.4 PROGRESS PAYMENT FOR THE WORK

- Delete paragraph 5.4.5 and replace with new paragraph 5.4.5:

5.4.5 When submitting the second and subsequent applications for payment, the *Construction Manager* shall furnish signed and sealed Statutory Declarations CCDC 9A to state that all accounts for labour, subcontracts, Products, Construction Equipment, and other indebtedness which may have been incurred by the *Construction Manager* related to preceding applications for payment have been paid in full except for amounts properly retained for holdback in accordance with the Construction Lien Act legislation.

GC 6.2 CHANGE ORDER

- Delete paragraph 6.2.1 and replace with new paragraph 6.2.1:

6.2.1 When a change in the *Work* is proposed or required, the *Consultant* shall provide the *Construction Manager* with a written description of the proposed change in the *Work*. The *Construction Manager* shall promptly present, in a form acceptable to the *Consultant*, a breakdown of all costs associated with the change including labour, materials, equipment, and subcontractors. The net extra cost of the change in the *Work* will not be subject to an increase in the *Construction Manager's Fee*. Rather, upon the issuance of a *Change Order*, the net extra cost of the change in the *Work* shall become part of the *Cost of the Work* (Article A-7) subject to the *Construction Manager's Fee* for the *Services and Work* (Article A-5.3)

- Delete paragraphs 6.2.2 and 6.2.3

GC 6.3 CHANGE DIRECTIVE

- Revise paragraph 6.3.5.1 to read... "the *Construction Manager's Fee* for a change carried out by a *Change Directive* shall not be adjusted. Rather, the net extra cost of the *Change Directive* shall become part of the *Cost of the Work* (Article A-7) subject to the *Construction Manager's Fee* for the *Services and Work* (Article A-5.3)

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- Add new paragraph 6.4.5:

6.4.5 The *Construction Manager* confirms that, prior to bidding the *Project*, it carefully investigated the *Place of the Work* and applied to that investigation the degree of care and skill described in paragraph 3.14.1. The *Construction Manager* is not



entitled to compensation or to an extension of the *Contract Time* for conditions which could reasonably have been ascertained by the *Construction Manager* by such careful investigation undertaken prior to the submission of the bid.

GC 6.5 DELAYS

- Delete the period at the end of paragraph 6.5.1, and substitute the following words: ' , but excluding any consequential, indirect or special damages.'
- Add new paragraph 6.5.6:

6.5.6 If the *Construction Manager* is delayed in the performance of the *Work* by an act or omission of the *Construction Manager* or anyone employed or engaged by the *Construction Manager* directly or indirectly, or by any cause within the *Construction Manager*'s control, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may decide in consultation with the *Construction Manager*. The *Owner* shall be reimbursed by the *Construction Manager* for all reasonable costs incurred by the *Owner* as the result of such delay, including all services required by the *Owner* from the *Consultant* as a result of such delay by the *Construction Manager* and, in particular, the cost 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 provisions of these General Conditions and any later, actual date of *Substantial Performance of the Work* achieved by the *Construction Manager*.

GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

- Add the following new paragraphs 8.2.9, 8.2.10, 8.2.11, 8.2.12., 8.2.13., and 8.2.14.

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

- a) a copy of the notice of arbitration
- b) a copy of supplementary conditions 8.2.9 to 8.2.14 of this *Contract*, and;
- c) any claims or issues which the *Construction Manager* 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.

8.2.10 The *Owner* and the *Construction Manager* agree that the *Consultant* may elect, within ten days of receipt of the notice under paragraph 8.2.9, to become a full party to the arbitration under paragraph 8.2.6 if the *Consultant*:

- a) has a vested or contingent financial interest in the outcome of the arbitration



- b) gives the notice of election to the *Owner* and the *Construction Manager* before the arbitrator is appointed
- c) agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.2.6, and;
- d) agrees to be bound by the arbitral award made in the arbitration.

8.2.11 If an election is made under paragraph 8.2.10, 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 respondent receives a copy of the notice of arbitration.

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

- a) on application of the *Owner* or the *Construction Manager*, determine whether the *Consultant* has satisfied the requirements of paragraph 8.2.10, and;
- b) make any procedural order considered necessary to facilitate the addition of the *Consultant* as a party to the arbitration.

8.2.13 The provisions of paragraph 8.2.9 shall apply mutatis mutandis to written notice to be given by the *Consultant* to any sub-consultant;

8.2.14 In the event of notice of arbitration given by the *Consultant* to a sub consultant, the subconsultant is not entitled to any election with respect to the proceeding as outlined in 8.2.10, and is deemed to be bound by the arbitration proceeding.

GC 9.1 PROTECTION OF WORK AND PROPERTY

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

9.1.1.1 Errors in the *Contract Documents* which the *Construction Manager* could not have discovered applying the standard of care described in paragraph 3.14.1;

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

9.1.2 Before commencing any *Work*, the *Construction Manager* 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.



GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- Add to paragraph 9.2.6 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 *Construction Manager* or anyone for whom the *Construction Manager* 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,'

- Add 'and the *Consultant*' after the word '*Construction Manager*' in sub-paragraph 9.2.7.4

- 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 *Construction Manager* or anyone for whom the *Construction Manager* 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,'

GC 9.5 MOULD

- Add 'and the *Consultant*' after '*Construction Manager*' in sub-paragraph 9.5.3.4

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- Delete from the first line of paragraph 10.2.5 the word, 'The' and substitute the words: 'Subject to paragraph 3.14.1, the '

GC 12.1 INDEMNIFICATION

- Add new clause 12.1.1.3

12.1.1.3. The *Construction Manager* shall indemnify and hold harmless the *Consultant*, its agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings by third parties that arise out of, or are attributable to, the *Construction Manager's* performance of the *Contract*, provided such claims are attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and caused by negligent acts or omissions of the



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Martha Rogers
Director of Education

Construction Manager or anyone for whose acts the *Construction Manager* may be liable, and made in writing within a period of 6 years from the date of *Substantial Performance of the Work* as set out in the certificate of *Substantial Performance of the Work*, or within such shorter period as may be prescribed by any limitation statute or the province or territory of the *Place of Work*.

GC 12.3 WARRANTY

- Delete from the first line of paragraph 12.3.2 the word, 'The' and substitute the words: 'Subject to paragraph 3.14.1, the '

End.



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APPENDIX C

Construction Management Contract for Services and Construction, CCDC 5B, 2010

Proposed Scope of Work will include but is not limited to:

- Selected asbestos abatement as required to facilitate the renovation work.
- Front entrance reconstruction.
- Exterior window wall reconstruction (4 sections) – remove and dispose existing window walls from top of existing brick knee wall to underside of roof, construct new insulated steel stud wall assembly with interior/exterior sheathing and exterior cladding.
- Roof drainage upgrades and roof replacements.
- Selected door and frame and hardware replacements.
- Washroom upgrades (plumbing fixtures, toilet partitions, painting, etc..).
- Classroom upgrades (flooring, millwork, painting, etc..).
- Library renovation.
- Misc. ceiling tile replacements, flooring replacements, millwork replacements, painting, etc.. throughout.
- Plumbing fixture replacements.
- LED lighting upgrades (interior and exterior).
- Public Address, Security, Exit Lighting replacement and upgrades.



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APPENDIX D

GUIDELINES & GENERAL NOTES FOR PRINCIPAL & CONTRACTOR **FOR CONSTRUCTION PROJECT IN AN OCCUPIED SCHOOL**

Capital Projects will review safety requirements and the rules that apply to construction in an occupied school with the Constructor and Principal prior to the start of the project. The following is a summary of the procedures to be followed on site.

1. **Construction Site** - The construction area (or site) is to be clearly separated from the school area. The premise in constructing or renovating at an occupied school is that the site, personnel and activities of the construction project are to be separated from the school activities. The contractor is to erect and maintain an enclosed hoarding (i.e. fencing). Construction workers should only be on site within the contained construction area with the exception of entering or leaving the construction area unless prior arrangements are made. Generally, washrooms are provided outside of the school for the workers and a phone is available in the construction trailer.

The Principal is to inform students and staff to stay away from the construction area. There is no need for construction workers (other than the construction site superintendent) to have contact with the students or staff.

Separation between the construction activities and school activities must be maintained.

2. **Site Authority** - The construction site superintendent (supervisor) directs all activities within the construction area.

That being said, in the case of an emergency, or in the case of practices or activities which the Principal deems may pose a hazard to staff or students, the Principal maintains control of all activities on school property.

If the Principal deems any activity on site to pose a “threat” to students or staff, then the Principal shall,

- a) instruct the contractor (through the site superintendent) to cease activities/operations;
- b) report the situation to the Project Manager (Capital Projects); and,
- c) take any other action as may be required in accordance with the Board’s emergency procedures to ensure the safety of students and staff.

Some examples of an “emergency” would be trucks entering or exiting the site interfering with busses/students, fumes in the school, or a gas leak.



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3. *Communication Procedures* - At the beginning of the project the Principal will be provided with the name and telephone number of the Project Manager (Capital Projects) and the site superintendent. All normal communication with the school by the contractor is to be by way of the site superintendent to either the Principal or his/her designate. The contractor is aware of this communication procedure. Communication from the school to the contractor is to be to the site superintendent. The Project Manager should also be contacted to be made aware of the situation.

In the event of a problem, the Principal should speak with the site superintendent to report and attempt to resolve the problem. The site superintendent, who takes instructions from Capital Projects only, will contact Capital Projects for instructions. The Principal should contact the Project Manager (Capital Projects) immediately if the problem persists or reoccurs.

4. *Additions or Changes to the Project Scope* - Requests for changes or additional work are to be made directly to the Capital Project Department. The Contractor is instructed to only make changes to the contract if instructed to do so by the Capital Project Department.
5. *Traffic* - The Contractor is to obtain bell times from the Principal. As a minimum requirement, no access to the construction site will be allowed one half hour before school starts and one half hour after school ends and no access is allowed through the playground during school breaks (recess).
6. *Fire Drills Exits* - The Principal will review routine access, and fire drill access, while the construction is ongoing with the students and staff. Access doors near the construction site may be closed to routine access but must be kept open for emergency use. The Principal is responsible for modifying the emergency exit plan accordingly and conducting fire drills to the modified plan. The Contractor is to advise the office in advance, of any change in exit status.
7. *Visitor Pass* - Workers can be identified by their hard hats and/or company name tag. These are to be worn at all times while on school property. It has been our practice in the past *not* to issue visitor badges to them as they are *not* visitors to the school.
8. *Police Record Checks* are normally done only on the site superintendents; however, they may be done if there is other site personnel that come into direct and frequent contact with students. The Principal shall advise Capital Projects if he or she feels it necessary to have a check done on any particular person.



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-
9. *Handling of Materials* - The Contractor has been instructed to give prior notice to the Principal of the use of any materials which may cause dangerous / obnoxious fumes. The Contractor will provide WHIMIS sheets (sample attached) to the school office.
 10. There is no smoking or swearing allowed on school property.
 11. *Site Requirements* - No school board staff are permitted in the construction zone without the permission and escort of the construction site superintendent. All persons, including the school staff, entering the construction area are required to wear hard hats and safety shoes.

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Part 1 General

1.0 SECTION INCLUDES

- 1.1 Precedence
- 1.2 Contract
- 1.3 Relations of Trades
- 1.4 Additional Drawings
- 1.5 Existing Site Conditions
- 1.6 Temporary Construction Fencing
- 1.7 Renovation to an Existing Occupied Building
- 1.8 Construction Sequencing
- 1.9 Contractor Parking
- 1.10 Bylaws, Permits and Approvals
- 1.11 Organization
- 1.12 Canadian Products and Local Labour
- 1.13 Materials and Workmanship
- 1.14 Quality Control
- 1.15 Overtime
- 1.16 Protection of Other Work
- 1.17 Fastenings
- 1.18 Supply and Install
- 1.19 Occupation Before Completion
- 1.20 General Requirements
- 1.21 Coordination
- 1.22 Access to the Project
- 1.23 Subtrade Awards
- 1.24 Safety Data Sheets
- 1.25 Regulating Documents
- 1.26 Site Superintendents and Project Managers
- 1.27 General Contractor's Responsibilities
- 1.28 Manufacturers' Instructions
- 1.29 Air and Vapour Seal
- 1.30 Fire Safety
- 1.31 Construction Safety
- 1.32 Independent Tests and Inspections
- 1.33 Periodic Cleaning
- 1.34 Temporary Protection
- 1.35 Completion
- 1.36 Guarantees
- 1.37 Contingency Allowance
- 1.38 Cash Allowances
- 1.39 Allowances Carried in Divisions 15 and 16
- 1.40 Schedule of Allowances
- 1.41 Polychlorinated Biphenyl (PCB)
- 1.42 Use of Consultant's Digital Drawings
- 1.43 Building Dimensions
- 1.44 Setting of the Work & Required Surveys
- 1.45 Layout of Work
- 1.46 Documents Required: Start, During & Close Out.

1.1 PRECEDENCE

- .1 This Section contains Articles prepared which represent the Owner standards and policies. In all cases this Section is intended to be read in conjunction with and to coordinate with all other Sections. In the case of discrepancy between this Section and other Sections to more stringent Articles of any applicable Section shall apply.
- .2 Use of the term “Contractor” or “General Contractor” in this Section, shall apply to the Construction Manager.

1.2 CONTRACT

- .1 Construct the Work under a single, lump sum, Stipulated Contract. The form of Contract for this project shall be the standard form of agreement “*Construction Management Contract for Services and Work, CCDC-5B, 2010*” and “*Amendments to the Construction Management Contract for Services and Work, CCDC-5B, 2010*” as issued by the owner.
- .2 Refer also to the Upper Grand District School Board issued “*General Instructions*” and indicate if any discrepancies are found.
- .3 Refer to Section 00 01 10 – ‘Scope of Work’. Contract includes, but is not limited to:
 - .1 Limited Areas of Abatement of Designated Substances related to the other project work below, as required.
 - .2 Removal of exterior window-wall system and replacement with new wall and windows at exterior walls to select areas of the school
 - .3 Modification and reconstruction of the existing front entrance masonry “screen” wall and associated site remediation.
 - .4 Replacement and repairs or modifications to hollow metal doors and screens to various locations.
 - .5 Modifications to gymnasium clerestory windows and stairwell windows in select locations.
 - .6 Replacement of existing baseball backstops.
 - .7 Various interior renovations including library area modifications and locker modifications, flooring replacement, millwork repair and replacement, painting, interior door and window screen repair or replacement, interior door signage, all to various locations.
 - .8 Roofing work to replace roof at various exterior canopies and portions of the west roof areas to accommodate new roof drains
 - .9 Plumbing fixture upgrades to various locations
 - .10 Various electrical upgrades including exterior ‘wall-pack’ lighting replacement, exit sign upgrades, lighting replacements and upgrades to corridors, gym, stairwells and specific rooms, upgrades to specific electrical sub-panels.
 - .11 PA system upgrades.
 - .12 Security monitoring system upgrades to various locations..
 - .13 Demolition and renovation work to existing architectural components and finishes to support the installation of the systems above
 - .14 Coordination of the Contract under Construction Management process and supervision and coordination of all trades to meet schedule requirements in accordance with the Contract.
- .4 Project Occupancy Requirements
 - .1 Generally: the work shall be Substantially Complete and suitable for full legal occupancy by **August 18th, 2017**.

- .2 Notwithstanding the above, refer to the subsections below, specifically Phasing and Sequencing. The Construction Manager shall have access to the work area in advance of the end of the occupied 2017 school year for the purposes of beginning on-site phased work. Any work that takes place during before the un-occupied summer period or after September 1, 2017 shall be specifically coordinated and approved by the Board Project Manager.
- .5 Cautionary Note for Sub-trades to the Construction Manager
 - .1 Ensure all Subcontractors are cautioned that they should not submit bids or tenders if they are unsure of their ability to comply with the construction/occupancy schedule and requirements, provide overtime work as necessary and/or are unwilling to be bound by the schedule and Provisions described in these documents.

1.3 RELATIONS OF TRADES

- .1 The Contract Specifications have been generally divided into trade sections for the purpose of ready reference.
- .2 The Contractor is responsible for coordinating 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.
- .3 Specifications and 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 as properly and sufficiently specified and will be part of the Work.

1.4 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.

1.5 EXISTING SITE CONDITIONS

- .1 At the outset of the contract and before any other work begins, the contractor shall review all site conditions to confirm compliance with the contract documents. Failure to do so at this initial stage shall eliminate the contractor's right to make claim regarding incorrect grades or site surface conditions at any later stage for the work.
- .2 Ascertaining the specific site and building conditions as they relate to the project is the responsibility of the contractor. Notwithstanding this overriding responsibility the consultant has made every effort to properly represent existing site conditions as they are evident at the time of tender.
- .3 Construction Manager shall ensure that inspection of the site during the bid periods by all sub-contractors to satisfy his acceptance of their bids. Coordinate any required site tours with the Board Project Manager.

1.6 TEMPORARY CONSTRUCTION FENCING

- .1 Provide temporary construction fencing and hoarding as shown on drawings.
- .2 Around the work area, provide a temporary, minimum 6'-0" (1.8 m) high chain link fence, complete with gates as required, which shall be locked when no work is in progress, and located as shown on the Architectural site plan drawing.
- .3 The Board requires that the installation of this construction fencing be accomplished as the first task of the Construction Manager when he moves onto the site.

1.7 RENOVATION TO AN EXISTING OCCUPIED BUILDING

- .1 Refer also to the Upper Grand District School Board issued Supplementary Conditions to the CCDC-5B and "*General Instructions*" therein and indicate if any discrepancies are found.
- .2 For any work to this project while the school is occupied, including deficiency work these clauses shall apply.
- .3 Refer also to *Section 01 35 23 – 'Site Safety Protocol for Occupied Buildings'*.
- .4 At all times it is the Owner of the school who is the authority responsible for the well-being of the school occupants. As such, the Contractor's Site Superintendent must establish a working rapport with the Owner or his/her designee, suitable to provide daily notification of proposed construction timing and activities.
- .5 During the occupied school year absolutely no contracting personnel are allowed in the school building during operating hours other than in those work areas designated within this Section under Construction Sequencing, or by express permission of the Owner and under the direct supervision of the Contractor's Site Superintendent.
- .6 During the school year, the General Contractor shall designate a full-time flag person to control construction traffic access and egress to any construction access points and at times as stipulated in articles in this Section and elsewhere in these specifications. Costs for compliance to execute work under these terms is to be carried by all trades as part of the base contract price.
- .7 Connection of any services must be made after hours and in such a way that it leaves no disturbance to materials or systems, nor any exposed construction conditions within the operating school area.
- .8 The General Contractor shall maintain construction fencing and hoarding and through access to fire routes at all times.
- .9 Catering trucks are not permitted on the school site whatsoever.
- .10 During the school year, the Contractor shall minimize nuisances to the school operation such as loud noise, percussion sounds from power tools, dust, odours. Due to noxious fumes, roofing and asphalt paving shall be done after hours (after 4:00 p.m., or during the weekends). If applicable, hot asphalt kettles may not be heated until after 4:00 p.m. on weekdays without prior permission from the school Owner and Owner Project Manager.

- .11 Refer also to Section 01 52 00- 'Construction Facilities' and Section 01 56 00- 'Temporary Barriers and Enclosures'

1.8 CONSTRUCTION SEQUENCING

- .1 Refer also to the Upper Grand District School Board issued "General Instructions" and indicate if any discrepancies are found.
- .2 Approach Phasing and Sequencing
- .1 **This project will involve access and work on site, where possible, in advance of the school year.** The Construction Manager shall coordinate and obtain approval of the schedule and phasing and sequencing approach with the Board Project Manager.
- .2 At the outset of contract award prepare, in direct consultation, with the Board Project Manager and consultants, a complete schedule that outlines all sequencing and phasing and multiple tenders and total project duration, as required.
- .3 Prepare the schedule to convey an on-site start during the school year- possibly March 2017. Subject to confirmation and refinement, the basic strategy during the school year will be:
- .1 School will make use of 3 portables to vacate 3 classrooms at a time.
- .2 Renovate or abate the 3 classroom group incorporating all required access, egress, dust protection hoarding etc. to complete the work in accordance with Board policies for Abatement and Work in an Occupied School.
- .3 No abatement work shall take place during occupied school hours – therefore any abatement work prior to July 1 must be scheduled for after hours and weekends and subject to Board approval.
- .4 Incorporate this sequence into the whole project schedule.
- .4 Confirm locations for on-site trailer, offices and storage of materials both during the occupied school year of 2017 and beyond.
- .5 Also immediately upon contract award, prepare and issue a Shop Drawing list, indicating all timing and requirements for long lead items.
- .6 Within 2 weeks of contract award, issue any long lead shop drawings for advance orders immediately.
- .7 Recognizing the window fabrication may be a critical long lead item, the Board may advance order this component.
- .8 Develop and issue a Project Gantt Chart Schedule illustrating work sequence and all milestone dates to achieve completion dates submitted at Tender.
- .9 Renovate all exterior and interior areas of the school as described in drawings and specifications.
- .10 Complete interior renovation to existing areas and site works such that the work is Substantially Performed by the required date for occupancy in the Contract.
- .11 Following Substantial Performance complete deficiencies to renovations to the existing building such that project Total Completion is achieved by the required date
- .3 Coordinate Schedule and Sequencing as indicated in Section 01 33 00 – Submittals and Section 01 22 00 – Meetings and Progress Reports
- .4 Coordinate sequencing with all trades and advise sub-trades of these sequencing requirements prior to the close of Tenders.

1.9 CONTRACTOR PARKING

- .1 Refer to section 01 52 00 - Construction Facilities.

1.10 BYLAWS, PERMITS AND APPROVALS

- .1 Nothing indicated on the Drawings or Specifications is intended to be in conflict with any law, by-law or regulation of Municipal, Provincial, or similar Authority Having Jurisdiction.
- .2 Work of this Contract must conform with such laws, by-laws and/or regulations. Any required variation to, or deviation from, the drawings and specifications, shall be performed in accordance with the Contract contained in these specifications.
- .3 Furnish inspection certificates and/or permits as may be applicable as evidence that the installed Work conforms with laws, by-laws and regulations of Authorities Having Jurisdiction.
- .4 Each subtrade shall obtain and pay for all permits and licenses required by Municipal, Provincial, or other authorities having Jurisdiction, particular to their trade.
- .5 It is the final responsibility of the Construction Manager to obtain all the required approvals and permits and include in his cost breakdown, the cost of such approvals, permits and fees. The only exception is the Building Permit, which will be applied for by the Consultant and paid for by the Owner. It is the contractor's responsibility include in the base tender amount any additional permit or connection fees not specifically identified in the Cash Allowance, and to provide any deposits or securities required by Authorities Having Jurisdiction.
- .6 Any revisions or deviations to Contract Documents required by any Authorities Having Jurisdiction must be reviewed by the Consultants before implementation.

1.11 ORGANIZATION

- .1 Organize the Work of each section as required for satisfactory and expeditious completion of the Work. Take field dimensions required for the Work. Fabricate and install work to suit field dimensions and conditions.
- .2 If applicable, take into account existing work to ensure best arrangements of components in available space. Contact the Consultant prior to commencing Work in critical locations and interface with other Contractors' Work.
- .3 Provide all forms, templates, anchors, sleeves, inserts and accessories required to be installed in the Work. Set in place, or instruct the applicable subtrade as to their location. Pay costs of extra work, if required, as a result of a failure to comply with these requirements at the proper time.
- .4 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 effects his own work, and the General Contractor shall promptly notify the Consultant IN WRITING, if any condition exists that will prevent any Subcontractor from giving a satisfactory result in his own work.

- .5 Should any 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.

1.12 CANADIAN PRODUCTS AND LOCAL LABOUR

- .1 To the extent that the same are available and consistent with the proper economy and expeditious completion of the Contract, Canadian equipment, materials, products and other such applicable items are preferred by the Owner to be used in the Work, wherever possible and practical.

1.13 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. 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 acceptance of any materials or workmanship shall not be a bar to their subsequent rejection, if found defective.
- .4 Adequate, dry storage facilities shall be provided and all stored materials shall be protected from damage and theft.
- .5 All Contractors will do 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.
- .6 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.
- .7 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.
- .8 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.
- .9 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.
- .10 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.

- .11 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.
- .12 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.
- .13 Verify lines, levels and dimensions and report any errors or inconsistencies on the drawings to the Consultants.
- .14 Final responsibility of satisfactory completion of all the Work, however, lies with the General Contractor.

1.14 QUALITY CONTROL

- .1 Refer also to Section 01 45 00.
- .2 The Consultants and authorized Owner staff shall have access to all areas of the Work, including any off site construction facilities.
- .3 The General 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.
- .4 If the General Contract 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.
- .5 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 General 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.
- .6 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 General 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 General Contractor shall pay all associated costs for retesting and re-inspection.
- .7 The General Contractor shall provide any tools, materials or equipment that may be required by the inspection and/or testing agencies in retesting the Work.
- .8 The employment of inspection and/or testing agencies does not, in any way, affect the General Contractor's responsibility to perform the Work in strict accordance with the Contract Documents.
- .9 The General 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.

- .10 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 Consultant.

1.15 OVERTIME AND OVERTIME SCHEDULING

- .1 It is anticipated that after hours and weekend work will be required. Incorporate this into the project schedule approved developed in conjunction with the Board and include in pricing, all costs for overtime work which may be necessary to complete the various portions of the Work, in accordance with the Completion Dates specified in the *Tender Form*. The Owner shall not entertain requests for any payments in connection with overtime work that may be required by the General Contractor, or any of his subtrades, in order to comply with the above referenced dates.
- .2 Similarly, it is the Contractor's responsibility to ensure, prior to the close of tenders that all subtrades will meet the requirements for overtime, as required, with no additional costs to the owner, in order to meet the Completion Dates specified in the Form of Tender.
- .3 Note that at no time will the Owner entertain additional charges or claims from the General Contractor or his subcontractors for premium, overtime or after-hours work.

1.16 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 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.

1.17 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.

1.18 SUPPLY AND INSTALL

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

1.19 OCCUPATION BEFORE COMPLETION

- .1 If the General Contractor, for any reason, does not have the Project completed by the specified 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.

1.20 GENERAL REQUIREMENTS

- .1 All Contractors 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 Contractors shall co-operate and co-ordinate their work for the proper completion of the work, including co-ordination of delivery dates and commencement of subtrades work.
- .3 The responsibility and costs for all work, including temporary structures, shoring, shoring design (if applicable) and erection shall at all times rest with the General 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 General Contractor.
- .4 The undertaking of period site review by the Consultant or Owner Representative shall not be construed as supervision of actual construction, nor make them responsible for providing a safe place for work, visit, use, access, travel, or occupancy of the Consultant’s or Owner’s employees or agents.
- .5 The General Contractor shall be fully responsible for coordinating 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.

1.21 COORDINATION

- .1 The General Contractor shall coordinate all work and preparation on which subsequent work depends to facilitate mutual progress, and to prevent any conflict.
- .2 The General Contractor shall ensure that each trade makes known, for the information of the General 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.
- .3 The General Contractor shall ensure that each trade, before commencing work, knows the requirements for subsequent work and that each trade is assisted in the execution of its preparatory work by trades whose work depends upon it.

- .4 The General Contractor shall ensure that shop and layout drawings, templates, and 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 cooperative location and installation by other trades and that such information is communicated to the applicable installer.
- .5 The General Contractor shall ensure that delivery of materials supplied by one trade to be installed by another is well before the installation begins.
- .6 The General Contractor shall inform all trades that giving installation information in error, or too late to incorporate in the work, shall be responsible for any extra work caused thereby, unless impractical and where required, cutting shall be done by each respective trade, and patching shall be done by the general contractor.

1.22 ACCESS TO THE PROJECT

- .1 The General Contractor for this Work shall, at all times allow the Consultants, the Owner, or any other Owner commissioned contractor or their employees, access into 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 The General Contractor shall cooperate fully with any and all Owner commissioned Contractors.

1.23 SUBTRADE AWARDS

- .1 The Contractor shall, on notice of award of the contract, obtain the Consultants 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. The General Contractor 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 specified in Divisions 26 and 33.

1.24 SAFETY DATA SHEETS

- .1 The General Contractor shall ensure that the following material and safety data sheets are submitted prior to commencing installation and application of at least the following:
 - .1 Lead-free solder
 - .2 Resilient flooring
 - .3 Painting and finishing
 - .4 Fertilizers
 - .5 Glues and adhesives
 - .6 Pesticides
 - .7 Herbicides
 - .8 Any other product which may give off air borne particles after installation.
 - .9 Sealants and caulking

- .2 The General 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.
- .3 Contractor The General 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 General Contractor with his authorized stamp/signature.

1.25 REGULATING DOCUMENTS

- .1 The General Contractor and all of his Subcontractors, Suppliers/Installers etc., must conform to the latest editions in force at the time of tender of each and all of the following: Ontario Building Code, Canadian Electrical Code (CEC), The Occupational Health and Safety Act, Ontario, the National Fire Code, the local Municipal Fire Code, and all other applicable Codes and Building By-Laws. All must also 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 hoarding, scaffolding and shoring, 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. The General Contractor and all of his Subcontractors, Suppliers/Installers must meet or exceed the requirements of specified standards.
- .3 Provide, on site, copies of documents referred to in the Specification for joint use of Contractor and Consultant.

1.26 SITE SUPERINTENDENTS AND PROJECT MANAGERS

- .1 It is the requirement under the work to this Contract that the Contractor provide on-site, full-time, *Site Superintendent* for the entire project duration through to the end of Deficiency completion. Superintendent shall have qualifications of previous experience with similar projects. Superintendent shall remain assigned full time to the project until completion of all deficiencies.

1.27 GENERAL CONTRACTOR'S RESPONSIBILITIES

- .1 The list of General 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 General Contractor and is reproduced only as a reminder. The Consultants and the Owner advise the General 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.
 - .1 The General 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.
 - .2 All equipment shall be in safe operating condition and appropriate to the task.
 - .3 Only competent personnel will be permitted on site. During the site introduction, *only the Consultant* will determine who is competent. The General Contractor will cause to remove from the site any persons not observing or complying with safety requirements.
 - .4 The General Contractor shall comply with, and shall ensure that all of his Subcontractors, Suppliers, Installers etc., comply with all Federal, Provincial and Municipal Safety Codes and Regulations and the Occupational Health and Safety Act.
 - .5 The General Contractor shall supply competent personnel to implement his safety program and ensure that all Subcontractors comply with the Owner's standards, and those of the Occupational Health and Safety Act.
 - .6 The Owner will provide 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 canceled and the General Contractor removed from the site.
 - .7 The Owner may hire Commissioners to perform inspections of building systems at the closing stages of the work of this contract. If so contracted and identified in the *Instructions to Bidders*, the General Contractor shall cooperate with and coordinate the work of the Owner's Commissioners on site.
 - .8 The General Contractor will 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 General Contractor's or any of his Subcontractors' execution of the work.
 - .9 The General Contractor will include all provisions of this contract in any agreement with Subcontractors, and hold them equally responsible for safe work performance.
 - .10 If the General 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 sole opinion of the Owner's Representative and Consultant, to avoid delay in the final completion of the work or any operations thereof.

1.28 MANUFACTURERS' INSTRUCTIONS

- .1 Unless otherwise specified, the General Contractor and all his Subcontractors shall comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 The General Contractor shall notify the Consultant in writing of any conflict between the Specifications and Manufacturer's Instructions and have same clarified.

1.29 AIR AND VAPOUR SEAL

- .1 The General Contractor shall 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.

1.30 FIRE SAFETY

- .1 The General Contractor and all of his Subcontractors must comply with requirements of standard for Building Construction Operations FC No. 301-1982, issued by the Fire Commissioner of Canada.
- .2 The appropriate clauses of the Ontario Building Code relating to fire protection shall be strictly followed.
- .3 The General Contractor shall provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.

1.31 CONSTRUCTION SAFETY

- .1 Refer also to *Section 01 35 23 – 'Site Safety Protocol for Occupied Buildings'*
- .2 The General Contractor and all his trades must observe and enforce construction safety measures required by Canadian Construction Safety Code, Workplace Safety & Insurance Owner, and Municipal statutes. In particular, the Ontario Construction Safety Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced. In event of conflict between any provisions of above authorities the most stringent provisions will apply.
- .3 The General Contractor is reminded, once again, that it is he who 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.
- .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, health working environment by providing the education necessary to perform these activities or duties safely.

- .5 The Owner is vitally interested in the health and safety of all Contractors and their workers performing work for the Owner. Cooperation and support of the General Contractor in the protection of workers from injury or occupational disease is a major, continuing object of the Owner. To achieve these goals, the Owner, in concert with the Contractors, will endeavor 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 General 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, including without limitation, Bill 208 (the "Act") in connection with all work performed by either the Contractor, Subcontractors, or any Other Contractor on, or in connection with, the Project.
- .7 Without limiting the foregoing, for the purposes of this Contract, the General Contractor agrees that **he** 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 General Contractor, Subcontractors and Other Contractors on or in connection with the Project.
- .8 The General 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 (hereinafter collectively referred to as the "Owner") 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 General Contractor shall assume all liability and responsibility in connection with same.
- .9 The General Contractor agrees to save harmless and indemnify the Owner from any losses, damages, costs and expenses of any kind, or nature whatsoever, including all legal expenses, and all defense 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 General 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 General Contractor of any of its covenants, agreements and obligations under this Contract.
- .10 The General 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 General 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.
- .11 The General Contractor shall ensure that all supervisory personnel on job site are fully aware of the procedures and requirements outlined above and comply with all requirements specified.

- .12 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.
- .13 The General 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 General Contractor. The Contract Price must include the General Contractor's fees for the coordination and supervision of the work of all Other Contractors.
- .14 In addition to the responsibility of all contractors as outlined above, Subcontractors will be held accountable for the health and safety of workers under their supervision.
- .15 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.
- .16 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 General Contractor, in their entirety, throughout the duration of the construction project.
- .17 The General Contractor shall provide the Consultant with the telephone number where the General Contractor or his representative can be reached at any time, day or night, for the duration of the contract.
- .18 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 General 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 Owner's Representative, who shall copy and inform the Owner's Supervisor of Health and Safety and/or the Owner's Joint Health and Safety Committee, containing such information and particulars as may be described.
- .19 Where a person is killed or critically injured from any cause at the work place, the General Contractor shall immediately call the Ministry of Labour. A written notice from the General 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 Architect and the Owner's Representative.
- .20 The General 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.

1.32 INDEPENDENT TESTS AND INSPECTIONS

- .1 The Contractor shall appoint inspection firms as directed by the 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 already described in *Quality Control* of this Section.
- .2 The Consultant will authorize payment of inspection services from specified cash allowances.
- .3 The General 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.
- .4 The General Contractor shall notify Inspection Firms sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .5 Where materials are specified to be tested, the General Contractor shall deliver representative samples in required quantity to testing laboratory.

1.33 PERIODIC CLEANING

- .1 Refer also to Section 01 74 11.
- .2 As part of the Tender, the General Contractor shall provide all necessary garbage bins through the duration of the project. The General Contractor shall ensure that the following is accomplished:
 - .1 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 for all areas of the Work on a daily basis.
 - .2 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 inspection and takeover.
 - .3 Schedule cleaning operations so that resulting dust and other contaminants do not affect wet, newly painted surfaces.
 - .4 In preparation for Substantial Performance and Occupancy, conduct inspections of all exposed interior and exterior surfaces.
 - .5 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all exposed interior and exterior finishes, including glass and other polished surfaces.
 - .6 Remove all protective film from switch plates and hardware, particular kick plates.
 - .7 Clean lighting reflectors, lenses and other lighting surfaces.

- .8 Broom clean 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.
- .9 Remove debris and surplus materials from the roof areas and accessible concealed spaces.
- .10 Replace heating, ventilation and/or air conditioning filters through the entire building to the extent that they supply or return from the work areas, whether or not, the units were operated during construction operations.
- .11 Refer to “cleaning” sections of the specifications for additional specific periodic and final clean up requirements.
- .3 The General Contractor must note the Owner insists that resilient tiled (VCT) and sheet good floors (vinyl or linoleum) be broom swept only. Wet mopping and waxing/polishing will be done by the Owner’s Caretaking Staff.
- .4 Do not provide sealants and waxes on terrazzo, ceramic and other hard surfaced floors without reviewing products and methods of application with the Owner’s Caretaking Staff. Failure to comply with this requirement will result in the contractor stripping these floors in their entirety.
- .5 The contractor shall also ensure that the appropriate measures including a stone mud mat are installed and maintained at all construction entrances, to avoid contamination of City roads and sewers. It is the Contractor’s responsibility and not the Owner’s to ensure that site entrances and roadways in front of the site are maintained in clean condition acceptable to the municipality or Subdivision Engineer, as the case may be for un-assumed subdivisions.
- .6 The contractor shall inspect the existing elevator sump pump on a weekly basis for the duration of construction. The sump pump is located within the construction hoarding area.

1.34 TEMPORARY PROTECTION

- .1 Refer also to Temporary Fencing in this Section.
- .2 The General Contractor to provide temporary covered-way protection, dustproof and fire resistant barricades, screens or barriers to separate all work areas from other parts of the building and/or as directed by the Consultant and/or authorized Owner Representative, for the safety of persons, or for dividing the Work from portion or portions of the building or site that may be required for use by the school, or others.
- .3 Properly protect the Work from any damage by the elements. In cold weather cover all exterior openings in the work areas likely to cause water damage.
- .4 During off hours and/or stages of suspended operations for whatever reasons, the General Contractor must assume all responsibility for protection against the elements, theft and/or vandalism. This applies to all work in progress and to any materials, products, tools, equipment, or other such items left at the work site.
- .5 Properly protect floors and roofs from any damage. Take special precautions when moving heavy loads or equipment over floors and roofs.

- .6 The General Contractor must keep floors free of oils, grease or other such materials likely to discolour them and/or affect bonding of applied surfaces.
- .7 The General Contractor must 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.
- .8 Protect glass and other finishes against heat, slab and weld splatters, using appropriate protective shields and covers.
- .9 The General Contractor must provide and maintain, in good working order, appropriately labeled ULC fire extinguishers, to the approval of Authorities Having Jurisdiction.
- .10 The General Contractor must provide a minimum of two safety helmets on site at all times for the use of the Consultant and any other Owner authorized visitors to the site. It is the General 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.

1.35 COMPLETION

- .1 Upon completion of the Work, all protection erected shall be removed, all damage to the Work and adjoining Work due to the lack or failure of such protection shall be made good and 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 Staff. The General Contractor shall give written notice to the Consultant, requesting final inspection of the completed Project.
- .2 Refer to the pertinent sections of the Specifications for requirements with respect to submission of *Record Documents*, *Maintenance Materials*, *Special Tools* and *Spare Parts*.

1.36 GUARANTEES

- .1 The following is a summary of the guarantees (in number of years) required by the contract. Refer to individual specifications sections for additional information on warranties. In the event an extended warranty is listed in the specific Section, that section will have precedence over this list. If no extended warranty is listed, this list will govern:
 - .1 Entire Project, General Contract 1
 - .2 Caulking 2
 - .3 Finish Hardware 3
 - .4 Acoustic Ceilings 2
 - .5 Concrete Floors 3
 - .6 Ceramic Tile 5
 - .7 Painting 2
 - .8 Resilient Tile 3
- .2 The guarantee period shall start on the date of issue of the Certificate of Substantial Performance of the Contract by the Consultant.

1.37 CONTINGENCY ALLOWANCE

- .1 The contingency allowance is not to be carried in the Tender Price and is not identified.
- .2 Expend Contingency Allowance as directed by the Consultant, in writing, in accordance with the Contract
- .3 Contractor's charges for expenses and profit on Contingency Allowance expenditure shall not be included in Contract Price. Refer to the Contract and Supplementary Conditions for percentages of mark-ups.
- .4 Such charges shall be added to the net trade cost of each expenditure from the Contingency Allowance at the percentage rates noted in the Bid Documents.

1.38 CASH ALLOWANCES

- .1 Include in the Contract Price, a Cash Allowance in the amount of **Seventy thousand dollars, (\$70,000.00) not including HST.**
- .2 Cash Allowances, unless otherwise specified, cover the net cost to the General Contractor of services, products, construction, machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing the Work.
- .3 The Contract Price, *and not the Cash Allowance*, includes the General Contractor's profit and coordination costs in connection with all Cash Allowance expenditures.
- .4 The Contract Price will be adjusted by written order by the Consultant to provide for an excess or deficit to each Cash Allowance. Any unused portions of these allowances shall be returned to the Owner on the conclusion of the Contract.
- .5 A schedule shall be prepared jointly by the Consultant and the General Contractor to show when items called for under Cash Allowances, so that the progress of the Work is not delayed.
- .6 Exclusive of Deposits, which are the contractor's sole responsibility to provide as required of Authorities Having Jurisdiction, the following is a summary of the scope Cash Allowances to be included in the contract:
- .7 Expend both Cash Allowances as directed by the 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 Cash Allowance Breakdown of Items
 - .1 Testing and Inspection
 - .2 Hazardous Material/Designated Substances Abatement (in addition to that in contract scope of work)
 - .3 Preparation of digital Architectural and Structural As-Built Drawings
 - .4 Supply and Install of Data Cabling and terminations and servicing by Board Approved Contractor
 - .5 Supply and Install of Security System upgrades

- .6 Fire stopping and smoke seals not shown on drawings
- .7 Supply only of Door Finish Hardware
- .8 Supply only of Door Signage

1.39 ALLOWANCES CARRIED IN DIVISIONS 15 AND 16

- .1 Refer to Electrical specifications for that Division to include an ESA Plans Examination Allowance.

1.40 SCHEDULE OF ALLOWANCES

- .1 Material Allowances shall include the following:
 - .1 Net cost of Material
 - .2 Applicable taxes and duties
 - .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 (i.e. contract co-ordination)
 - .5 Overhead and profit
- .3 Material and Installation Allowances shall include the following:
 - .1 Net cost of material
 - .2 Applicable taxes and duties
 - .3 Deliver to site
 - .4 Handling at site, including unloading, uncrating, storage and hoisting
 - .5 Labour, installation and finishing

1.41 POLYCHLORINATED BIPHENYL (PCB)

- .1 Conform to the Environmental Protection Act and Regulations, Ontario Regulation 11/82 as amended.

1.42 USE OF CONSULTANTS'S DIGITAL DRAWINGS

- .1 Where a contractor wishes to obtain a digital copy of consultant drawings for shop drawings or survey purposes, the consultant may elect to provide this drawing for a nominal fee. As this is the consultants' option, the contractor shall not anticipate provision of these digital drawings to meet the contract schedule.

1.43 BUILDING DIMENSIONS

- .1 Ensure that all necessary job dimensions are taken and all trades are co-ordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.
- .2 Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by

requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.

- .3 Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions, with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.
- .4 Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.
- .5 All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.
- .6 Advise Consultant of discrepancies and if there are omissions on drawings, including layout of items which affect aesthetics, or which interfere with services, equipment or surfaces. DO NOT PROCEED without direction from the Consultant.
- .7 Prepare interference drawings AND SUBMIT AS SHOP DRAWINGS IN ADVANCE OF PRODUCTION to properly co-ordinate the work in all ceiling spaces and where necessary. Coordinate these drawings with all Divisions. Refer also to Section 01 33 00.

1.44 SETTING OF WORK AND REQUIRED SURVEYS

- .1 This article not applicable to this project.

1.45 LAYOUT OF WORK

- .1 Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.
- .2 Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.

1.46 DOCUMENTS REQUIRED AT START, DURING & CLOSE-OUT OF CONSTRUCTION

- .1 At Commencement of Contract, ***as applicable to the Board General Conditions and requirements of the CCDC 5B and Supplementary Conditions to the CCDC-5B:***
 - .1 Supply Performance Bond and Labour and Material Bond, in accordance with Section 00 21 13, Instructions to Bidders.
 - .2 Supply Public Liability and Property Damage Insurance Certificates, also Builder's Risk and Boiler Insurance as required of the Contract.
 - .3 Supply Certificates of good standing from WSIB for the General Contractor and all Subcontractors.
 - .4 Supply a complete Contract Sum Breakdown of all subtrades or parts of work and general expense items for approval by all consultants. Include Mechanical and Electrical Breakdowns for review and acceptance by Consultants.

- .5 Supply a competent detailed Construction Schedule that has been reviewed and approved by major subtrades. Identify critical milestone dates for Renovations.
- .6 Supply Cash Flow schedule of monthly progress payments in coordination with the Construction Schedule and plot as 'S' curve chart.
- .7 Supply Schedule of Shop Drawing Submissions and identify list of long-lead items.
- .8 Apply for and post and supply a copy of Notice of Project.
- .9 Supply a copy of Health & Safety policy as well as post at the job site.
- .10 Supply Shoring Designs and Method Statements of any aspects requiring shoring or as required of the construction sequence or specifications Sections.
- .11 Supply interference drawings for all areas requested by the Architect, Mechanical Engineer or Electrical Engineer. Treat as Shop Drawings for approval.
- .2 During Construction
 - .1 Maintain as-built record drawings in clean condition.
 - .2 Organize regular Trade Coordination meetings.
 - .3 Provide at each bi-weekly site meeting a "Two-Week Look ahead" schedule that is updated for each meeting.
 - .4 Organize separate, regular Owner and Consultant Job Meetings in accordance with Section 01 22 00.
 - .5 Maintain a copy of up to date records on site including, but not limited to Permit Sets, Contract Documents updated with all addenda, all Changes and Supplementary Instructions issued by Consultants.
- .3 Monthly with Each Progress Payment Application
 - .1 Supply Monthly Progress Reports and Construction Schedule in accordance with Section 01 22 00.
 - .2 Adjust Allowances, as required.
 - .3 Current WSIB Form
 - .4 Confirm that payments are being made to subcontractors and suppliers by submission of original copies of the current versions of Statutory Declarations with the second and subsequent Progress Payment Application. Include both Statutory Declarations Form CCDC-9A for the General Contractor and CCDC-9B from subcontractors with each monthly Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.
- .4 Prior to Substantial Completion
 - .1 Provide detailed Completion Schedule a minimum of 21 days prior to Substantial Completion. Schedule to illustrate all trades and sequences required for completion and legal occupancy. Issue to Consultants and upon acceptance, to all trades.
 - .2 Prior and as a requirement of owner acceptance of Substantial Completion of the work the following to be observed, executed and submitted:
 - .1 DEFICIENCIES ARE LISTED: prior to Substantial Completion, the contractor shall prepare a room by room deficiency list in electronic format on an MS Excel spreadsheet provided by the Consultant.

Contractor shall print and review on site with consultants at a site meeting and post on each room or area. Contractor shall reissue back to Consultant, when updated, in Excel electronic format. This list will be acted upon by all trades and coordinated and updated weekly as a minimum by the General Contractor to ensure all deficiencies are addressed by the date required for Total Performance. Confirm in writing to the Architect when and on what dates each deficiency has been completed in a satisfactory manner. The Consultant's site review will be final approval.

- .2 Acceptable preliminary submissions of all Mechanical and Electrical Operations and Maintenance Manuals have been reviewed by Consultants.
- .3 Acceptable preliminary submissions of all Warranty and Shop Drawing Records have been reviewed by Consultants.
- .4 All final clean-up to have been executed, as specified in Section 01 74 11.
- .5 Complete preliminary Balancing and provide preliminary Balancing Reports.
- .3 Failure to comply with these requirements shall have amounts withheld on Progress Payments and delay issuance of Certificate of Substantial Completion.
- .4 Note that Prior to the Release of Holdback, a similar Progress Claim is required, and must include current Statutory Declaration Forms CCDC-9A for the General Contractor and CCDC-9B from subcontractors updated to refer to the Previous Certificate of Payment.
- .5 Upon Completion (Refer also to 01 78 00 Close-Out Submittals)
 - .1 Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:
 - .2 DEFICIENCIES ARE COMPLETE. Confirm in writing to the Architect when and on what dates each deficiency has been completed in a satisfactory manner. The Consultant's site review will be final approval.
 - .3 Finishing Hardware, Inspection and Verification. Note requirements for qualified installation and inspection in Section 08 71 10- Door Hardware.
 - .4 Organize a Final Inspection tour at which to be present: the Owner's authorized representative; the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any; the Contractor and his superintendent.
 - .5 Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.
 - .6 A complete release of all liens arising out of this Contract, other than his own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.
 - .7 Certificates of good standing from the WSIB, for the General Contractor and all Subcontractors.
 - .8 All reference records, as specified, under Section 01 78 00.

- .9 Certificate of Inspection from Mechanical and Electrical Engineers.
- .10 Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.
- .11 Statement of Completion from General Contractor.
- .12 Final adjustment of all Allowances.
- .13 Certificates required by Provincial, Municipal and other authorities having jurisdiction. Including signed Building Permit.
- .14 Provide 1 hard copy and one digital copy of as-built drawings and 3 hard copies of manuals, all as per timing, sequence and quantity noted in detail in Section 01 78 00

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

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Part 1 General

1.1 PROJECT MEETINGS FOR COORDINATION

- .1 In consultation with the Consultant not later than the second week of construction, arrange for site meetings weekly or every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled.
- .2 Responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.
- .3 Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.
- .4 Provide physical space for meetings, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: _____".
- .5 Within three days after each meeting, distribute two copies of the minutes to each invited person and regular distribution list to be issued by the consultant.

1.2 PRECONSTRUCTION MEETING

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .1 Include in the agenda the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Review project communications procedures.
 - .3 Site Safety and Security
 - .4 Scheduling Review. Provide schedule for discussion. Refer also to Section 01 33 00 - Submittals.
 - .5 Method Statement Review. Provide schedule for discussion. Refer also to Section 01 33 00 - Submittals
 - .6 Interference with ongoing business.
 - .7 Work by other Contractors.
 - .8 Schedule of submission of shop drawings and samples.
 - .9 Requirements for temporary facilities, site sign, offices, storage sheds utilities.
 - .10 Delivery schedule of specified equipment and identification of long-lead or other critical items.
 - .11 Procedures for Contemplated change notices, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .12 Record drawings.
 - .13 Maintenance manuals.
 - .14 Take-over procedures, acceptance, warranties.

- .15 Monthly progress claims, administrative procedures, photographs, holdbacks.
- .16 Appointments of inspection and testing agencies or firms.
- .17 Insurances, transcript of policies.
- .18 Schedule for progress meetings.
- .19 Identify all critical points on Construction Schedule for positive action.
- .20 Review any points which require clarification.

1.3 PROJECT MEETINGS FOR PROGRESS OF WORK

- .1 Conduct progress meetings in accordance with the schedule and/or decisions made at Preconstruction meeting.
- .2 Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.
- .3 Prepare and include in the agenda the following:
 - .1 Site Safety and security record or incidents.
 - .2 Review, approval of minutes of previous meeting.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revisions to construction schedule.
 - .9 Review of 2 week "look-ahead" detail schedule.
 - .10 Progress during succeeding work period as a "two-week look ahead".
 - .11 Review submittal schedules: expedite as required.
 - .12 Maintenance of quality standards.
 - .13 Pending changes and substitutions.
 - .14 Review proposed changes for effect on construction schedule and on completion date.
 - .15 Other business.
- .4 Record minutes of each meeting and promptly distribute copies to be received by all participants not later than seven days after meeting has been held.

1.4 SUPERVISION

- .1 Employ a full-time, experienced and qualified superintendent for the project who shall devote his time exclusively to the work of this Contract and who shall be in complete charge of the work from commencement to completion. A working foreman will not be acceptable. The superintendent shall not be changed after commencement of work without the Consultant's approval. The Superintendent may have or be in progress toward a CCA Gold Seal Certificate designation and must be acceptable to the Owner.
- .2 Supervise, direct, manage and control the work of all forces carrying out the work, including subcontractors and suppliers. Carry out daily inspections to ensure compliance with the working drawings and detailed specifications and the maintenance of quality

standards. Ensure that the inspection staff includes personnel competent in supervising the mechanical and electrical trades.

1.5 PROGRESS RECORDS

- .1 Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:
 - .1 Daily weather conditions, including maximum and minimum temperatures.
 - .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
 - .3 Conditions encountered during excavation.
 - .4 Dates of erection and removal of formwork, in each area of the project.
 - .5 Dates of pouring the concrete in each area of the project, with quantity and Particulars of the concrete.
 - .6 Work force on project daily per trade and active hours.
 - .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

1.6 DOCUMENTS ON SITE

- .1 The Contractor's field office shall at all times contain a complete set of Contract Documents (Schematic Drawings and Performance Specifications) with all addenda, site instructions, change orders, reviewed shop drawings and samples, colour schedule, paint materials schedules, hardware list, progress reports and meeting minutes.
- .2 The Contractor's field office shall at all times contain a complete set of all construction documents, as issued for building permit and bearing the stamp of the appropriate municipal authority.

1.7 PROGRESS REPORTS

- .1 Submit to the Consultant, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims. Stipulate progress by trade or Division: e.g. masonry; mechanical, finishing trades and the like. Include with this submission the digital schedule referenced below.

1.8 DIGITAL PROJECT SCHEDULES

- .1 Refer also to Section 01 33 00 Submittals.
- .2 At the outset of the project, General Contractor to provide and maintain a digital Gantt chart type project schedule including Milestone Dates and listing all trades. To be issued in format compatible with Microsoft Project program.
- .3 Update and issue to Consultant in hard copy and electronic copy *not less than* monthly and at each Progress Draw and as required from any changes in 2 week "look-ahead" schedules.
- .4 Prepare for review at each bi-weekly project meeting a detailed **2 week "look ahead schedule"**.

- .5 At a minimum of **3 weeks prior to Substantial Completion develop a detailed Completion Schedule** outlining final coordination and sequences to completion including cleaning schedule, verifications, coordination with Air Balancing, rooms and areas to be available for cleaning, final inspections, etc.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples and mock ups.

1.2 GENERAL

- .1 Unless specified otherwise, make all submissions to the Consultant at his office, with additional submissions made as directed by the Consultant to other parties involved in the construction.
- .2 Make all submissions required by the Contract Documents with reasonable promptness and in orderly sequence so as to cause no delay in the work.

1.3 PROJECT SCHEDULE

- .1 **Critical to this project is the staging and sequencing of work and the order of long lead items.**
- .2 At the outset of contract award and in advance of the pre-construction meeting, review the dates of access to the first and second floors and the entire scope of work.
- .3 Prepare a detailed schedule that is coordinated with all trades and the Method Statement submission requirement listed below, taking into consideration period of owner occupancy, required sequencing of trades, any simultaneous or overlapping stages, staging work into zones to allow multiple trades to simultaneously remain active on site and ensuring appropriate time for each sequence. Note that overtime requirements are at no additional cost to the base contract price.
- .4 Review schedule and sequence with trades, ensuring and understanding and commitment to provide adequate manpower to meet each stage.
- .5 Submit detailed Project Schedule in Gantt Format for review. Review and receive approval of owner and consultants prior to start of work. The Contractor shall make all changes to the schedule requested by the Owner.
- .6 Provide schedule updates on a bi-weekly basis for duration of Contract. Submit 2 week “look-ahead” schedule at each bi-weekly project meeting.

1.4 CASH FLOW CHART AND CONTRACT BREAKDOWN

- .1 The Contractor shall submit an estimated cash flow chart broken down on a monthly basis. Cash flow chart shall indicate anticipated Contractor’s estimated monthly progress billings from commencement of work until completion.
- .2 The Contractor shall update cash flow chart whenever changes occur to scheduling.

1.5 MOCK-UPS

- .1 Where required by the Performance Specifications, construct mock ups of the work in a location approved by the Consultant.
- .2 Construct mock-ups from the specified materials and assemblies for the review of the Consultant.
- .3 Make any revisions required by the Consultant.
- .4 Mock-ups reviewed and approved by the Consultant shall become the standard against which installed work will be evaluated.
- .5 Mock-ups, on the approval of the Consultant, may be incorporated into the finished work.
- .6 Do not proceed with the Work until the associated mock-up has been approved.

1.6 SAMPLES

- .1 Submit 2 sample boards of all finishes to be used. The Owner and Consultant will review samples.
- .2 Submit samples with identifying labels bearing material or component description, manufacturer's name and brand name, project name, location in which material or component is to be used, and date.
- .3 No work requiring a sample submission shall be commenced until the submission has received Consultant's final review.
- .4 Within the project schedule allow ten (10) working days for the review and approval of samples by the Owner and the Consultant.

1.7 MAINTENANCE AND OPERATING MANUALS

- .1 Submit in accordance with Section 01 77 00 Project Close Out.

1.8 REPLACEMENT MATERIAL

- .1 Supply replacement material at completion of the project for the following products:
 - .1 Floor tiles – minimum of 2 boxes of each colour and type
 - .2 Ceiling tile – minimum of 2 boxes of each type
 - .3 Light fixtures complete with lens – refer to Electrical drawings
- .2 Turn over all material to the Owner and obtain a signed receipt for same.

1.9 SCHEDULE OF SUBMITTALS

- .1 Submit detailed schedule of submittals for shop drawings, samples, list of materials for review by the Consultant.
- .2 Indicate the date of submission and time limit for review of each item.

- .3 Schedule submissions to allow adequate time for review and resubmission if necessary.

1.10 SHOP DRAWINGS

- .1 Submit to Architect, for review, shop drawings, product data and samples specified.
- .2 Until submission is reviewed, work involving relevant product must not proceed.
- .3 Review of shop drawings by the Owner and Consultant does not relieve the Contractor of this responsibility for detail design inherent in the shop drawing. The Contractor is responsible for all dimensions and coordination pertinent to the fabrication and/or construction and installation techniques and coordination of work of all sub-trades.
- .4 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .5 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.
- .6 Identify details by reference to sheet and detail numbers shown on Contract Drawings.
- .7 Maximum sheet size 606 x 909 mm.
- .8 Reproductions for submissions: opaque whiteprints.

1.11 REFERENCES

- .1 CCDC 2 Stipulated Price Contract - 2008

1.12 PROJECT 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 Above will only be accepted if they conform to 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 Show wiring diagrams (when requested) and controls.

1.13 COORDINATION OF SUBMISSIONS

- .1 Review shop drawings, product data and samples prior to submission.
- .2 Verify:

- .1 Field measurements.
- .2 Field construction criteria.
- .3 Catalogue numbers and similar data.
- .3 Co-ordinate each submission with requirement of work and Contract documents.
Individual shop drawings will not be reviewed until all related drawings are available.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.
- .5 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect's review of submission, unless Architect gives written acceptance of specified deviations.
- .6 Notify Architect, in writing at time of submission, of deviations from requirements of Contract documents.
- .7 After Architect's review, distribute copies.

1.14 SUBMISSION REQUIREMENTS

- .1 **All submissions must be reviewed and stamped by the General Contractor before issuance to consultants. Submissions not reviewed by the Contractor will be rejected.**
- .2 Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.
- .3 Submit two sets of reproducible prints, plus six (6) opaque copies of shop drawings, product data to Architect for review. Electronic PDF copies may be used in lieu of opaque copies.
- .4 Accompany submissions (including electronic submissions) with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Number of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.
- .5 Submissions must include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name of:
 - .1 Contractor.
 - .2 Subcontractor.

- .3 Supplier.
- .4 Manufacturer.
- .5 Separate detailer when pertinent.
- .6 Identification of product or material:
 - .1 Relation to adjacent structure or materials.
 - .2 Field dimensions, clearly identified as such.
 - .3 Specification Section number.
 - .4 Applicable standards, such as CSA or CGSB numbers.
 - .5 Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract documents

1.15 INTERFERENCE DRAWINGS

- .1 Prepare interference drawings for all work in confined space: all typical ceiling space conditions and atypical conditions. Coordinate with all trades.
- .2 Submit as shop drawings in advance of fabrication or installation of components. Site conditions requiring corrections, due to failure to provide interference drawings as required will be corrected at no additional cost to the owner.
- .3 Ceiling heights and bulkheads will not be revised during construction due to failure to prepare interference drawings.

1.16 SHORING DESIGN DRAWINGS & METHOD STATEMENT

- .1 Temporary wall shoring or bracing of walls may be required as part of the base contract price. Refer to drawings and individual specification sections.
- .2 Related to the entire sequence above, submit a Method Statement and Shoring Drawings describing all locations and details of connections and bracing type as a submittal package in advanced of the work. Method Statement shall describe the sequence of steps including:
 - .1 installation of shoring
 - .2 work steps related to shoring
 - .6 removal of temporary shoring
- .3 Shoring design drawings shall bear the seal of a Professional engineer registered in the Province of Ontario. The Method Statement shall describe the work sequence.
- .4 Submit to the Consultants as shop drawings in advance of the work. Approval of methods and materials is required before proceeding with the work.

1.17 SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEERS

- .1 In addition to any the similar requirements for shop drawings of any mechanical or electrical systems, Shop Drawings for all structural components or components required to perform in conjunction with other structural or building envelope components,

cladding and the like shall bear the seal of a professional engineer licensed in the Province of Ontario.

- .2 In addition, all components to be attached to or suspended from the walls and ceiling areas shall also bear the seal of a professional engineer licensed in the Province of Ontario. This includes the lateral wall bracing required for this project.

1.18 LIST OF SAMPLE OR MOCK-UP SUBMITALS

- .1 At the outset of the project the contractor shall prepare a comprehensive list of all shop drawings, sample submissions and mock ups required.
- .2 The list of possible Mock-Up components will be determined with the Consultant and Board Project Manager

1.19 SUBMISSIONS TO INSPECTION AGENCIES

- .1 Not applicable to this project.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section outlines the mandatory minimum Health and Safety protocols for all renovation project work where all or a portion of the existing school building remains occupied and in use.
- .2 These Health and Safety protocols are mandatory minimum requirements, procedures and standards that the Upper Grand District School Board insists are fully complied with by all parties involved with Upper Grand District School Board Projects.
- .3 **Although work is scheduled for the unoccupied summer months, this Section is provided in the event work is required during any occupied period of the school year. In that event, all aspects of this section apply for periods when the school is occupied prior to June 30, 2017 and for all work that may extend beyond September 1, 2017.**

1.2 RELATED SECTIONS

- .1 These specifications apply to all Divisions of this Project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this Project.
- .2 The requirements of this Section supersede those of all other specification Sections and Drawings. Where conflicts exist in procedures, methods or materials, they shall immediately be brought to the attention of the Consultant and Board Project Manager. Where clarification is not immediately available, the Contractor shall assume the specifications contained in this Section are a minimum standard and the more stringent specification shall apply.
- .3 The Contractor must receive approval from Board Project Manager for any deviations from this specification Section.
- .4 The General Contractor shall recognize that it is *he* who is the Constructor of the Project. The General Contractor shall also recognize that he is solely responsible for site safety at the Place of the Work and compliance with the requirements of this Section does not limit or remove his total responsibility for site safety as Constructor of the Project.

1.3 REFERENCES

- .1 Applicable related regulations, standards and laws related to safety include but are not limited to:
 - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

.3 Province of Ontario

1. Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. –latest editions and updates.

1.4 COMPLIANCE SPECIFICATION

- .1 Notwithstanding the requirements of this Section, the Contractor must comply with all applicable health, safety and environmental regulations and statutes.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Board's intention to develop a specification which provides the safest practical procedures and policies for construction project sites that are occupied and in use by staff, students and visitors during the execution of the Construction Contract.
- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore, these specifications cover both material and methods.
- .3 These provisions apply to both indoor and outdoor applications equally.

Part 2 Products

2.1 NOT USED

Part 3 Execution and Compliance Requirements

3.1 APPLICATION OF COMPLIANCE REQUIREMENTS

- .1 The articles setout herein are to be applied together as a set of related policies and procedures to achieve a comprehensive Health and Safety working protocol.
- .2 The Contractor shall execute all of the procedures and meet all of the requirements set out herein and apply these protocols from the outset of the Construction Phase.
- .3 These procedures or requirements are to be maintained for the duration of the Construction Phase. The Contractor shall not discontinue any of the individual procedures or requirements without the prior approval of the Board Project Manager.

3.2 SITE SUPERVISOR (SITE SUPERINTENDENT)

- .1 A full-time Site Supervisor (Site Superintendent) is required on site, regardless of the number of active workers on site.

- .2 Site Superintendent 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.
- .3 Site Superintendent 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.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 Site Superintendent shall not be changed throughout project unless confirmed and approved by the Board Project Manager.

3.3 ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS

- .1 General Contractor to comply with the Ontario Occupational Health & Safety Act and Regulations for Construction Projects, latest edition– including all amendments.

3.4 ON-SITE COMMUNICATIONS

- .1 At the outset of the project the General Contractor shall provide to the Board Project Manager all relevant contact information for the Site Superintendent, GC Project Manager and key sub-contractors including names and cell phone numbers.
- .2 The General Contractor shall provide at least one “emergency contact” telephone number at which the Contractor's representative can be reached directly during all work hours and have the ability to have voicemail recorded during all non-work hours including weekends and holidays. As outlined below, this may be designated to the Site Superintendent's cell phone number.
- .3 Regardless of compliance method for the emergency contact telephone number stated above, the Site Superintendent 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.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 The Contractor is to ensure that the Board Project Manager is immediately apprised of any safety issues as each arises and the related request and/or resolution. The Board Project Manager is responsible for any decisions that have an effect on the contract execution.

- .6 Notwithstanding the reporting to the Project Manager noted above the Site Superintendent shall liaise with school principal or designate on all safety related matters as required on a daily basis.
- .7 In the event of a safety issue requiring contractual clarification or action (i.e. Change Notice, etc.), the contractor shall ensure that, where applicable, the action is followed up with appropriate documentation.

3.5 ON-SITE FLAGMEN

- .1 A designated Flagman is required at all vehicular construction entrances for the period of the occupied school year.
- .2 Flagman may not be same person as Site Superintendent or other construction worker.
- .3 Flagman shall not be changed throughout the Project unless confirmed and approved by the Board Project Manager.
- .4 Flagman must have means of phone communication with Site Superintendent (phone or walkie-talkie).
- .5 The Flagman shall not be designated for any other duties than to act as a Flagman for safety purposes as described herein.
- .6 The Flagman shall meet and escort any construction traffic from the site **entrance** into and out of the hoarded/fenced construction area (including through open site areas until entrances to hoarding).
- .7 The Flagman shall only open hoarded areas when construction traffic moves through and immediately re-close gates.
- .8 The Flagman shall control construction parking at the school site (including vehicles parking or traveling in unauthorized areas).
- .9 The location of the Flagman shall be set to ensure the safe guarding of staff, student, and pedestrian traffic.
- .10 If not designated on the Contract Documents, the location of the Flagman shall be confirmed with the Board Project Manager and Consultant at the outset of the project and before the placement of hoarding and fencing.
- .11 Where the Contractor deems it necessary, in order for the Flagman to carry out the required full-time duties, the cost of a temporary shelter shall be included in the Tender Price.
- .12 The Flagman shall be properly attired to carry out his duties, including the use of safety equipment (e.g. wear reflective vest, have appropriate traffic hand-held "Stop" sign and have a visible identification tag).

3.6 SITE SAFETY SIGNAGE

- .1 Standardised Safety Signage is required at all construction entrances.

- .2 If not designated on the Contract Documents, the location of the Safety Signage shall be confirmed with the Board Project Manager and Consultant at the outset of the Project and before the placement of any applicable hoarding and fencing.
- .3 Safety Signage is to be posted at all street entrances to school site and at each entrance to hoarded/fenced construction area.
- .4 Total surface area of signage is to avoid exceeding municipal standards that would require a separate signage permit.
- .5 Access signage text shall include cell phone contact number for Site Superintendent.
- .6 Signage posted at gates shall state restrictions on hours of entry and egress as described in the Contract Documents and under no circumstances shall construction traffic be allowed within 30 minutes prior to school start, during recess, lunch break, and 30 minutes after dismissal periods.

3.7 ACCESS/EGRESS CONTROLS

- .1 At the outset of the Contract, the General Contractor shall advise all suppliers and subcontractors of the protocols listed herein and of the requirement to contact the Site Superintendent by Cell phone prior to entering the site.
- .2 The drivers of all construction vehicles entering the site, including delivery vehicle drivers, are to contact site Superintendent by cell phone prior to entering site; the Site Superintendent shall, in turn, give notice to the Flagman to be aware of the traffic and authorize the Flagman to allow entry of that vehicle.
- .3 Vehicular Gates separating the work area are not required for this project.

3.8 CONTRACTOR PARKING

- .1 Refer also to Section 01 52 00 "Construction Facilities". Contractor parking shall be restricted to hoarded areas or designated parking areas only where pre-approved by Board Project Manager and Principal.
- .2 Contractor parking is restricted from all off-site street areas that interfere with site specific parent drop-off and parking areas.

3.9 REQUIRED PRE-CONSTRUCTION MEETINGS

- .1 Contractor shall receive approval from the Architect and the Board Project Manager and Principal for parking, vehicular movement, access/egress strategies at a Pre-construction meeting taking place in advance of mobilizing on site.
- .2 Once hoarding and fencing is erected BEFORE site construction is fully active and vehicles or equipment is mobilized on site, an initial site meeting shall take place at which time the layout of trailers and staging, deliveries, storage of materials, parking areas and vehicular movement to be reviewed and approved by the Board Project Manager and Principal.
- .3 See article 3.12- 'Site Meetings' following.

3.10 CONSTRUCTION FENCING AND HOARDING

- .1 Construction hoarding requirements shall be a site based decision to be determined by the Architect and the Board Project Manager at the design stage and shown on Contract Documents.
- .2 No fencing or hoarding shall be less than a continuous 1800 mm high.
- .3 In portions of the site where chain link is approved, it shall be continuous 1800 mm high chain link fencing, wire-tied to staked iron 'tees' at 1800 mm on centre - OR - leased, modular 'quick fencing' if staked down and wire tied together.
- .4 All fenced and hoarded areas to be gated with lockable vehicular and man gates-minimum construction to be steel rail and chain link construction.
- .5 Plastic snow fencing is NOT permitted.
- .6 All hoarding and fencing shall be maintained in a stable condition, for duration of construction period as part of the base contract price and to include Superintendent's inspection at the beginning and end of each work day.
- .7 All Fire Routes to be outside all fenced and hoarded areas and maintained clear at all times.
- .8 'Covered way' protection shall be provided when accesses or pathways are in proximity to construction, in accordance with Ministry of Labour *Occupational Health & Safety Act* Regulations.

3.11 SITE MEETINGS

- .1 Coordinate the requirements of this Section with *Section 01 22 00 – 'Meetings and Progress Reports'*.
- .2 Initial site meeting to take place after erecting fencing and hoarding but prior to the mobilisation of any vehicles, equipment or start of Work.
- .3 Contractor shall ensure that the Board Project Manager, and if so designated by the Board, the School Principal or school representative shall attend the initial site meeting.
- .4 The initial meeting shall review and approve a standardised agenda for all site meetings and a thorough review of the Site Safety Protocol.
- .5 The standardised agenda shall include a Checklist and Report of Health and Safety items at the beginning of the agenda. This Checklist shall be included and each item reviewed at all site meetings for the duration of the project.
- .6 The Checklist of Site Safety items shall include but not be limited to:
 - .1 Contractor's report of site safety record and report of recent site activities, precautions or actions.
 - .2 Review any visits to the site and actions required by Ministry of Labour or Board Health, Wellness & Safety representatives or other Authorities Having Jurisdiction.

-
- .3 Contractor's Health & Safety policy manual posted in site trailer.
 - .4 Copy of Ministry of Labour *Occupational Health & Safety Act and Regulations for Construction Projects* in site trailer.
 - .5 Name of General Contractor H&S representative.
 - .6 Continuing compliance with Safety Signage.
 - .7 Hoarding & fencing layout and condition.
 - .8 Access and egress measures and any breaches of requirements.
 - .9 Confirmation of communications link between Site Superintendent & Flagman.
 - .10 Work that may produce any noxious odours and the containment measures, (i.e.: schedule, type, approvals required therefore).
 - .11 Copies of Material Safety Data sheets in site office.
 - .12 Complete meeting minutes including details of Safety Checklist shall be copied to Architect, Board Project Manager and Principal.
- .7 Contractor to produce record of written Memorandum to all subtrades and suppliers detailing but not limited to: hours of delivery; site access procedures and restrictions; use of existing facilities.
 - .8 Contractor to prepare detailed and accurate written record of all meetings to be kept and issued to all parties.

3.12 CONTRACTOR'S HEALTH AND SAFETY COMMITTEE MEETINGS

- .1 As required in item 3.1.2, the Contractor shall form a Health and Safety Committee, hold meetings and record minutes of meetings for the duration of the Contract.

END OF SECTION

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Part 1 General

1.1 SECTION INCLUDES

- .1 Health and safety considerations required to ensure due diligence towards health and safety on construction sites, and meets the requirements laid out Occupational Health and Safety - Construction.

1.2 RELATED SECTIONS

- .1 These specifications apply to all divisions of this project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.
- .2 Recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the Owner, notify the Consultant of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Consultant.
- .3 Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Consultant. Suitability of all products used is the responsibility of the Contractor.

1.3 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O.

1.4 COMPLIANCE SPECIFICATION

- .1 The Contractor must comply with all applicable health, safety and environmental regulations.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner's intention to develop a specification which maximizes environmentally "friendly" materials and methods wherever possible within current technical and budget limitations.
- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low

cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.

- .3 The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.
- .4 These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.
- .5 These provisions apply to both indoor and outdoor applications equally.

1.6 EXCEPTIONS

- .1 These specifications recognize that not all substitutes are equal and therefore exceptions can be made based on substantive evidence of necessary and superior performance. Special considerations may be given to restricted substances when secondary provisions are made such as sealed in place (contained) applications. All such exceptions must be approved in writing by the Consultant.

1.7 PRODUCTS OR SUBSTANCES TO BE AVOIDED OR LIMITED IN USE

- .1 No product containing the following substances may be used on this project when an equivalent product without or with a lower concentration of this substance is suitable and available. All products containing substances which are known to cause health effects including but not limited to cancer, mutagenic, neurological, or behavioral effects should be avoided if suitable substitutes not containing or containing lower concentrations are available. This provision shall be limited to information contained on Material Safety Data Sheets, therefore MSDS sheets must be reviewed for all products for which such sheets are required. Applications for exceptions must be accompanied by related MSDS and product application and performance sheets, clearly showing a need for the exception.

1.8 VOLATILE ORGANIC COMPOUNDS

- .1 No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.
 - .1 Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.
- .2 Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents; therefore the fact that a product is waterborne does not automatically make it acceptable.

1.9 CHLORINATED SUBSTANCES

- .1 Poly Vinyl Chloride (vinyl) and other chlorinated products should be avoided if suitable substitutes are available.

1.10 PLASTICIZERS

- .1 Plasticizers which off-gas (low molecular weight) should be avoided.

1.11 MAN MADE MINERAL FIBRES

- .1 Products containing mineral fibres which can be emitted or abraded should be avoided.
 - .1 Examples: duct liner, mineral fibre ceiling tiles, etc.

1.12 RADIATION

- .1 Products or methods which result in the lowest emission of Electro Magnetic Fields are preferred.

1.13 BIOCIDES

- .1 Products containing biocides (pesticides, miticides, mildewicides, fungicides, rodenticides, etc.) are not to be used if suitable alternatives are available. Highly stable, low human toxicity biocides such as Portcept may be acceptable substitutes. Biocide formulas which break down, emit powders or offgass should be avoided.

1.14 HEAVY METALS

- .1 Heavy metals such as lead, cadmium, mercury etc. should be avoided.

1.15 ALUMINUM

- .1 Raw aluminum should be avoided, anodized or factory painted aluminum is acceptable. This is particularly applicable to surfaces which people can touch.

1.16 OZONE DEPLETING SUBSTANCES

- .1 Products which contain or which use Ozone Depleting Substances such as Bromide, Chlorofluorocarbons (CFC) or Hydrofluorocarbons (HFC) etc. should be avoided if suitable substitutes are available.

1.17 GREENHOUSE GASES

- .1 Products which contain, use or generate Greenhouse gasses such as CO₂ should be avoided if suitable substitutes are available.

1.18 BITUMINOUS (Tar) PRODUCTS

- .1 Products containing tar compounds should not be used if suitable substitutes are available.

1.19 CHEMICAL COMPOUNDS

- .1 Products containing the following chemical compounds should not be used if suitable substitutes are available: Neoprene, Latex, Butyl, ABS, and Formaldehyde.

1.20 ADHESIVES

- .1 Adhesives containing solvents or other non preferred ingredients should be avoided if suitable substitutes are available, including systems designs which do not need adhesives or can use mechanical etc. fastening alternatives

1.21 COMPOSITE PRODUCTS

- .1 Some composite products contain adhesives such as formaldehyde which are not preferred, and some composites such as Fibre Reinforced Plastics are not practical for recycling. These products should be avoided if suitable substitutes are available.

1.22 CLEANERS AND SOLVENTS

- .1 Products, equipment, and methods which require the use of cleaners and solvents are not preferred if suitable substitutes are available. Examples of preferred products would include No Wax floors, or primerless caulks and adhesives, or products not requiring caulks and adhesives.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- .1 Section 1 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.

1.3 GENERAL

- .1 The Contractor shall retain and the Owner shall pay independent inspection companies who shall inspect and test site conditions, procedures and materials related but not limited to the following:
 - .1 Concrete
 - .2 Mortar
 - .3 Structural Steel
 - .4 Roofing
 - .5 Asbestos and Designated Substances Abatement

1.4 DUTIES AND AUTHORITIES OF TESTING AGENCY

- .1 The Consultant shall prepare terms of reference for each testing agency. These terms of reference shall be submitted to the Contractor for review.
- .2 Testing agency is expected to do the following:
 - .1 Review the relevant specification section with respect to materials and standards required prior to conducting any inspections.
 - .2 Act on a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents, Working Drawings and Detailed Specifications. Notify the Consultant immediately of any deviation from the Contract Documents.
 - .3 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens tested conform to requirements of Contract Documents, Working Drawings and Detailed Specifications, specifically noting deviations.
 - .4 Distribute reports as follows:

- .1 Owner - 1 copy
 - .2 Consultant - 2 copies
 - .3 Building Department - 1 copy
 - .4 Contractor - 1 copy
 - .5 Sub-consultants (where applicable) - 1 copy
- .3 Testing agency is not authorized to amend or release any requirements of Contract Documents, Working Drawings nor Detailed Specifications, nor to approve or accept any portion of work.

1.5 CONTRACTOR'S RESPONSIBILITY

- .1 The Contractor shall do the following:
- .1 Notify testing agency minimum 48 hours in advance of operations to allow for assignment of personnel and scheduling of tests without causing delay in work.
 - .2 Provide testing agency with access to work at all times.
 - .3 Supply material samples for testing.
 - .4 Supply casual labour and other incidental services required by testing agency.
 - .5 Provide facilities for site storage of samples.
- .2 When initial inspection and testing indicates non-compliance with Contract Documents, Working Drawings or Detailed Specifications any subsequent re-inspection and re-testing occasioned by non-compliance shall be performed by same testing agency and cost thereof borne by the subcontractor.

1.6 INSPECTION

- .1 General: Materials and workmanship shall be subject to inspection at any time. Cooperate in permitting access for inspection to all places where work is being done or stock is being stored.
- .2 Owner's quality control inspection and testing is specified in the technical sections and will be paid from Cash Allowance except as otherwise specified. Contractor to be responsible to pay for inspections and retesting to verify acceptability of work requiring correction.
- .3 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .4 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .5 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .6 Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.7 ACCESS TO WORK

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

1.8 PROCEDURES

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

1.9 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.10 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.
- .3 Allow sufficient time for testing, evaluation, alterations and retesting so as not to interrupt the Progress Schedule for the Project.
- .4 The Consultant may require testing of connections and special prefabricated inserts, as part of the work of this Section.

1.11 MOCK-UPS

- .1 Refer to specification sections for mock-up requirements.
- .2 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .3 Construct in all locations acceptable to Consultant.

- .4 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .5 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .6 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
- .7 Remove mock-up at conclusion of Work or when acceptable to Consultant.
- .8 Mock-ups may remain as part of Work only if previously agreed to by consultant and accepted as acceptable quality upon completion..
- .9 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.12 MILL TESTS

- .1 Not required for the scope of this project.

1.13 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Temporary utilities.

1.2 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 INSTALLATION AND REMOVAL

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

1.4 DEWATERING

- .1 Not anticipated to be required for this project.

1.5 WATER SUPPLY

- .1 Use of the school water supply is acceptable providing it does not disrupt school services. Limited water usage from existing services is at the discretion of the school Principal and Board Project Manager.

1.6 TEMPORARY HEATING AND VENTILATION

- .1 During the period of work when the school is occupied the existing school heating and ventilation system will be operating. Take all measures and precautions that under any circumstances construction activities causing fumes, dust or other contaminants shall not take place in the building or during occupied hours.
- .2 Similarly, during the construction period when the school is not occupied avoid any construction activities that generate dust or other contaminants that may enter the ventilation system. Advise the owner in advance and to turn off fans and heating or ventilation systems as required to avoid contamination.
- .3 As required, furnish and install temporary heat and ventilation in enclosed areas, if required to:
 - .1 Facilitate progress of work.
 - .2 Protect work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity for storage, installation, curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain minimum temperature of 16 degrees C or higher where specified as soon as finishing work is commenced and maintained until acceptance by consultants.

- .5 Ventilating:
 - .1 Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform 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.
- .7 The Architect may permit the use of permanent system providing agreement can be reached on:
 - .1 Conditions of use, special equipment, protection and maintenance.
 - .2 Guarantees will not be affected.
 - .3 Approval of the Owner.

1.7 TEMPORARY COMMUNICATION FACILITIES

- .1 For duration of contract, provide and pay for temporary telephone and fax hook up, lines and equipment necessary for own use and use of Consultant. Connection of an additional telephone line through the school's telephone service connection shall be granted only be the Board's project manager provided the Contractor's service can be isolated for payment by the Contractor.
- .2 Otherwise, immediately upon award of contract, arrange for temporary Bell telephone line to be connected to the site trailer for purposes of providing functional communication equipment listed above.

1.8 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.9 POWER

- .1 Temporary power is available at the site subject to the approval of the Board Project Manager and the following:
 - .1 power connections can be made without interruption to the school's power supply during the period of school occupancy.
 - .2 the contractor can isolate power usage or itemized based on previous power usage records, such that costs for power usage by the contractor shall be tracked and paid for by the contractor.
- .2 Contractors may bid this project on the assumption that temporary power is available at the site on the basis as described above.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements with prior approval of the Consultants, provided that guarantees are not affected. Make good damage. Replace lamps which have been used over period of three (3) months.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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Part 1 General

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- .1 Section 01 51 00 – Temporary Utilities.
- .2 Section 01 56 00 – Temporary Barriers and Enclosures.
- .3 Section 01 11 00 – General Instructions and Summary of Work, article “Phasing and Sequencing”, which may address site activity commencing prior to end of the school year.

1.3 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 5B-2010.

1.4 INSTALLATION AND REMOVAL

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

1.5 SCAFFOLDING

- .1 All necessary scaffolding shall be provided and constructed according to all by-laws and safety regulations. It shall be removed promptly and completely when no longer required.
- .2 As required by Ministry or Labour, design of scaffolding or hoarding shall be by a Professional Engineer.

1.6 ACCESS

- .1 Provide and maintain adequate access to project site.
- .2 The General Contractor for this Work shall, at all times allow the Consultants, the Board, or any other Board commissioned contractor or their employees, access into 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.

- .3 The General Contractor shall cooperate fully with any and all Board commissioned Contractors.

1.7 HOISTING

- .1 Provide, operate and maintain hoists [cranes] required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists shall be operated by qualified operator.

1.8 ELEVATORS

- .1 Not applicable to this project.

1.9 SITE STORAGE/LOADING

- .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.10 CONSTRUCTION PARKING

- .1 During the occupied school year on-site parking is not available. Use on-site parking during the unoccupied school year in accordance with any instructions from the Board Project Manager.

1.11 OFFICES

- .1 During the period of the work scheduled when the school is occupied, no site office is available in the school. During this period, as required to provide a site office and administer the project from the site, provide heated, lighted and ventilated office site trailer accommodation to suit. Maintain in clean condition.
- .2 Provide and maintain in clean condition: separate plans layout tables, minimum 1200 x 1800 each. One table shall be used by the General Contractor and subcontractors at their discretion. The second shall be provided for use by subcontractors and by the consultant or Inspection and Testing Companies during site visits.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.13 SANITARY FACILITIES

- .1 School washrooms are NOT available for the contractors' use.
- .2 For the duration of the project provide site toilets in a location approved by the Board Project Manager, for work force in accordance with governing regulations and ordinances.

- .3 Post notices and take such precautions, as required, by local health authorities. Keep area and premises in sanitary condition at all times.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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Part 1 General

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Traffic Controls.
- .3 Fire Routes.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 52 00 - Construction Facilities.
- .3 Section 01 11 00 - Summary of Work.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.189M- [84], Primer, Alkyd, Wood, Exterior.
 - .2 CGSB 1.59- [97], Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121- [M1978], Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

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

1.5 SITE ENCLOSURES

- 2. Not applicable to this project.

1.6 WEATHER ENCLOSURES

- .1 As may be required to protect and/or maintain the schedule of any exterior work to the project, provide temporary weathertight enclosures protection for exterior walls and openings until work can withstand the elements.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .3 Design enclosures to withstand wind pressure.

1.7 DUST TIGHT SCREENS

- .1 Assess all interior work that may cause the migration of dust into areas other than the work area and/or HVAC systems and provide dust tight screens, insulated and fire rated temporary partitions as required to separate work.
- .2 Install and obtain approval of the consultant and owner rep prior to demolition or other work.
- .3 Similarly, ensure that dust does not contaminate existing furniture and equipment or materials stored in the school during the period of the work. If such materials are

unprotected, cover with dust protection before work begins or advise the owner to otherwise protect stored equipment, furniture, etc.

- .4 Localize areas of dust generating activities, and for protection of workers, equipment and finished areas of work and the public.
- .5 Maintain and relocate protection as required until such work is complete.

1.8 ACCESS TO SITE

- .1 Not applicable to this project.

1.9 PUBLIC TRAFFIC FLOW

- .1 Refer also to Section 01 52 30 – “Site Safety Protocol for Occupied Buildings”.
- .2 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.10 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.12 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Consultant locations and installation schedule 5 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work. The General Contractor shall ensure that all cutting and patching responsibilities are coordinated between trades in advance of the Tender submission.
- .2 The responsibilities of this section includes but is not limited to the following item(s), including all related labour and materials necessary to successfully complete the installation of same as detailed on the Drawings.
- .3 The cutting, removal and disposal and patching of gypsum board ceilings or walls or masonry wall sections in all locations to accommodate new or relocated electrical components including light fixtures or controls, other electrical devices and for all mechanical ducts, grilles and diffusers passing through masonry walls or located in walls of any other construction not automatically accommodated in new work by the mason.
- .4 The cutting, removal and patching of all penetrations required for mechanical and electrical services through floors, ceilings and walls.
- .5 The supply and installation of a Portland cement based leveling skim coat as required to provide an acceptable surface for the installation of new VCT tile to any corridors or rooms as described on drawings to receive such flooring.
- .6 All other work not listed in other Sections, but detailed on the Drawings.

1.2 SUBMITTALS

- .1 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Concrete lintel block, concrete block, reinforcing steel and concrete fill for openings if required at new penetrations in walls or steel lintels as may be permitted by consultant.
- .4 Portland Cement based Concrete Patching Compound compatible with all existing flooring types to make good a smooth, suitable surface to accept the direct application of new carpet, VCT or resilient sheet flooring.
- .5 Portland Cement based Concrete for new floor openings or floor leveling, or patching of floor openings.
- .6 All other materials not listed in other Sections, but detailed on the Drawings.

1.4 EXECUTION

- .1 The Trades requiring cuts, holes or sleeves for their work shall locate them.
- .2 Do not cut, drill or sleeve load-bearing members without obtaining prior written approval from the Consultant for each condition.
- .3 Cut holes carefully, leaving holes no longer than required, with clean, true and smooth edges.
- .4 Fit items to the tolerances established by industry 'Best Practice' standard for applicable type of work.
- .5 Make patches undetectable in the finished work. All other work not listed in other Sections, but detailed on the Drawings, is to be done in a professional manner and to the industry 'Best Practice' standard for the described work.
- .6 Execute cutting, fitting, and patching including excavation and fill if required, to complete Work.
- .7 Fit several parts together, to integrate with other Work.
- .8 Uncover Work to install ill-timed Work.
- .9 Remove and replace defective and non-conforming Work.
- .10 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .11 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .12 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

- .13 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .14 Restore work with new products in accordance with requirements of Contract Documents.
- .15 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .16 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.
- .17 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .18 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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.1 SECTION INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

.2 RELATED SECTION

- .1 Section 01 77 00 - Closeout Procedures.
- .2 Section 01 11 00 – Summary of Work.

.3 GENERAL CLEANINESS DURING CONSTRUCTION

- .1 Refer also to Section 01 11 10, item 1.32 'Periodic Cleaning' and coordinate with this Section.
- .2 Burning or burying of rubbish and waste materials on site is not permitted.
- .3 Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- .4 Use cleaning material only on surfaces recommended by cleaning material manufacturer.
- .5 Remove debris, packaging and waste materials on a daily basis.
- .6 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .7 Store volatile wastes in covered metal containers, and remove from premises daily.
- .8 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often if required.
- .9 Prevent accumulation of wastes which create hazardous conditions.
- .10 Provide adequate ventilation during use of volatile or noxious substances.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Provide on-site dump containers for collection of waste materials, and rubbish.
- .13 Remove waste materials, and rubbish from site.
- .14 Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.
- .15 Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

.4 FINAL CLEANING

- .1 At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.
- .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.
- .3 Remove stains, dirt and smudges from finished surfaces.
- .4 Clean wall, ceiling and floor surfaces in accord with respective material manufacturer's recommendations.
- .5 Clean glass, remove stickers and paint; leave glass in spotless, polished condition; use cleaning liquids only.
- .6 Clean and polish hardware.
- .7 Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
- .8 Broom-clean paved surfaces; rake clean other surfaces of grounds.
- .9 Clean exposed ductwork, and structure.
- .10 Replace filters.
- .11 Clean bulbs and lamps and replace those burned out.
- .12 Clean mechanical and electrical fixtures and other fittings of labels, wrappings, paper and other foreign material.
- .13 Clean diffusers and grilles.
- .14 Clean ducts, blowers and coils.
- .15 Clean sinks, faucets, and water closets and controls.
- .16 Remove snow and ice from access to building, if applicable.
- .17 Maintain cleaning until project, or portion thereof, is occupied by Owner.
- .18 Upon completion of project, prior to Total Performance. Remove from site all waste and surplus materials.

Products

.1 NOT USED

- .1 Not Used.

Execution

.1 NOT USED

.1 Not Used.

END OF SECTION

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Part 1 General

1.1 REFERENCES

- .1 Section 01 11 00 - Summary of Work
- .2 CCDC 5B – 2010 and Supplementary Conditions to the CCDC 5B

1.2 INSPECTION AND DECLARATION

- .1 Refer to Section 01 11 00 – Summary of Work, for a detailed list of requirements.
- .2 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .3 Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .4 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by all Authorities Having Jurisdiction have been submitted to the consultants.
 - .5 Operation of systems has been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for final inspection.
- .5 Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Consultant and Contractor If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.
- .6 Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.
- .7 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .8 Final Payment: when Owner and Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed,

make application for final payment. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.

- .9 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2 Stipulated Price Contract – 2008.

.10 CLEANING

- .1 All Cleaning to be in accordance with Section 01 74 11 – Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site immediately following completion of work and prior to final inspection.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 As-built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.
- .7 Final site survey.

1.2 REFERENCE STANDARDS

- .1 Comply with provisions of OAA, OCGA Document No. 100, latest Edition "Take-Over Procedures" except as modified herein or elsewhere in the Contract Documents.
- .2 Section 01 11 00 – Summary of Work, item 1.45 – 'Documents Required at Start, During and at Completion of Work'

1.3 SUBMISSION

- .1 Submit one copy of completed project operation and maintenance volumes and as-built drawings in final form minimum 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after inspection with Consultants' comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Provide 1 hard copy and one digital copy of as-built drawings as follows:
 - .1 For contract drawings (architectural, site services, landscaping, structural, mechanical, and electrical), transfer neatly as-built notations onto a full set of drawings and submit with a corresponding digital set. Cost of only the transfer of these as-built sets into digital format is to be included in the tender price. Completion of digital as-built to the Consultant is a mandatory requirement of Total Completion of the Contract.

- .6 Final Submission Requirements:
 - .1 Once all revisions have been incorporated, submit within 10 days after final inspection:
 - .1 Three (3) hard copies of the revised volumes of the operation and maintenance manuals,
 - .2 1 set of final red line as-built drawings,
 - .3 one digital copy of manuals and as-builts on a data stick;.
 - .7 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
 - .8 If requested, furnish evidence as to type, source and quality of products provided.
 - .9 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
 - .10 Pay costs of transportation.

1.5 **FORMAT**

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf, 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.6 **CONTENTS - EACH VOLUME**

- .1 Table of Contents: provide title of project;
 - .1 date of submission; names,
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 "Typewritten" Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- .6 Title sheet labelled "Operating and Maintenance Data" and listing project name, date, volume number, if applicable and names and addresses of Design-Build Contractor, and consultants.
- .7 List of contents. If more than one volume is required, provide a cross-reference contents page at front of each volume.
- .8 Complete list of subcontractors and suppliers.
- .9 Copy of finish hardware list, complete with all amendments and revisions.
- .10 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose copy of colour schedule.
- .11 Maintenance instructions for all finished surfaces.
- .12 Brochures, cuts of all equipment and fixtures.
- .13 Operating and maintenance instructions for all equipment.
- .14 Valve manual.
- .15 Controls schematics.
- .16 Extended warranties.
- .17 Maintenance contracts.
- .18 Other data required elsewhere in Contract Documents or deemed necessary by Consultant.

1.7 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in Sections 00 21 13 – 'Instructions to Bidders' and 01 11 00 – 'Summary of Work', item 1. 43. maintain at the site for Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.

- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

1.8 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.10 DIGITAL AS-BUILT DRAWINGS

- .1 Retain the services of a CAD drafting company acceptable to the Consultant.
- .2 Transfer to digital file all information recorded on As-Built drawings. Layering of information as per Consultant's instructions.
- .3 The Consultant will provide CAD file of contract documents.
- .4 The cost for preparing digital As-Built drawings will be paid for by the Cash Allowance.
- .5 Refer to item 1.3 for Submission Requirements and ensure to digital set to include:
 - .1 PDF copy of all drawings listed on the Consultants' List of Drawings
 - .2 CAD files of all drawings listed on the List of Drawings broken down into separate folders by discipline (architectural, site, structural, mechanical, electrical)
 - .3 CAD files shall include:
 - .1 All x-refs, objects, blocks and images bonded into the drawings
 - .2 Plot style
 - .3 Room signage (YRDSB room numbers)
 - .4 CAD files to be saved in "*.dwg" format AutoCAD version 2014 or earlier

1.11 EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Mechanical Sections.
- .15 Additional requirements: As specified in individual specification sections.

1.12 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

1.13 MAINTENANCE MATERIALS

- .1 On completion of project, submit to Architect two (2) copies of Operations Data and Maintenance Manual in English, made up as follows:
 - .1 Bind data in vinyl hard covered, 3 ring loose leaf binder for 215 x 280 mm size paper.
 - .2 Enclose title sheet, labeled "Operation Data and Maintenance Manual", project name, date and list of contents.
 - .3 Organize contents into applicable sections of work to parallel project's specification break-down. Mark each section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 Include following information, plus data specified.
 - .1 Maintenance instruction for finished surface and materials.
 - .2 Copy of hardware and paint schedules.
 - .3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
 - .4 Names, addresses and phone numbers of sub-contractors and suppliers.
 - .5 Guarantees, Warranties and bonds showing:

- .1 Name and address of project.
 - .2 Guarantee commencement date (date of Final Certificate of Completion).
 - .3 Duration of guarantee.
 - .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - .5 Signature and seal of Contractor.
 - .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
- .3 Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.
 - .4 Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.
 - .5 Deliver to site, unload and store where directed, maintenance materials as required elsewhere in these Specifications. Obtain receipt from Owner for delivered materials and submit copy of receipt to the Consultant.
 - .6 Package materials so that they are protected from damage and loss of essential properties.
 - .7 Label packaged materials for proper identification of contents.

1.14 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.15 OPERATING INSTRUCTIONS

- .1 At Substantial Performance, at a time acceptable to Owner, but not before operating and maintenance manuals have been reviewed and accepted by the Consultant, instruct Owner's representatives in the operation of all systems and equipment.
- .2 Coordinate training sessions for each type of operating system and equipment with qualified instructors and attendance of relevant subcontractor.

1.16 SUBSTANTIAL PERFORMANCE

- .1 Advise the Consultant in writing when the work has been substantially completed.
- .2 Prior to requesting a Substantial Performance submit the following:
 - .1 Operating and maintenance manuals, per requirements of item 1.3
 - .2 Inspection and acceptance certificates required from regulatory agencies.

- .3 Upon agreement of the Consultant that substantial Performance has been achieved, prepare a complete list of deficiencies and submit list to the consultant.
- .4 Re-issue an updated deficiency list incorporating additional deficiencies identified during the inspection.
- .5 The Owner will take over and occupy the building upon completion, inspection and acceptance of the work.

1.17 FINAL SUBMISSION

- .1 Prior to claiming final payment:
 - .1 Submit record drawings and indicated in item 1.3
 - .2 Submit digital set, hard copy set and three (3) hard copy manuals with the following:
 - .1 Complete set of reviewed shop drawings of mechanical and electrical items, folded to 8 1/2" x 11" size, contained in heavy duty manila envelopes, numbered and labelled. Follow specification format with no more than one Section per envelope.
 - .2 Heating and ventilating systems balancing reports.
 - .3 Replacement materials.
 - .4 Consultant's final deficiency lists.
 - .3 Upon completion of all items noted on the deficiency list, clean all areas, surfaces, and components affected by corrections and completion of deficient items.
 - .4 Confirm by written transmittal that all additional materials (ceiling tiles, floor tiles) have been delivered to the site and identify recipient and date.
 - .5 Ensure that all services, equipment, apparatus are properly tested and adjusted.
 - .6 Deliver replacement materials to a location determined by the Consultant.

1.18 WARRANTIES AND BONDS

- .1 Refer to Section 00 21 13 'Instructions to Bidders' for bonding requirements for this project, both at the time of tender submission and throughout the duration of the construction period.
- .2 Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested as well as Section 01 11 00 article 1.35.
- .3 Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.
- .4 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .5 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 017810 Sample Guarantee/Warranty Form, whenever standard preprinted trade or

manufacturer's Guarantee/Warranty forms are not available. Provide written form for each warranty specified in Section 01 11 00 Summary of Work, Article 1.35.

- .6 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work.
- .7 Date at beginning of time of warranty start shall be Date of Substantial Performance.
- .8 Verify that documents are in proper form, contain full information, and are notarized.
- .9 Co-execute submittals when required.
- .10 Retain warranties and bonds until time specified for submittal.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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1. Completion Instructions

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.
2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.
3. Comply with Requirements for Guarantee/Warranty as specified in Section 017810, Closeout Submittals.

To: Upper Grand District School Board
500 Victoria Road North
Guelph, ON. N1E 6K2

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER Upper Grand District School Board

PROJECT Renovations to _____ Public School 2017

ARCHITECT Hossack & Associates Architects Inc.

REFERENCE (to specifications or drawings)

TIME Period of Guarantee/Warranty: _____ years

GUARANTEE/ Starting Date: Substantial Performance as certified by Architect

WARRANTY

Date: _____

(Description of Guarantee/Warranty)

Upon written notification from the Owner or the Consultant that the above work is defective any repair or replacement work required shall be to the Consultant's satisfaction at no cost to the Owner.

This guarantee shall not apply to defects caused by the work of others, maltreatment of materials, negligence or Acts of God.

SUBCONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

Address:

Telephone Number

CONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

CORPORATE SEAL

Address:

Telephone Number

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

1. Section 01 11 00 - Summary of Work
2. Section 01 73 03 – Execution Requirements (Cutting and Patching)
3. Section 01 33 00 - Submittal Procedures
4. Report and Sections related to Designated Substances Abatement
5. Section 08 11 14- Metal Doors and Frames
6. Section 08 71 15 – Finish Hardware
7. Section 09 91 22- Painting
8. Section 09 21 16- Gypsum Board Assemblies
9. Section 09 51 13- Acoustic Panel Ceilings
10. Section 10 11 25- Manufactured Specialties
11. Mechanical and Electrical Sections

1.2 Scope

1. Scope includes but is not limited to:
 - .1 Demolition or alteration of all structural architectural, mechanical, electrical or site components, equipment, fitments and finishes as required to execute the work.
 - .2 The removal, repair and reinstallation as required to make good of existing interior components as required to connect new work to existing or components to be removed and reinstalled such as walls, ceilings or bulkheads, where required to be removed for routing new services or revising demising walls.
 - .3 Removal and reinstallation as indicated of any existing chalkboards or tackboards or similar fitments or devices, if so identified to remain and be reinstalled.
 - .4 The removal, repair, cleaning and reinstallation as required to make good existing window coverings or curtains where required to be removed and/or relocated and reinstalled.
 - .5 Making good of all finishes to remain as result of selective demolition or removals.

1.3 Existing Conditions

1. Take over structures to be demolished or altered based on their condition on date that tender is accepted, at time of examination prior to tendering.
2. Abatement procedures are anticipated in this contract related to the renovation work. Refer to Designated Substances survey attached for information.

3. Prior to beginning alteration or demolition, confirm with Owner that no items to be salvaged or turned over to the owner remain in the work areas.

1.4 Building and Systems Protection

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
- .2 Take precautions to support structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify Consultant. Refer to Section 01 00 50 for requirements to provide shoring designs and method statements, if applicable to the procedures.
- .3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 Work

- .1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction. Confirm in Divisions 15 and 16 for removal and re-use of mechanical and electrical materials and equipment.
- .2 If so designated by the Owner, carefully remove materials and equipment and store in location designated by Owner.
3. For a scope of work refer to all Drawings and also coordinate items to be altered, re-built, cleaned or otherwise “made good” as a result of the cutting and patching scope of work described in *Section 01 73 03 - Execution Requirements* or other Sections.

3.2 Preparation

- .1 If applicable, disconnect electrical and telephone service lines entering buildings to be demolished in accordance with rules and regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
- .2 If applicable, disconnect and cap designated mechanical services in accordance with requirements of local authority having jurisdiction.
 - .1 Natural gas supply lines, if applicable, to be removed by gas Utility Company’s qualified tradesman in accordance with Utility Company instructions.

- .2 Remove, cap or dispose of other underground services as indicated in drawings.
- .3 Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.
- .3 Prior to cutting, demolition or removal of any slabs on grade or exterior asphalt areas where scans have not been completed and transferred to contract documents, engage a **private locate firm to provide magnetic scans** of all areas involved. This is the responsibility of the General Contract and costs for such scans are to be included in the base contract price.
- .4 Prior to any roofing demolition or new roof work, engage a **private locate firm to provide magnetic scans** of all areas involved. This is the responsibility of the Roofing Contract and costs for such scans are to be included in the base contract price. Also conduct an **infra-red scan** at the direction of the Consultant. Scan to be paid for from Cash Allowance.

3.3 Protection

- .1 Notwithstanding protection requirements of other Sections, protect any existing to remain equipment and lose furniture that cannot be removed from the worksite. Use tarps, floor protection, dust proof covers etc. for the protection of all existing equipment and surfaces which could be contaminated by dust from selective demolition procedures.
- .2 In the case of classroom furniture and equipment, ensure it is grouped into areas where possible and covered by plastic tarps, taped down to form a dustproof seal. In the case of individual pieces of equipment (shop equipment, etc.) similarly protect each piece of equipment.

3.4 Disconnection and Removal of Materials and Equipment

- 1. Contractor shall cooperate with the Owner to determine which materials are to be removed and retained by Owner. The Owner will decide which items or equipment they wish to retain as their property and all other materials shall be removed from the premises by this Contractor. The equipment which is to be retained by the Owner shall be stored on site where directed by the Owner.
- 2. Refer to mechanical and electrical drawings and for disconnection and removal and/or relocated existing electrical, ductwork, piping and/or equipment.
- 3. Refer to Mechanical specifications for reuse existing piping, and/or equipment.

3.5 Temporary Removals and Replacement

- 1. All items to be removed and installed shall be completed so that replaced materials are left in a clean undamaged state. If required to be replaced due to damage, the contractor shall include in his price for the component to be replaced and installed at no additional cost to the Contract.

2. Where the Contractor deems necessary, he shall include in the base Tender amount an amount for the replacement of identical components which may become damaged as a result of mishandling.

3.6 Selective Demolition

1. Note that any Shoring is subject to submission of Shoring Designs and Method Statements as indicated in Section 01 00 50 – Summary of Work. Any shoring required to execute the work, including support for above floor structure as part of demolition of load bearing walls or beams, columns, etc. is part of the Base Bid of the work and included in the Tender Amount.
2. Follow best trade practices for all demolition and alteration work. This includes but is not limited to the following items.
 - .1 Ensure demolition work does not disrupt the ongoing operation of the school. Confirm all demolition work (including potential noise, vibration, tools or equipment noise, etc.) in advance with the principal of the school on a daily basis. Similarly, notify all building occupants in advance at each possible interruption in services or utilities.
 - .2 Protect all areas from damage and intrusion by means of locking rooms under construction when not in use, use of hoarding, signage to be posted at all times.
 - .3 Take precautions to demolish only areas as necessary to complete the work, and avoid damage to adjacent areas. Make good all areas affected by demolition or renovation activities, whether specifically included in the contract documents or not.
 - .4 The Contractor shall be responsible for damage to all areas affected by renovation or alteration activities.
 - .5 Prior to demolition, the Contractor shall carefully examine the drawings in relation to the site conditions, to ensure that all intended work can be carried out without ambiguity. Incorrect demolition of any work by the Contractor, will be back-charged to him. Any discrepancies between the drawings and the site conditions, must be reported to the Consultants immediately.
 - .6 Demolish or remove interior and exterior elements as indicated.
 - .7 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
 - .8 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.
 - .9 Demolish to minimize dusting. Keep dusty materials wetted where practical without damaging existing finishes or equipment.
 - .10 Demolish masonry and concrete walls in small sections. Carefully remove and lower structural framing and other heavy or large objects as required. Where partial walls of

exposed concrete block masonry is to remain, grind all exposed edges to a bullnose and patch as required suitable for final painting.

- .11 Do not sell or burn materials on site.
- .12 Remove contaminated or dangerous materials from site and dispose of in safe manner to minimize danger at site or during disposal, in accordance with all governing legislation.

3.7 Repair to all Finishes and Colours

- 1. Repaint all walls in rooms or areas modified as indicated in the Finish Schedule, or as directed by the Consultant.
- 2. Repair and **make good** all fixtures, finishes, trims and surfaces to all floor, wall and ceiling areas in rooms or areas whether or not they have been modified or affected by the work.
- 3. Existing paint colours are to be matched exactly using computer colour matching.

END OF SECTION

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Part 1 General

1.1 BULK ASBESTOS LAB ANALYSIS & ABATEMENT SPECIFICATIONS

- .1 **Asbestos and Designated Substance Abatement forms part of this Contract** and is to be included in the Tender Amount.
- .2 Refer to the following pages for Bulk Laboratory Asbestos Analysis and key plan diagrams and Specification Sections which contain the **Scope of Work in Contract** pertaining to hazardous materials and Abatement procedures included following this Section. This test reports and the Abatement Sections respectively outline the areas of hazardous materials discovered at this site and procedures for abatement.
- .3 Refer also to **Binder C** – for previous reports conducted by Golder Associates which are provided for information only, or in the event that work to the project requires review of existing conditions that are not contained in the Bulk Sampling tests or scope described in the following Sections.
- .4 The Bulk Asbestos Lab Tests, the Abatement Specifications by Pinchin Ltd. and the contents of Binder C are prepared by consultants engaged directly by the Board and are not sub-consultants engaged by Hossack & Associates.
- .5 Direct any questions regarding clarification regarding Asbestos Abatement procedures to:
Pinchin Ltd.
Attention: Jessica Cozzitorto, Project Manager, Hazardous Materials
Tel: 905.577.6206 ext. 1712
- .6 Refer also to Division 1 and Section 01 35 30 and coordinate with this Section.

Part 2 Products

2.1

1. Refer to Hazardous Building Materials Survey by Pinchin Ltd. enclosed following this page.

Part 3 Execution

- .1 All abatement work described in Contract Documents is to be included in Tender Amount.
- .2 Inspection and Testing will be paid by the Board.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.
- .2 Related Work Specified Elsewhere
Division 13, Section 02 82 11 Asbestos Abatement - Type 2
- .3 The site conditions identify the location and condition of all known asbestos-containing materials (ACM) to be disturbed by the work of this section. The specification fulfils the requirements of the report required by Ontario Regulation 278/05.
- .4 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 Site Conditions and General Precautions

- .1 The following documents are available from the Upper Grand District School Board (UGDSB):
 - .1 Golder Report 06-1135-044, titled “Asbestos Building Materials Survey – Waverly Drive Public School, 140 Waverly Drive, Guelph, Ontario”, dated June 14, 2007.
 - .2 Golder Letter 1546270-L41 titled “2016 Asbestos-Containing Material Visual Reassessment – Waverly Drive Public School, 140 Waverly Drive, Guelph, Ontario”, dated October 14, 2016.
- .2 The following have been provided for reference:
 - .1 SAI Bulk Asbestos Analysis sample results, Analysis ID 1702498_PLM, dated February 10, 2017.
 - .2 SAI Bulk Asbestos Analysis sample results, Analysis ID 1703124_PLM, dated February 20, 2017.
 - .3 SAI Analysis for Lead Concentration in Paint Chips sample results, Analysis ID 1702474_PBP, dated February 10, 2017.
 - .4 Aevitas PCB Certificate of Analysis sample results, 17-0242, dated February 13, 2017.
 - .5 Golder “Sample Location Floor Plan” drawings from Report 06-1135-044, dated June 14, 2007.
- .3 **Asbestos-Containing Materials**
 - .1 Asbestos-containing parging cement insulation, containing chrysotile asbestos (friable and in good condition), is present on pipe fittings within the following locations:
 - .1 Custodial 109 (Golder Location 5)

- .2 Custodial 46 (Golder Location 54)
- .2 Pipes insulated with friable asbestos insulations may be present in inaccessible spaces such as above solid ceilings, in walls, in chases, in column enclosures and within shafts.
- .3 Asbestos-containing gold sink undercoating, containing chrysotile asbestos (non-friable and in good condition), is present in the following locations:
 - .1 Classroom 23 (Golder Location 28)
 - .2 Classroom 24 (Golder Location 42)
 - .3 Classroom 25 (Golder Location 29)
 - .4 Classroom 26 (Golder Location 41)
 - .5 Classroom 30 (Golder Location 38)
 - .6 Classroom 31 (Golder Location 30)
 - .7 Classroom 41 (Golder Location 56)
 - .8 Classroom 42 (Golder Location 49)
 - .9 Classroom 43 (Golder Location 52)
 - .10 Classroom 45 (Golder Location 51)
- .4 Asbestos-containing 9" x 9" vinyl floor tiles (dark blue with white streaks, light blue with white streaks), containing chrysotile asbestos (non-friable and in good condition), with non-asbestos mastic, are present in the following locations:
 - .1 Classroom 6 (Golder Location 12)
 - .2 Classroom 33 (Golder Location 34)
 - .3 Classroom 34 (Golder Location 36)
- .5 Asbestos-containing 9" x 9" white vinyl floor tiles (below carpet), containing chrysotile asbestos (non-friable and in good condition), with associated non-asbestos mastic, are present in the following locations:
 - .1 Library 22 (Golder Location 43)
- .6 Asbestos-containing 12" x 12" vinyl floor tiles (light green with dark green streaks, light grey with dark grey streaks, beige with brown streaks, light brown with white streaks, white with green streaks, beige with dense brown streaks, dark brown with white streaks and grey with white streaks), containing chrysotile asbestos (non-friable and in good condition), with associated non-asbestos mastic, are present in the following locations:
 - .1 Classroom 31 (Golder Location 30)
 - .2 Classroom 32 (Golder Location 37)
 - .3 Classroom 35 (Golder Location 35)
 - .4 Classroom 40 (Golder Location 48)
 - .5 Classroom 41 (Golder Location 56)
 - .6 Classroom 42 (Golder Location 49)
 - .7 Classroom 43 (Golder Location 52)
 - .8 Classroom 44 (Golder Location 50)

- .9 Classroom 45 (Golder Location 51)
- .7 Asbestos-containing vinyl sheet flooring (grey), containing chrysotile asbestos (potentially friable and in good condition), are present in the following locations:
 - .1 Library 20A (Golder Location 43)
 - .2 Office 120 (Golder Location 22)
 - .3 Classroom 23 (Golder Location 28)
 - .4 Classroom 24 (Golder Location 42)
 - .5 Classroom 25 (Golder Location 29)
- .8 Asbestos-containing vinyl sheet flooring (taupe pattern), containing chrysotile asbestos (potentially friable and in good condition), is present in the following locations:
 - .1 Kindergarten 30 Washroom #1 (Golder Location 39)
 - .2 Kindergarten 30 Washroom #2 (Golder Location 40)
- .9 Asbestos-containing wall board (between the window and concrete block wall), containing amosite asbestos (friable and in good condition), is present in the following locations:
 - .1 Girl's Washroom 118 (Golder Location 15)
 - .2 Boy's Washroom 117 (Golder Location 16)
- .10 Asbestos-containing hard grey caulking, containing chrysotile asbestos (non-friable and in good condition), is present around a door on the exterior side of Corridor 13 (Golder Location A).
- .11 Asbestos-containing hard grey caulking, containing chrysotile asbestos (non-friable and in good condition), is present around a door on the exterior side of Kindergarten 30 (Golder Location 38).
- .12 Asbestos-containing hard grey caulking, containing chrysotile asbestos (non-friable and in good condition), is present around the perimeter of the Gym 100 windows (Golder Location 47).
- .13 Asbestos-containing siporex joint compound, containing chrysotile asbestos (non-friable and in good condition), is present within the seams of the deck within the following locations:
 - .1 Girl's Washroom 118 (Golder Location 15)
 - .2 Boy's Washroom 117 (Golder Location 16)
 - .3 Classroom 1 (Golder Location 6)
 - .4 Classroom 2 (Golder Location 14)
 - .5 Classroom 3 (Golder Location 7)
 - .6 Classroom 4 (Golder Location 13)
 - .7 Classroom 5 (Golder Location 8)
 - .8 Classroom 6 (Golder Location 12)
 - .9 Classroom 7 (Golder Location 9)
 - .10 Classroom 8 (Golder Location 11)

- .11 Classroom 9 (Golder Location 9)
- .12 Staff Room 108 (Golder Location 17)
- .14 Asbestos-containing hard white caulking containing chrysotile asbestos (non-friable and in good condition), is present where the window and deck join within the following locations:
 - .1 Classroom 1 (Golder Location 6)
 - .2 Classroom 2 (Golder Location 14)
 - .3 Classroom 3 (Golder Location 7)
 - .4 Classroom 4 (Golder Location 13)
 - .5 Classroom 5 (Golder Location 8)
 - .6 Classroom 6 (Golder Location 12)
 - .7 Classroom 7 (Golder Location 9)
 - .8 Classroom 8 (Golder Location 11)
 - .9 Classroom 9 (Golder Location 9)
 - .10 Staff Room (Golder Location 17)
 - .11 Boy's Washroom (Golder Location 16)
 - .12 Girl's Washroom (Golder Location 15)
 - .13 Principal Office (Golder Location 4)
 - .14 Main Office (Golder Location 1)
- .15 Asbestos-containing textured plaster, containing chrysotile asbestos, is present as a soffit finish on the exterior north and south side of Vestibule 14 (Golder location D).
- .16 Asbestos-containing textured plaster, containing chrysotile asbestos, is present as a wall finish above the door in a Vestibule 14 (Golder Location D).
- .17 Asbestos-containing board (Transite or Marinite) may be present behind radiators throughout the school.
- .18 Non-asbestos materials identified in the Work Area include the following:
 - .1 Drywall joint compound on walls and ceilings.
 - .2 Lay-in acoustic ceiling tiles (24" x 48" Fleck).
 - .3 Vinyl floor tiles (12" x 12" white and beige flakes, 12" x 12" brown with light brown streaks, 12" x 12" white beige and taupe mix, and 9" x 9" brown with white streaks).
 - .4 Grey caulking on roof flashing.
 - .5 Dark brown caulking on roof air handling units.
 - .6 Brown caulking on roof flashing.
 - .7 Dark brown door caulking on exterior side of Main Vestibule.
 - .8 Dark brown door caulking on interior side of Main Vestibule.
 - .9 Light brown caulking on exterior side of Stairwell door (Golder Location I).

- .10 Soft grey caulking on exterior side of Classroom windows.
- .11 Soft white caulking around radiator in Classroom 8 (Golder Location 11).
- .12 Tan door caulking within Vestibule (Golder Location D).
- .13 Hard light brown door caulking within Vestibule (Golder Location D).
- .14 Hard white door caulking within Vestibule (Golder Location D).
- .15 Soft grey caulking around radiators within Boy's and Girl's Washroom (Golder Location 15 and 16).
- .16 Hard grey caulking on interior side of door within side exit of Corridor (Golder Location A).
- .17 Soft grey caulking on the vertical seams of the Gym windows (Golder Location 47).
- .18 Soft white caulking on interior side of Gym exit door (Golder Location 47).
- .19 Grey mastic on seams of ductwork.
- .20 Cellulose drain line within Custodial Room (Golder Location 54).
- .21 Mastic associated with 9"x 9" light blue with white streaks vinyl floor tile within Classrooms 33 and 34 (Golder Locations 34 and 36).
- .22 Fibreglass pipe insulation throughout the Work Areas.
- .23 Vermiculite insulation was not observed within the masonry block walls.
- .19 Roofing felts are presumed to contain asbestos.
- .20 Where present, the following materials must be presumed to be an asbestos-containing material and are best sampled prior to disturbance:
 - .1 Concrete floor levelling compound
 - .2 Electrical components within electrical disconnects
 - .3 Mechanical gaskets
 - .4 Fire resistant doors or metal clad finishes

.4 Lead

- .1 Lead-containing paint (>0.1%) is present in the following locations within the Work Area:
 - .1 Interior (brown paint on Classroom doors)
- .2 For paints identified as having elevated levels of lead (i.e., greater than the EACO guideline of 0.1% for lead-containing paints), construction disturbance may result in over-exposure to lead dust or fumes. Follow the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair (October 2014) during disturbance of paint.
- .3 Special precautions are not required unless aggressive disturbance (grinding, blasting, torching) is planned of paints in the renovation areas that contain low

levels of lead (i.e., less than the EACO guideline of 0.1% for lead-containing paints).

- .4 Lead-containing batteries are present in emergency lighting.
- .5 Lead wool or lead caulking may be present in bell and spigot fittings on cast iron pipes in the Work Areas.
- .6 Lead is presumed present in electrical components, including wiring connectors, grounding conductors, and solder.
- .7 Lead-containing items should be recycled when taken out of service or prior to demolition.

.5 Silica

- .1 Free crystalline silica is present in concrete, mortar, brick, masonry, ceramic tiles and plaster throughout the Work Area.
- .2 Construction disturbance of silica-containing products may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with provincial standards or guidelines.
 - .1 Silica work to be completed in accordance with the Ontario Ministry of Labour Guideline: Silica on Construction Projects, September 2004 (revised 2011).

.6 Mercury

- .1 Mercury vapour is present in fluorescent and compact fluorescent lamps where present in the Work Areas.
- .2 Do not break lamps. Recycle fluorescent lamps when taken out of service.

.7 Polychlorinated Biphenyls (PCBs)

- .1 Non-PCB caulking is present at exterior door frames, window frames, and expansion joints on the exterior of the building.
- .2 When light fixtures are removed, examine light ballasts for PCB content. If ballasts are not clearly labelled as “non-PCB”, or are suspected to contain PCBs; package and ship ballasts for destruction at a federally permitted facility.
- .3 All transformers in the renovation areas are dry type transformers and do not contain PCB-containing dielectric fluids.

.8 Remaining Designated Substances

- .1 Remaining designated substances including Arsenic, Acrylonitrile, Benzene, coke oven emissions, ethylene oxide, isocyanates, vinyl chloride monomer, are not typically found in building materials in a composition/state that is hazardous and are not presumed to be present.

1.3 Outline of Work

- .1 Refer to the contract drawings for the extent of the renovation work.

- .2 Quantities provided in the specifications are approximate, it is the contractor's responsibility to confirm all quantities provided and to verify all site conditions.
- .3 Coordinate the following items with the Construction Manager, which are to be included in the lump sum bid of the Abatement Contractor, including but not limited to: electrical isolations, GFI connection, water connections, hoarding walls, bin placement, hours of work, schedule, etc.
- .4 Use Type 1 procedures to remove and dispose of the following:
 - .1 Grey caulking from the following locations:
 - .1 Exterior door of Corridor 13 - Golder Location A (25 linear feet (LF)).
 - .2 Grey caulking around the perimeter of Gym 100 windows - Golder location 47 (150 LF).
 - .3 Exterior side of the Kindergarten 30 door - Golder Location 38 (20 LF).
 - .2 Siporex joint compound at the seams of the deck within the following locations:
 - .1 Classroom 1 - Golder Location 6 (28 LF)
 - .2 Classroom 2 - Golder Location 14 (28 LF)
 - .3 Classroom 3 - Golder Location 7 (30 LF)
 - .4 Classroom 4 - Golder Location 13 (30 LF)
 - .5 Classroom 5 - Golder Location 8 (30 LF)
 - .6 Classroom 6 - Golder Location 12 (30 LF)
 - .7 Classroom 7 - Golder Location 9 (43 LF)
 - .8 Classroom 8 - Golder Location 11 (36 LF)
 - .9 Classroom 9 - Golder Location 9 (20 LF)
 - .10 Storage - Golder Location 9 (10 LF)
 - .3 Hard white caulking at the window and deck join within the following locations:
 - .1 Classroom 1 - Golder Location 6 (28 LF)
 - .2 Classroom 2 - Golder Location 14 (28 LF)
 - .3 Classroom 3 - Golder Location 7 (30 LF)
 - .4 Classroom 4 - Golder Location 13 (30 LF)
 - .5 Classroom 5 - Golder Location 8 (30 LF)
 - .6 Classroom 6 - Golder Location 12 (30 LF)
 - .7 Classroom 7 - Golder Location 9 (43 LF)
 - .8 Classroom 8 - Golder Location 11 (36 LF)
 - .9 Classroom 9 - Golder Location 9 (20 LF)
 - .10 Storage - Golder Location 9 (10 LF)
 - .4 Vinyl floor tiles (9" x 9") in the following areas:
 - .1 Classroom 6 – Golder Location 12 (700 square feet (SF)).
 - .2 Library 22 - Golder Location 43 (750 SF)
 - .3 Classroom 33 - Golder Location 34 (810 SF)

- .4 Classroom 34 - Golder Location 36 (810 SF)
- .5 Vinyl floor tiles (12" x 12") in the following areas:
 - .1 Classroom 31 - Golder Location 30 (805 SF)
 - .2 Classroom 35 - Golder Location 35 (805 SF)
 - .3 Classroom 32 - Golder Location 37 (805 SF)
 - .4 Classroom 40 - Golder Location 48 (830 SF)
 - .5 Classroom 41 - Golder Location 56 (830 SF)
 - .6 Classroom 42 - Golder Location 49 (830 SF)
 - .7 Classroom 43 - Golder Location 52 (830 SF)
 - .8 Classroom 44 - Golder Location 50 (830 SF)
 - .9 Classroom 45 - Golder Location 51 (830 SF)
- .6 Sinks with gold undercoating from the following locations:
 - .1 Classroom 30 - Golder Location 38 (1 sink)
 - .2 Classroom 31 - Golder Location 30 (1 sink)
 - .3 Classroom 41 (Golder Location 56) (1 sink)
 - .4 Classroom 42 - Golder Location 49 (1 sink)
 - .5 Classroom 43 - Golder Location 52 (1 sink)
 - .6 Classroom 45 - Golder Location 51 (1 sink)

1.4 Schedule

- .1 Coordinate all work with the Construction Manager.
 - .1 A schedule is to be provided to the Construction Manager.
 - .1 The Construction Manager will provide advance notice to the UGDSB who will inform the school administration when work will be performed.
- .2 Perform the following work during Quiet Hours:
 - .1 Waste transfer.

1.5 Definitions

- .1 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .2 Asbestos Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.
- .4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.
- .5 Asbestos Work Area: Area where work takes place which will, or may, disturb ACM.

- .6 Authorized Visitors: Prime Contractor, Building Owner or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.
- .7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.
- .8 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.
- .9 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .10 PCM: Phase Contrast Microscopy.
- .11 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.
- .12 Occupied Area: Any area of the building outside the Asbestos Work Area.
- .13 Personnel: All contractor's employees, sub-contractors employees, supervisors.
- .14 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .15 TEM: Transmission Electron Microscopy.

1.6 Submittals

- .1 Submit prior to starting work:
 - .1 Workplace Safety and Insurance Board Clearance Certificate.
 - .2 Insurance certificates.
 - .3 Copy of Company Health and Safety Policy and applicable Programs.
 - .4 Copy of Certificate of Approval for transportation of asbestos waste and location of landfill.
 - .5 Pre-removal survey of damage in all areas where asbestos abatement will take place or waste will be transported.
- .2 Submit the following information regarding personnel prior to starting work:
 - .1 Resumes of the supervisory personnel.
 - .2 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal (2 day minimum duration) or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.
 - .3 WHMIS training certificates for all personnel.

- .4 Written statement that personnel have had instruction on hazards of asbestos exposure, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.
- .5 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
- .3 Submit performance data on HEPA filtered vacuums including HEPA challenge integrity leak tests no more than 3 months old prior to isolating the work area or commencing asbestos abatement.
- .4 Submit the following prior to isolating the work area:
 - .1 Written statement that the Ground Fault Interrupter Panels use CSA approved parts and have been inspected by the Electrical Safety Authority.
 - .2 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.
- .5 Submit the following upon completion of the work.
 - .1 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.7 Regulations

- .1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed. Regulations include but are not limited to the following:
- .2 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.
- .3 Ministry of Transportation Regulations for the transport of asbestos waste, including the Transportation of Dangerous Goods Act.
- .4 Ministry of the Environment Regulations for the disposal of asbestos waste, including R.R.O. 1990, Reg. 347 as amended.

1.8 Supervision

- .1 Provide a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.
- .2 The supervisor must be on site at all times during work at risk of disturbing ACM. Failure to comply with this requirement may result in a stoppage of work, at no cost to the Owner.

1.9 Quality Assurance

- .1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.

- .2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.
- .3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.
- .4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.10 Notification

- .1 Notify Sanitary Landfill site as per Ontario Regulation 347 as amended.
- .2 Inform all sub trades of the presence of ACM identified in the contract documents.
- .3 Notify the Owner or Owners Representative, the Joint Occupational Health and Safety Committee and the Ontario Ministry of Labour, as required by Regulation 278/05, if friable materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.11 Insurance

- .1 Maintain a Commercial General Liability Policy with an insurance company acceptable to the Construction Manager. The intent of this policy is to hold the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to the Construction Manager. The intent of these policies is to hold the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.
- .3 Maintain a Pollution Liability Policy (or asbestos liability policy or specific coverage under the CGL for asbestos abatement) with an insurance company acceptable to the Construction Manager. The intent of this policy is to hold the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of asbestos abatement and shall not contain any environmental

and/or health hazard exclusions relating to remediation operations including asbestos abatement.

- .4 Forward all certificates to the Construction Manager before work is commenced, showing the Construction Manager as additional insured as their interest may appear.
- .5 The limits will not be less than:
 - .1 Commercial General Liability \$5,000,000.00
 - .2 Automobile \$2,000,000.00
 - .3 Pollution Policy (Asbestos Liability) \$5,000,000.00

1.12 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of asbestos.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section.
- .2 Instruction and training must be provided by a competent person.

1.13 Personal Protection

- .1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.
- .2 Respirators shall be:
 - .1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
 - .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.
 - .3 Assigned to a worker for their exclusive use.
 - .4 Maintained in accordance with manufacturer's specifications.
 - .5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
 - .6 Repaired or have damaged or deteriorated parts replaced.
 - .7 Stored in a clean and sanitary location.
 - .8 Provided with new filters as necessary, according to manufacturer's instructions.

- .3 Personnel must have respirators fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.
 - .1 Personnel shall wear and use the respirator provided.
- .4 As per the requirements of Regulation 278/05, when requested by personnel, provide protective clothing which:
 - .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.
 - .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
 - .3 Is replaced or repaired if torn or ripped.
- .5 Decontaminate clothing or protective clothing by using a HEPA Vacuum, or by damp wiping prior to leaving the Asbestos Work Area:
 - .1 Dispose of as ACM.
- .6 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Asbestos Work Area.
- .7 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area.
- .8 Use hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.14 Authorized Visitor Protection

- .1 Provide clean protective clothing and equipment, and approved respirators to Authorized Visitors.
- .2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.15 Air Monitoring

- .1 Air monitoring may be performed following the National Institute for Occupational Safety and Health method 7400, Asbestos and other fibres by PCM (Phase Contrast Microscopy).
- .2 Co-operate with the Asbestos Abatement Consultant in collection of air samples, including providing workers to wear sampling pumps for up to full-shift periods. Asbestos Abatement Contractor to exercise care with Asbestos Abatement Consultant's equipment.
- .3 Results of air monitoring of 0.05 fibres per millilitre of air (fibre/mL) or greater, outside of Asbestos Work Area, will indicate asbestos contamination of these areas and result in the following actions:
 - .1 Suspend Work within the adjoining Asbestos Work Area until written authorization to resume Work has been received from the Asbestos Abatement Consultant.

- .2 Isolate and clean area in the same manner applicable to the Asbestos Work Area.
- .3 Maintain Work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

1.16 Inspection

- .1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant may be present periodically on site both inside and outside the Asbestos Work Area.
- .2 Inspection of the Asbestos Work Area will be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the contract documents and governing authorities. Any deviations from these requirements, which have not been approved in writing, may result in a stoppage of work at no additional cost to the Owner.
- .3 If the Asbestos Work Area is found unacceptable by the standards specified or required by governing authorities, the remedial work required to meet these standards and obtain consent to proceed from the Asbestos Abatement Consultant, shall be performed at no additional cost to the Owner.
- .4 The following Milestone Inspections may take place, at the Owner's cost:
 - .1 Milestone Inspection A - Clean Site Preparation
 - .1 Inspection of preparations and set-up prior to contaminated work in the Asbestos Work Area.
 - .2 Milestone Inspection D - Visual Clearance
 - .1 Inspection of Asbestos Work Area after removal of all asbestos, but prior to application of lock-down agent.
- .5 The Asbestos Abatement Consultant is empowered by the Owner to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.
- .2 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .3 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.
- .4 Asbestos Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment comprised of one of the following:
 - .1 A 6 mil (0.15 mm) labelled yellow sealed polyethylene bag, inside a second clear 6 mil (0.15 mm) sealed polyethylene bag.

- .2 A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation and disposal.
- .3 Labelled containers as required by the Ontario Ministry of the Environment Reg. 347 as amended and Regulation 278/05.
- .5 Ground Fault Panel: Electrical panel as follows:
 - .1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.
 - .2 Interrupters to have a 5 mA ground fault protection.
 - .3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.
 - .4 Openings sealed to prevent moisture or dust penetration.
 - .5 Inspected by the Electrical Safety Authority.
 - .6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.
- .6 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.
- .7 Hose: Leak-proof, minimum bursting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.
- .8 OSB: Oriented Strand Board.
- .9 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.
- .10 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .11 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck. Acceptable materials: Dupont Tyvek or Kimberly Clark Kleenguard.
- .12 Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.
- .13 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

- .14 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .15 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 Signage

- .1 Work Area Signs: Post signs in both official languages at access points to the Asbestos Work Area and on hoarding walls as follows:
 - .1 CAUTION.
 - .2 Asbestos Dust Hazard Area.
 - .3 Unauthorized Entry Prohibited.
 - .4 Wear Assigned Protective Equipment.
 - .5 Breathing Asbestos Dust May Cause Serious Bodily Harm.
- .2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful To Your Health
 - .4 Wear Approved Protective Equipment.
- .3 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Perform pre-removal damage survey and submit to Asbestos Abatement Consultant.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Install polyethylene drop sheets below areas of work.
- .5 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .6 Isolate, at panel, and disconnect existing power supply to Asbestos Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.

- .2 Mark/tag any items within or passing through the Asbestos Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .7 Install polyethylene sheeting over openings in ducts and diffusers and seal.
- .8 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).
- .9 Provide power from ground fault interrupt circuits as follows:
 - .1 Use CSA approved ground fault interrupt outlets outside the Asbestos Work Area to provide power to equipment within the enclosure.
 - .2 All electrical equipment used during work shall be supplied power from a Ground Fault Panel.

3.2 Maintenance of Asbestos Work Area

- .1 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Asbestos Work Area.
- .2 Maintain Asbestos Work Area in tidy condition.
- .3 Remove any standing water at the end of every shift.
- .4 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Asbestos Work Area at end of shift.

3.3 Asbestos Removal - General

- .1 Do not use powered tools or non-hand held tools.
- .2 Do not use compressed air to clean or remove dust or debris.
- .3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.
- .4 Wet ACM prior to work and keep ACM wet throughout the removal process.
- .5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .6 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

- .1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.
- .2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.
- .3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.

- .4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.
- .5 Use a hot air gun where deposits are heavy or difficult to scrape.
- .6 Deposit scrapings into asbestos waste disposal bag.
- .7 HEPA vacuum floor on completion of work in area.

3.5 Asbestos Removal - Removal of Other Non-Friable Asbestos Materials

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.6 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving. Coordinate location of the bin with Construction Manager.
- .2 All bins must be locked and covered when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.
- .4 Clean and wash equipment prior to removal from Asbestos Work Area if removed prior to completion.
- .5 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.
- .6 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Asbestos Work Area to waste bin.
- .7 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.
- .8 Removal of waste containers and decontaminated tools and materials from the Asbestos Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of the non-porous or sealable item being removed from the Asbestos Work Area. If the item can be cleaned, remove it from the site. If it cannot be cleaned thoroughly, place it in an Asbestos Waste Container.
 - .2 Place waste or item in Asbestos Waste Container and seal closed.
 - .3 Wet wipe outside of Asbestos Waste Container.
 - .4 At entrance to Asbestos Work Area, place in second Asbestos Waste Container. Seal closed.

- .5 Remove the item from the Asbestos Work Area.
- .9 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .10 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.
- .11 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the Owner's operations.
- .12 Transport asbestos contaminated waste to landfill licensed by Ontario Ministry of the Environment.
- .13 Co-operate with Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

3.7 Asbestos Work Area Dismantling

- .1 Wash or HEPA vacuum equipment used in Asbestos Work Area, seal vacuum hoses and fittings.
- .2 Place tools and equipment used in contaminated work site but not cleaned in 6 mil polyethylene bags prior to removal from Asbestos Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Remove seals, tape, signage etc.
- .5 Seal openings in HEPA vacuums.
- .6 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.8 Re-Establishment of Items

- .1 Upon completion of work:
 - .1 Remove tags and locks from electrical panels and re-energize equipment and items.
 - .2 Clean, mop and vacuum Asbestos Work Area.
 - .3 Enable building air handling systems.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.
- .1 Related Work Specified Elsewhere
Division 13, Section 02 82 10 Asbestos Abatement - Type 1
- .2 The site conditions identify the location and condition of all known asbestos-containing materials (ACM) to be disturbed by the work of this contract. The specification fulfils the requirements of the report required by O.Reg. 278/05.
- .3 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM included in work of this section and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 Site Conditions and General Precautions

- .1 The following documents are available from the Upper Grand District School Board (UGDSB):
 - .1 Golder Report 06-1135-044, titled “Asbestos Building Materials Survey – Waverly Drive Public School, 140 Waverly Drive, Guelph, Ontario”, dated June 14, 2007.
 - .2 Golder Letter 1546270-L41 titled “2016 Asbestos-Containing Material Visual Reassessment – Waverly Drive Public School, 140 Waverly Drive, Guelph, Ontario”, dated October 14, 2016.
- .2 The following have been provided for reference:
 - .1 SAI Bulk Asbestos Analysis sample results, Analysis ID 1702498_PLM, dated February 10, 2017.
 - .2 SAI Bulk Asbestos Analysis sample results, Analysis ID 1703124_PLM, dated February 20, 2017.
 - .3 SAI Analysis for Lead Concentration in Paint Chips sample results, Analysis ID 1702474_PBP, dated February 10, 2017.
 - .4 Aevitas PCB Certificate of Analysis sample results, 17-0242, dated February 13, 2017.
 - .5 Golder “Sample Location Floor Plan” drawings from Report 06-1135-044, dated June 14, 2007.
- .3 **Asbestos-Containing Materials**
 - .1 Asbestos-containing paring cement insulation, containing chrysotile asbestos (friable and in good condition), is present on pipe fittings within the following locations:
 - .1 Custodial 109 (Golder Location 5)

- .2 Custodial 46 (Golder Location 54)
- .2 Pipes insulated with friable asbestos insulations may be present in inaccessible spaces such as above solid ceilings, in walls, in chases, in column enclosures and within shafts.
- .3 Asbestos-containing gold sink undercoating, containing chrysotile asbestos (non-friable and in good condition), is present in the following locations:
 - .1 Classroom 23 (Golder Location 28)
 - .2 Classroom 24 (Golder Location 42)
 - .3 Classroom 25 (Golder Location 29)
 - .4 Classroom 26 (Golder Location 41)
 - .5 Classroom 30 (Golder Location 38)
 - .6 Classroom 31 (Golder Location 30)
 - .7 Classroom 41 (Golder Location 56)
 - .8 Classroom 42 (Golder Location 49)
 - .9 Classroom 43 (Golder Location 52)
 - .10 Classroom 45 (Golder Location 51)
- .4 Asbestos-containing 9" x 9" vinyl floor tiles (dark blue with white streaks, light blue with white streaks), containing chrysotile asbestos (non-friable and in good condition), with non-asbestos mastic, are present in the following locations:
 - .1 Classroom 6 (Golder Location 12)
 - .2 Classroom 33 (Golder Location 34)
 - .3 Classroom 34 (Golder Location 36)
- .5 Asbestos-containing 9" x 9" white vinyl floor tiles (below carpet), containing chrysotile asbestos (non-friable and in good condition), with associated non-asbestos mastic, are present in the following locations:
 - .1 Library 22 (Golder Location 43)
- .6 Asbestos-containing 12" x 12" vinyl floor tiles (light green with dark green streaks, light grey with dark grey streaks, beige with brown streaks, light brown with white streaks, white with green streaks, beige with dense brown streaks, dark brown with white streaks and grey with white streaks), containing chrysotile asbestos (non-friable and in good condition), with associated non-asbestos mastic, are present in the following locations:
 - .1 Classroom 31 (Golder Location 30)
 - .2 Classroom 32 (Golder Location 37)
 - .3 Classroom 35 (Golder Location 35)
 - .4 Classroom 40 (Golder Location 48)
 - .5 Classroom 41 (Golder Location 56)
 - .6 Classroom 42 (Golder Location 49)
 - .7 Classroom 43 (Golder Location 52)
 - .8 Classroom 44 (Golder Location 50)

- .9 Classroom 45 (Golder Location 51)
- .7 Asbestos-containing vinyl sheet flooring (grey), containing chrysotile asbestos (potentially friable and in good condition), are present in the following locations:
 - .1 Library 20A (Golder Location 43)
 - .2 Office 120 (Golder Location 22)
 - .3 Classroom 23 (Golder Location 28)
 - .4 Classroom 24 (Golder Location 42)
 - .5 Classroom 25 (Golder Location 29)
- .8 Asbestos-containing vinyl sheet flooring (taupe pattern), containing chrysotile asbestos (potentially friable and in good condition), is present in the following locations:
 - .1 Kindergarten 30 Washroom #1 (Golder Location 39)
 - .2 Kindergarten 30 Washroom #2 (Golder Location 40)
- .9 Asbestos-containing wall board (between the window and concrete block wall), containing amosite asbestos (friable and in good condition), is present in the following locations:
 - .1 Girl's Washroom 118 (Golder Location 15)
 - .2 Boy's Washroom 117 (Golder Location 16)
- .10 Asbestos-containing hard grey caulking, containing chrysotile asbestos (non-friable and in good condition), is present around a door on the exterior side of Corridor 13 (Golder Location A).
- .11 Asbestos-containing hard grey caulking, containing chrysotile asbestos (non-friable and in good condition), is present around a door on the exterior side of Kindergarten 30 (Golder Location 38).
- .12 Asbestos-containing hard grey caulking, containing chrysotile asbestos (non-friable and in good condition), is present around the perimeter of the Gym 100 windows (Golder Location 47).
- .13 Asbestos-containing siporex joint compound, containing chrysotile asbestos (non-friable and in good condition), is present within the seams of the deck within the following locations:
 - .1 Girl's Washroom 118 (Golder Location 15)
 - .2 Boy's Washroom 117 (Golder Location 16)
 - .3 Classroom 1 (Golder Location 6)
 - .4 Classroom 2 (Golder Location 14)
 - .5 Classroom 3 (Golder Location 7)
 - .6 Classroom 4 (Golder Location 13)
 - .7 Classroom 5 (Golder Location 8)
 - .8 Classroom 6 (Golder Location 12)
 - .9 Classroom 7 (Golder Location 9)
 - .10 Classroom 8 (Golder Location 11)

- .11 Classroom 9 (Golder Location 9)
- .12 Staff Room 108 (Golder Location 17)
- .14 Asbestos-containing hard white caulking containing chrysotile asbestos (non-friable and in good condition), is present where the window and deck join within the following locations:
 - .1 Classroom 1 (Golder Location 6)
 - .2 Classroom 2 (Golder Location 14)
 - .3 Classroom 3 (Golder Location 7)
 - .4 Classroom 4 (Golder Location 13)
 - .5 Classroom 5 (Golder Location 8)
 - .6 Classroom 6 (Golder Location 12)
 - .7 Classroom 7 (Golder Location 9)
 - .8 Classroom 8 (Golder Location 11)
 - .9 Classroom 9 (Golder Location 9)
 - .10 Staff Room (Golder Location 17)
 - .11 Boy's Washroom (Golder Location 16)
 - .12 Girl's Washroom (Golder Location 15)
 - .13 Principal Office (Golder Location 4)
 - .14 Main Office (Golder Location 1)
- .15 Asbestos-containing textured plaster, containing chrysotile asbestos, is present as a soffit finish on the exterior north and south side of Vestibule 14 (Golder location D).
- .16 Asbestos-containing textured plaster, containing chrysotile asbestos, is present as a wall finish above the door in a Vestibule 14 (Golder Location D).
- .17 Asbestos-containing board (Transite or Marinite) may be present behind radiators throughout the school.
- .18 Non-asbestos materials identified in the Work Area include the following:
 - .1 Drywall joint compound on walls and ceilings.
 - .2 Lay-in acoustic ceiling tiles (24" x 48" Fleck).
 - .3 Vinyl floor tiles (12" x 12" white and beige flakes, 12" x 12" brown with light brown streaks, 12" x 12" white beige and taupe mix, and 9" x 9" brown with white streaks).
 - .4 Grey caulking on roof flashing.
 - .5 Dark brown caulking on roof air handling units.
 - .6 Brown caulking on roof flashing.
 - .7 Dark brown door caulking on exterior side of Main Vestibule.
 - .8 Dark brown door caulking on interior side of Main Vestibule.
 - .9 Light brown caulking on exterior side of Stairwell door (Golder Location I).

- .10 Soft grey caulking on exterior side of Classroom windows.
- .11 Soft white caulking around radiator in Classroom 8 (Golder Location 11).
- .12 Tan door caulking within Vestibule (Golder Location D).
- .13 Hard light brown door caulking within Vestibule (Golder Location D).
- .14 Hard white door caulking within Vestibule (Golder Location D).
- .15 Soft grey caulking around radiators within Boy's and Girl's Washroom (Golder Location 15 and 16).
- .16 Hard grey caulking on interior side of door within side exit of Corridor (Golder Location A).
- .17 Soft grey caulking on the vertical seams of the Gym windows (Golder Location 47).
- .18 Soft white caulking on interior side of Gym exit door (Golder Location 47).
- .19 Grey mastic on seams of ductwork.
- .20 Cellulose drain line within Custodial Room (Golder Location 54).
- .21 Mastic associated with 9"x 9" light blue with white streaks vinyl floor tile within Classrooms 33 and 34 (Golder Locations 34 and 36).
- .22 Fibreglass pipe insulation throughout the Work Areas.
- .23 Vermiculite insulation was not observed within the masonry block walls.
- .19 Roofing felts are presumed to contain asbestos.
- .20 Where present, the following materials must be presumed to be an asbestos-containing material and are best sampled prior to disturbance:
 - .1 Concrete floor levelling compound
 - .2 Electrical components within electrical disconnects
 - .3 Mechanical gaskets
 - .4 Fire resistant doors or metal clad finishes

.4 Lead

- .1 Lead-containing paint (>0.1%) is present in the following locations within the Work Area:
 - .1 Interior (brown paint on Classroom doors)
- .2 For paints identified as having elevated levels of lead (i.e., greater than the EACO guideline of 0.1% for lead-containing paints), construction disturbance may result in over-exposure to lead dust or fumes. Follow the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair (October 2014) during disturbance of paint.
- .3 Special precautions are not required unless aggressive disturbance (grinding, blasting, torching) is planned of paints in the renovation areas that contain low

levels of lead (i.e., less than the EACO guideline of 0.1% for lead-containing paints).

- .4 Lead-containing batteries are present in emergency lighting.
- .5 Lead wool or lead caulking may be present in bell and spigot fittings on cast iron pipes in the Work Areas.
- .6 Lead is presumed present in electrical components, including wiring connectors, grounding conductors, and solder.
- .7 Lead-containing items should be recycled when taken out of service or prior to demolition.

.5 Silica

- .1 Free crystalline silica is present in concrete, mortar, brick, masonry, ceramic tiles and plaster throughout the Work Area.
- .2 Construction disturbance of silica-containing products may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with provincial standards or guidelines.
 - .1 Silica work to be completed in accordance with the Ontario Ministry of Labour Guideline: Silica on Construction Projects, September 2004 (revised 2011).

.6 Mercury

- .1 Mercury vapour is present in fluorescent and compact fluorescent lamps where present in the Work Areas.
- .2 Do not break lamps. Recycle fluorescent lamps when taken out of service.

.7 Polychlorinated Biphenyls (PCBs)

- .1 Non-PCB caulking is present at exterior door frames, window frames, and expansion joints on the exterior of the building.
- .2 When light fixtures are removed, examine light ballasts for PCB content. If ballasts are not clearly labelled as “non-PCB”, or are suspected to contain PCBs; package and ship ballasts for destruction at a federally permitted facility.
- .3 All transformers in the renovation areas are dry type transformers and do not contain PCB-containing dielectric fluids.

.8 Remaining Designated Substances

- .1 Remaining designated substances including Arsenic, Acrylonitrile, Benzene, coke oven emissions, ethylene oxide, isocyanates, vinyl chloride monomer, are not typically found in building materials in a composition/state that is hazardous and are not presumed to be present.

1.3 Outline of Work

- .1 Refer to the contract drawings for the extent of the renovation work.

- .2 Quantities provided in the specifications are approximate, it is the contractor's responsibility to confirm all quantities provided and to verify all site conditions.
- .3 Coordinate the following items with the Construction Manager, which are to be included in the lump sum bid of the Abatement Contractor, including but not limited to: electrical isolations, GFI connection, water connections, bin placement, hours of work, schedule, etc.
- .4 Using Type 2 procedures of this section, remove and dispose of the following:
 - .1 Vinyl sheet flooring from the following locations:
 - .1 Library 20A - Golder Location 43 (920 SF)
 - .2 Office 120 - Golder Location 22 (250 SF)
 - .3 Classroom 23 - Golder Location 28 (10 SF)
 - .4 Classroom 24 - Golder Location 42 (10 SF)
 - .5 Classroom 25 - Golder Location 29 (10 SF)
 - .6 Kindergarten 30 Washroom #1 - Golder Location 39 (25 SF)
 - .7 Kindergarten 30 Washroom #2 - Golder Location 40 (25 SF)
 - .2 Wall board (between window and concrete block wall) in the following locations:
 - .1 Girl's Washroom 118 (Golder Location 15) (10 SF)
 - .2 Boy's Washroom 117 (Golder Location 16) (5 SF)
- .5 Using Type 2 procedures of this section, remove light fixtures from the north and south exterior soffit overhangs in Vestibule 14 – Golder location D (2 light fixtures).
 - .1 Electrical isolation to be completed by the General Contractor.

1.4 Schedule

- .1 Coordinate all work with the Construction Manager.
 - .1 A schedule is to be provided to the Construction Manager.
 - .1 The Construction Manager will provide advance notice to the UGDSB who will inform the school administration when work will be performed.
- .2 Perform the following work during Quiet Hours:
 - .1 Waste transfer.

1.5 Definitions

- .1 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .2 Asbestos Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.

- .4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.
- .5 Asbestos Work Area: Area where work takes place which will, or may, disturb ACM.
- .6 Authorized Visitors: Prime Contractor, Building Owner or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.
- .7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.
- .8 DOP Testing (or HEPA Integrity Test): Testing performed on HEPA Filtered Negative Pressure Machines and HEPA vacuums using DOP or equivalent. Testing shall ensure that total penetration from the unit does not exceed 0.03%, or 99.97% efficient of airborne particulate removal. DOP Testing must be in compliance with ASME N510-1989 (1995) and must be performed using a Temporary Mixing Chamber with installed baffles to allow uniform mixing of challenge aerosol.
- .9 Fitting: Section of pipe other than straight uninterrupted sections including elbows, valves, tees, hangers, nipples, union or ends.
- .10 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.
- .11 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .12 PCM: Phase Contrast Microscopy.
- .13 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.
- .14 Occupied Area: Any area of the building outside the Asbestos Work Area.
- .15 Personnel: All contractors' employees, sub-contractors employees, supervisors.
- .16 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .17 TEM: Transmission Electron Microscopy.

1.6 Submittals

- .1 Submit prior to starting work:
 - .1 Schedule.
 - .2 Workplace Safety and Insurance Board Clearance Certificate.
 - .3 Insurance certificates.
 - .4 Copy of Company Health and Safety Policy and applicable programs.

- .5 Ministry of Labour Notice of Project form.
- .6 Copy of Certificate of Approval for disposal of asbestos waste and location of landfill.
- .7 Pre-removal survey of damage in all areas where asbestos abatement will take place or waste will be transported.
- .2 Submit the following information regarding personnel prior to starting work:
 - .1 Resumes of the supervisory personnel.
 - .2 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal (2 day minimum duration) or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.
 - .3 WHMIS training certificates for all personnel.
 - .4 Written statement that personnel have had instruction on hazards of asbestos exposure, the use of respirator, protective clothing, worker and waste decontamination procedures, use of Glove Bags and all aspects of work procedures and protective measures.
 - .5 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
- .3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:
 - .1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.
 - .2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed or the unit is vented indoors.
 - .3 DOP tests to be performed by an independent testing company.
 - .1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).
 - .2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.
 - .3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.
 - .4 Proof of calibration of DOP testing equipment.
- .4 Submit the following prior to isolating the work area:

- .1 Written statement that the Ground Fault Interrupter Panels use CSA approved parts and have been inspected by the Electrical Safety Authority.
- .2 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.
- .5 Submit the following upon completion of the work.
 - .1 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.7 Regulations

- .1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed. Regulations include but are not limited to the following:
- .2 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.
- .3 Ministry of Transportation Regulations for the transport of asbestos waste, including the Transportation of Dangerous Goods Act.
- .4 Ministry of the Environment Regulations for the disposal of asbestos waste, including R.R.O. 1990, Reg. 347 as amended.

1.8 Supervision

- .1 Provide onsite, a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.
- .2 The supervisor must be on site at all times during work at risk of disturbing ACM. Failure to comply with this requirement may result in a stoppage of work, at no cost to the Owner.

1.9 Quality Assurance

- .1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.
- .2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.
- .3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.
- .4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for

safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.10 Notification

- .1 Notify Sanitary Landfill site as per Ontario Regulation 347 as amended.
- .2 Inform all sub trades of the presence of ACM identified in the contract documents.
- .3 Notify the Owner or Owners Representative, the Joint Occupational Health and Safety Committee and the Ontario Ministry of Labour, as required by Regulation 278/05, if friable materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.11 Insurance

- .1 to the Construction Manager. The intent of this policy is to hold the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to the Construction Manager. The intent of these policies is to hold the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.
- .3 Maintain a Pollution Liability Policy (or asbestos liability policy or specific coverage under the CGL for asbestos abatement) with an insurance company acceptable to the Construction Manager. The intent of this policy is to hold the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of asbestos abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations including asbestos abatement.
- .4 Forward all certificates to the Construction Manager before work is commenced, showing the Construction Manager as additional insured as their interest may appear.
- .5 The limits will not be less than:

.1	Commercial General Liability	\$5,000,000.00
.2	Automobile	\$2,000,000.00
.3	Pollution Policy (Asbestos Liability)	\$5,000,000.00

1.12 Instruction and Training

- .1 Provide instruction and training to all workers including the following:

- .1 Hazards of asbestos.
- .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
- .3 Personal hygiene to be observed when performing the work.
- .4 The measures and procedures prescribed by this section including decontamination of the worker.
- .5 Instruction and training must be provided by a competent person.

1.13 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide workers, at a minimum, with non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters for all work of this section.
- .3 Respirators shall be:
 - .1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
 - .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.
 - .3 Assigned to a worker for their exclusive use.
 - .4 Maintained in accordance with manufacturer's specifications.
 - .5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
 - .6 Repaired or have damaged or deteriorated parts replaced.
 - .7 Stored in a clean and sanitary location.
 - .8 Provided with new filters as necessary, according to manufacturer's instructions.
 - .1 Replace cartridge filters for negative pressure respirator every 16 hours of wear unless tested on site.
 - .2 Replace PAPR cartridge filters every 8 hours of wear unless tested on site.
 - .3 Mark filters for rotation and regular replacement.
 - .9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.
- .4 Provide protective clothing, to all personnel which:

- .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.
- .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
- .3 Is replaced or repaired if torn or ripped.
- .4 Is disposed of as ACM.
- .5 Decontaminate clothing or protective clothing by using a HEPA Vacuum, or by damp wiping prior to leaving the Asbestos Work Area:
- .6 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .7 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Asbestos Work Area.
- .8 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area.

1.14 Authorized Visitor Protection

- .1 Provide clean protective clothing and equipment, and approved respirators to Authorized Visitors.
- .2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.15 Air Monitoring

- .1 Air monitoring will be performed following the National Institute for Occupational Safety and Health method 7400, Asbestos and other fibres by PCM (Phase Contrast Microscopy).
- .2 Co-operate with the Asbestos Abatement Consultant in collection of air samples, including providing workers to wear sampling pumps for up to full-shift periods. Asbestos Abatement Contractor to exercise care with Asbestos Abatement Consultant's equipment. The Owner reserves the right to back-charge the Asbestos Abatement Contractor for further collection of samples damaged by tampering or abuse. In addition, the Asbestos Abatement Contractor will be responsible for the cost of testing equipment repairs resulting from the actions of the Asbestos Abatement Contractor's forces.
- .3 Results of air monitoring of 0.05 fibres per millilitre of air (fibre/mL) or greater, outside of Asbestos Work Area, will indicate asbestos contamination of these areas and result in the following actions:
 - .1 Suspend Work within the adjoining Asbestos Work Area until written authorization to resume Work has been received from the Asbestos Abatement Consultant.
 - .2 Isolate and clean area in the same manner applicable to the Asbestos Work Area.
 - .3 Maintain Work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

- .4 Install additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas at the discretion of the Asbestos Abatement Consultant.
- .4 Perform the following when results of PCM monitoring within the Asbestos Work Area show airborne fibre levels have exceeded the respirator protection factor:
 - .1 Immediately stop Work within the Asbestos Work Area.
 - .2 Instruct workers to exit the Asbestos Work Area via the Worker Decontamination Facility while observing specified personal decontamination procedures.
 - .3 Contractor's forces shall not re-enter the Asbestos Work Area until authorized by the Asbestos Abatement Consultant.
 - .4 Upon re-entry to the Asbestos Work Area, mist any fallen debris or exposed surfaces with amended water using an airless sprayer.
 - .5 If PCM monitoring shows repeated failure, change respiratory protection to suitable alternative and change unsatisfactory methods used.

1.16 Inspection

- .1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant may be present periodically on site both inside and outside the Asbestos Work Area.
- .2 The following Milestone Inspections will take place, at the Owner's cost:
 - .1 Milestone Inspection A - Clean Site Preparation
 - .1 Inspection of preparations and set-up prior to contaminated work in the Asbestos Work Area.
 - .2 Milestone Inspection D - Visual Clearance
 - .1 Inspection of Asbestos Work Area after removal of all asbestos, but prior to application of lock-down agent.
- .3 Do not proceed with next phase of Work until written approval of each milestone is received from the Asbestos Abatement Consultant.
- .4 In addition to the Milestone Inspections, inspection of the Asbestos Work Area may be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the contract documents and governing authorities. Any deviations from these requirements that have not been approved in writing, may result in a stoppage of work, at no additional cost to the Owner.
- .5 The Asbestos Abatement Consultant is empowered by the Owner to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.
- .2 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .3 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.
- .4 Asbestos Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment comprised of one of the following:
 - .1 A 6 mil (0.15 mm) labelled yellow sealed polyethylene bag, inside a second clear 6 mil (0.15 mm) sealed polyethylene bag.
 - .2 A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation and disposal.
 - .3 Labelled containers as required by the Ontario Ministry of the Environment Reg. 347 as amended and Regulation 278/05.
- .5 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.
- .6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.
- .7 Ground Fault Panel: Electrical panel as follows:
 - .1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.
 - .2 Interrupters to have a 5 mA ground fault protection.
 - .3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.
 - .4 Openings sealed to prevent moisture or dust penetration.
 - .5 Inspected by the Electrical Safety Authority.
 - .6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.
- .8 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Asbestos Work Area and discharges the air to the exterior of the building. Equipped as follows:
 - .1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.
 - .2 Pressure differential gauge to monitor filter loading.
 - .3 Auto shut off and warning system for HEPA filter failure.
 - .4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.

- .9 OSB: Oriented Strand Board.
- .10 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.
- .11 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .12 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck. Acceptable materials: Dupont Tyvek or Kimberly Clark Kleenguard.
- .13 Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.
- .14 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.
- .15 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .16 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 **Transfer Room**

- .1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.
- .3 Install one layer of rip-proof polyethylene sheeting beneath entire Transfer Room.
- .4 Install one layer rip-proof polyethylene sheeting over roof.
- .5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
- .6 Install a fire extinguisher, mount to wall.

2.3 **Curtained Doorways**

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Asbestos Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

2.4 Signage

- .1 Work Area Signs: Post signs in both official languages at access points to the Asbestos Work Area as follows:
 - .1 CAUTION.
 - .2 Asbestos Dust Hazard Area.
 - .3 Unauthorized Entry Prohibited.
 - .4 Wear Assigned Protective Equipment.
 - .5 Breathing Asbestos Dust May Cause Serious Bodily Harm.
- .2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful To Your Health
 - .4 Wear Approved Protective Equipment.
- .3 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Perform pre-removal damage survey and submit to Asbestos Abatement Consultant.
- .2 Remove stored or non-fixed items from the Asbestos Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .3 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .4 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping using Type 2 Procedures as required by O. Reg. 278/05.

- .5 Maintain emergency and fire exits from Asbestos Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.
- .6 Isolate, at panel, and disconnect existing power supply to Asbestos Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Asbestos Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .7 Shut down HVAC systems serving the Asbestos Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Asbestos Work Area.
- .8 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).
- .1 Provide power from ground fault interrupt circuits as follows:
 - .1 Use CSA approved ground fault interrupt outlets outside the Asbestos Work Area to provide power to equipment within the enclosure.
 - .2 All electrical equipment used during work shall be supplied power from a Ground Fault Panel.

3.2 Site Preparation –Enclosure Required

- .1 Install polyethylene enclosure at Asbestos Work Areas in which the abatement of friable asbestos-containing materials (less than 1 square metre) is performed.
- .2 Install Transfer Room where duration of work is to last longer than one 8 hour shift.
- .3 Install Curtained Doorways.
- .4 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .5 Install polyethylene sheeting at openings in walls (as required) and seal.
- .6 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .7 Install 6 mil polyethylene sheeting on walls within the Asbestos Work Area., including existing walls that make up, or are within, the Asbestos Work Area.

- .8 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Asbestos Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Toilet Partitions.
 - .5 Plumbing fixtures.
- .9 Place required tools to complete the abatement with the Asbestos Work Area.
- .10 Provide a completely sealed polyethylene top for free standing enclosures.
- .11 Extend enclosure to underside of ceiling system.
- .12 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .13 Establish negative pressure in Asbestos Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Asbestos Work Area a minimum of every 20 minutes.
 - .2 Arrange negative air units to maximize the distance between units and decontamination facilities.
 - .3 Replace prefilters to maintain specified flow rate.
 - .4 Replace HEPA filter as required to maintain flow rate and integrity of unit.
 - .5 Discharge HEPA filtered negative air machines as follows:
 - .6 To building exterior or into Occupied Areas as required.
 - .7 DOP test all HEPA filtered negative pressure machines where they discharge into Occupied Areas.
 - .8 DOP test all HEPA filtered negative pressure machines.
- .14 Establish negative pressure in Asbestos Work Areas as follows if the work area is less than 50 square feet:
 - .1 Use HEPA Vacuum.
 - .2 Insert vacuum hose into enclosure, leave HEPA vacuum outside enclosure. Provide enough hose to reach all areas of enclosure.
 - .3 Operate HEPA vacuum continuously at all times when ACM may be disturbed.

3.3 Site Preparation – No Enclosure Required

- .1 Install caution tape around work area where existing walls are not present.
- .2 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .3 Install polyethylene drop sheets.

- .4 Place HEPA vacuum in Asbestos Work Area.
- .5 Place required tools to complete the abatement with the Asbestos Work Area.

3.4 Maintenance of Asbestos Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Asbestos Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Asbestos Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Asbestos Work Area at end of shift.

3.5 Asbestos Removal - General

- .1 Do not use compressed air to clean or remove dust or debris.
- .2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .3 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal - Sheet Flooring

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Use only hand-help non-powered tools.
- .3 Remove binding strips or other restrictive mouldings.
- .4 Make series of cuts 100 to 200 mm (4" to 8") apart through top layers and about halfway through paper backing/underpad.
- .5 Pry up a strip or vinyl sheet flooring at corner of Asbestos Work Area and work to centre.
- .6 Pull sheet back upon itself slowly and evenly along with any adhering underpad which remains attached to top layers.
- .7 Roll up strip (finished side out) into tight roll, tape or tie securely, and place into Asbestos Waste Container.
- .8 As sheeting is removed, wet all exposed ACM underpad/backing with Amended Water.
- .9 Remove remaining adhered underpad by wet scraping as follows:
 - .1 Wet underpad with Amended Water applied by sprayer.

- .2 Scrape off all remaining material including mastic.
- .3 Place scrapings in Asbestos Waste Container.
- .10 Allow floor to dry and clean with HEPA vacuum.
- .11 Wet clean or HEPA vacuum Asbestos Work Area, including any surfaces not covered with polyethylene sheeting. Any materials removed to access ACM that are to be re-used, and any abatement equipment, must be wet cleaned or vacuumed prior to completion.
- .12 Apply a coat of Post Removal Sealer to all surfaces within the Asbestos Work Area from which ACM has been removed.

3.7 Asbestos Procedure - Removal of Light Fixture

- .1 Use the procedures described above under *Site Preparation –No Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Undo fasteners if necessary to remove material.
- .4 Use hand held tools to remove the light fixture.
- .5 Scrape to remove any remaining material adhered to light fixture.
- .6 Wipe light fixture surfaces and dispose of as clean waste.
- .7
- .8 Wet clean or HEPA vacuum the entire Asbestos Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.8 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins must be covered and locked when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.
- .4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Asbestos Work Area. Recycle metals or dispose of metals as clean waste.
- .5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Asbestos Abatement Consultant for each individual type of material.
- .6 Clean and wash equipment prior to removal from Asbestos Work Area if removed prior to completion.
- .7 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.
- .8 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Asbestos Work Area to waste bin.

- .9 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.
- .10 Removal of waste containers and decontaminated tools and materials from the Asbestos Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Asbestos Work Area. If the item can be cleaned, remove it from the site as clean waste.
 - .2 Place waste or item in Asbestos Waste Container and seal closed.
 - .3 Wet wipe outside of Asbestos Waste Container.
 - .4 Within Transfer Room or at the perimeter of the Asbestos Work Area, place in second Asbestos Waste Container. Seal closed.
 - .5 Remove the item from the Asbestos Work Area.
- .11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .12 Limit transportation of waste and materials through Occupied Areas of the building to Quiet Hours.
- .13 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.
- .14 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the Owners operations.
- .15 Transport asbestos contaminated waste to landfill licensed by Ontario Ministry of the Environment.
- .16 Co-operate with Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

3.9 Application of Post Removal Sealant

- .1 Obtain Asbestos Abatement Consultant's written permission to proceed.
- .2 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Asbestos Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.
- .3 Do not apply post removal sealant to materials that will be damaged by its application.
- .4 Notify Pinchin Ltd. at least 24 hours prior to the need for Milestone Inspection E (Air Monitoring Clearance). Obtain written approval of this Milestone Inspection before proceeding.

3.10 Clean-Up and Dismantling

- .1 Wash or HEPA vacuum equipment used in Asbestos Work Area.
- .2 Wash remaining equipment and tools used in contaminated Asbestos Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Asbestos Work Area.
- .3 Clean polyethylene sheeting and drop sheets with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting on floors or drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove and dispose of polyethylene sheeting as asbestos waste.
- .7 Remove remaining site isolation, seals, tape, etc.
- .8 Remove Transfer Room.
- .9 Remove seals, tape, Signage etc.
- .10 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos-contaminated waste.
- .11 Remove temporary lights.
- .12 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.
- .13 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.
- .14 Seal openings in HEPA vacuums.
- .15 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.11 Re-Establishment of Items

- .1 Upon completion of work:
 - .1 Enable building air handling systems.
 - .2 Clean and vacuum Asbestos Work Area.

END OF SECTION

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: Jessica Cozzitorto
Matthew Gibbs

Lab Order ID: 1702498
Analysis ID: 1702498_PLM
Date Received: 2/8/2017
Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0001A	Grey Flashing Caulking / Roof	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_1					Ashed
0001B	Grey Flashing Caulking / Roof	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_2					Ashed
0001C	Grey Flashing Caulking / Roof	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_3					Ashed
0002A	Brown Caulking / Roof Air Handling Unit	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_4					Ashed
0002B	Brown Caulking / Roof Air Handling Unit	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_5					Ashed
0002C	Brown Caulking / Roof Air Handling Unit	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_6					Ashed
0003A	Brown Flashing Caulking / Roof	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_7					Ashed
0003B	Brown Flashing Caulking / Roof	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_8					Ashed

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Byron Stroble (153)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



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Lab Sample ID	Lab Notes				Treatment
0003C	Brown Flashing Caulking / Roof	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_9					Ashed
0004A	Dark Brown Exterior Caulking / Main Entrance Door X112	None Detected		100% Other	Black Non Fibrous Homogeneous
1702498PLM_10					Ashed
0004B	Dark Brown Exterior Caulking / Main Entrance Door X112	None Detected		100% Other	Black Non Fibrous Homogeneous
1702498PLM_11					Ashed
0004C	Dark Brown Exterior Caulking / Main Entrance Door X112	None Detected		100% Other	Black Non Fibrous Homogeneous
1702498PLM_12					Ashed
0005A	Light Brown Caulking / NW Exterior Door X38	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_13					Ashed
0005B	Light Brown Caulking / NW Exterior Door X38	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_14					Ashed
0005C	Light Brown Caulking / NW Exterior Door X38	None Detected		100% Other	Brown Non Fibrous Homogeneous
1702498PLM_15					Ashed
0006A	Hard Grey Caulking / NE Exterior Door X12	3% Chrysotile		97% Other	Beige Non Fibrous Heterogeneous
1702498PLM_16					Dissolved

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



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Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0006B	Hard Grey Caulking / NE Exterior Door X12	Not Analyzed			
1702498PLM_17					
0006C	Hard Grey Caulking / NE Exterior Door X12	Not Analyzed			
1702498PLM_18					
0007A	Soft Grey Caulking / Exterior Windows	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_19					Ashed
0007B	Soft Grey Caulking / Exterior Windows	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_20					Ashed
0007C	Soft Grey Caulking / Exterior Windows	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_21					Ashed
0008A	Hard Grey Caulking / Classroom Exterior Door X30	3% Chrysotile		97% Other	Gray Non Fibrous Homogeneous
1702498PLM_22					Ashed
0008B	Hard Grey Caulking / Classroom Exterior Door X30	Not Analyzed			
1702498PLM_23					
0008C	Hard Grey Caulking / Classroom Exterior Door X30	Not Analyzed			
1702498PLM_24					

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

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Matthew Gibbs

Lab Order ID: 1702498
Analysis ID: 1702498_PLM
Date Received: 2/8/2017
Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0009A	Dark Brown Interior Caulking / Main Entrance Door X112	None Detected		100% Other	Black Non Fibrous Homogeneous
1702498PLM_25					Ashed
0009B	Dark Brown Interior Caulking / Main Entrance Door X112	None Detected		100% Other	Black Non Fibrous Homogeneous
1702498PLM_26					Ashed
0009C	Dark Brown Interior Caulking / Main Entrance Door X112	None Detected		100% Other	Black Non Fibrous Homogeneous
1702498PLM_27					Ashed
0010A	Soft White Caulking / Room X08 Radiator	None Detected		100% Other	White Non Fibrous Homogeneous
1702498PLM_28					Ashed
0010B	Soft White Caulking / Room X08 Radiator	None Detected		100% Other	White Non Fibrous Homogeneous
1702498PLM_29					Ashed
0010C	Soft White Caulking / Room X08 Radiator	None Detected		100% Other	White Non Fibrous Homogeneous
1702498PLM_30					Ashed
0011A	Tan Caulking / Interior Vestibule Doors X14	None Detected	10% Wollastonite	90% Other	Tan Non Fibrous Homogeneous
1702498PLM_31					Ashed
0011B	Tan Caulking / Interior Vestibule Doors X14	None Detected	10% Wollastonite	90% Other	Tan Non Fibrous Homogeneous
1702498PLM_32					Ashed

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



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Matthew Gibbs

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Analysis ID: 1702498_PLM
Date Received: 2/8/2017
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Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0011C	Tan Caulking / Interior Vestibule Doors X14	None Detected	10% Wollastonite	90% Other	Tan Non Fibrous Homogeneous
1702498PLM_33					Ashed
0012A	Hard Light Brown Caulking / Interior Vestibule Doors X14	None Detected	10% Cellulose	90% Other	Brown Non Fibrous Homogeneous
1702498PLM_34					Ashed
0012B	Hard Light Brown Caulking / Interior Vestibule Doors X14	None Detected	10% Wollastonite	90% Other	Brown Non Fibrous Homogeneous
1702498PLM_35					Ashed
0012C	Hard Light Brown Caulking / Interior Vestibule Doors X14	None Detected	10% Wollastonite	90% Other	Brown Non Fibrous Homogeneous
1702498PLM_36					Ashed
0013A	Hard White Caulking / Interior Vestibule Doors X14	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_37					Ashed
0013B	Hard White Caulking / Interior Vestibule Doors X14	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_38					Ashed
0013C	Hard White Caulking / Interior Vestibule Doors X14	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_39					Ashed
0014A	Soft Grey Caulking / Boy's Washroom Radiator X117	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_40					Ashed

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EPA Method: 600/R-93/116 and 600/M4-82-020



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Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0014B	Soft Grey Caulking / Boy's Washroom Radiator X117	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_41					Ashed
0014C	Soft Grey Caulking / Girl's Washroom Radiator X118	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_42					Ashed
0015A	Hard Grey Interior Caulking / Side Exit Corridor Door	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1702498PLM_43					Dissolved
0015B	Hard Grey Interior Caulking / Side Exit Corridor Door	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1702498PLM_44					Dissolved
0015C	Hard Grey Interior Caulking / Side Exit Corridor Door	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1702498PLM_45					Dissolved
0016A	Fibreboard / Boy's Washroom X117	15% Amosite		85% Other	Gray Non Fibrous Heterogeneous
1702498PLM_46					Dissolved
0016B	Fibreboard / Boy's Washroom X117	Not Analyzed			
1702498PLM_47					
0016C	Fibreboard / Boy's Washroom X117	Not Analyzed			
1702498PLM_48					

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

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Attn: Jessica Cozzitorto
Matthew Gibbs

Lab Order ID: 1702498
Analysis ID: 1702498_PLM
Date Received: 2/8/2017
Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
17	Samples Not Used	Not Submitted			
1702498PLM_49					
18	Samples Not Used	Not Submitted			
1702498PLM_50					
0019A - A	12x12 Beige with Brown Streaks Floor Tile / Room X40	2% Chrysotile		98% Other	Beige Non Fibrous Heterogeneous
1702498PLM_51	floor tile				Dissolved
0019A - B	12x12 Beige with Brown Streaks Floor Tile / Room X40	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_119	mastic				Dissolved
0019B - A	12x12 Beige with Brown Streaks Floor Tile / Room X40	Not Analyzed			
1702498PLM_52	floor tile				
0019B - B	12x12 Beige with Brown Streaks Floor Tile / Room X40	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_120	mastic				Dissolved
0019C - A	12x12 Beige with Brown Streaks Floor Tile / Room X40	Not Analyzed			
1702498PLM_53	floor tile				
0019C - B	12x12 Beige with Brown Streaks Floor Tile / Room X40	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_121	mastic				Dissolved

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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
20	Samples Not Used	Not Submitted			
1702498PLM_54					
21	Samples Not Used	Not Submitted			
1702498PLM_55					
0022A - A	12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	2% Chrysotile		98% Other	Beige Non Fibrous Heterogeneous
1702498PLM_56	floor tile				Dissolved
0022A - B	12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_123	mastic				Dissolved
0022B - A	12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	Not Analyzed			
1702498PLM_57	floor tile				
0022B - B	12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_124	mastic				Dissolved
0022C - A	12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	Not Analyzed			
1702498PLM_58	floor tile				
0022C - B	12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_125	mastic				Dissolved

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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0023A - A	12x12 Brown with Light Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1702498PLM_59	floor tile				Dissolved
0023A - B	12x12 Brown with Light Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_126	mastic				Dissolved
0023B - A	12x12 Brown with Light Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1702498PLM_60	floor tile				Dissolved
0023B - B	12x12 Brown with Light Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_127	mastic				Dissolved
0023C - A	12x12 Brown with Light Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1702498PLM_61	floor tile				Dissolved
0023C - B	12x12 Brown with Light Brown Streaks Floor Tile / Room X42	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_128	mastic				Dissolved
0024A - A	12x12 Dark Brown with White Streaks Floor Tile / Room X41	3% Chrysotile		97% Other	Brown Non Fibrous Heterogeneous
1702498PLM_62	floor tile				Dissolved
0024A - B	12x12 Dark Brown with White Streaks Floor Tile / Room X41	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_129	mastic				Dissolved

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Byron Stroble (153)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: Jessica Cozzitorto
Matthew Gibbs

Lab Order ID: 1702498
Analysis ID: 1702498_PLM
Date Received: 2/8/2017
Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0024B - A	12x12 Dark Brown with White Streaks Floor Tile / Room X41	Not Analyzed			
1702498PLM_63	floor tile				
0024B - B	12x12 Dark Brown with White Streaks Floor Tile / Room X41	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_130	mastic				Dissolved
0024C - A	12x12 Dark Brown with White Streaks Floor Tile / Room X41	Not Analyzed			
1702498PLM_64	floor tile				
0024C - B	12x12 Dark Brown with White Streaks Floor Tile / Room X41	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_131	mastic				Dissolved
0025A - A	Cellulose Drain Line / Custodial X46	None Detected	80% Cellulose	20% Other	Beige Fibrous Heterogeneous
1702498PLM_65	canvas				Teased, Dissolved
0025A - B	Cellulose Drain Line / Custodial X46	None Detected	95% Cellulose	5% Other	Brown Fibrous Heterogeneous
1702498PLM_132	paper layer				Teased, Ashed
0025A - C	Cellulose Drain Line / Custodial X46	None Detected	70% Cellulose	30% Other	Black Fibrous Heterogeneous
1702498PLM_133	felt				Teased, Dissolved
0025B - A	Cellulose Drain Line / Custodial X46	None Detected	95% Cellulose	5% Other	Brown Fibrous Heterogeneous
1702498PLM_66	paper layer				Teased, Ashed

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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0025B - B	Cellulose Drain Line / Custodial X46	None Detected	70% Cellulose	30% Other	Black Fibrous Heterogeneous
1702498PLM_134	felt				Teased, Dissolved
0025C - A	Cellulose Drain Line / Custodial X46	None Detected	80% Cellulose	20% Other	Beige Fibrous Heterogeneous
1702498PLM_67	canvas				Teased, Dissolved
0025C - B	Cellulose Drain Line / Custodial X46	None Detected	95% Cellulose	5% Other	Brown Fibrous Heterogeneous
1702498PLM_135	paper layer				Teased, Ashed
0025C - C	Cellulose Drain Line / Custodial X46	None Detected	70% Cellulose	30% Other	Black Fibrous Heterogeneous
1702498PLM_136	felt				Teased, Dissolved
0026A - A	12x12 White and Beige Flakes Floor Tile / Room X30	None Detected		100% Other	White Non Fibrous Heterogeneous
1702498PLM_68	floor tile				Dissolved
0026A - B	12x12 White and Beige Flakes Floor Tile / Room X30	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_137	mastic				Dissolved
0026B - A	12x12 White and Beige Flakes Floor Tile / Room X30	None Detected		100% Other	White Non Fibrous Heterogeneous
1702498PLM_69	floor tile				Dissolved
0026B - B	12x12 White and Beige Flakes Floor Tile / Room X30	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_138	mastic				Dissolved

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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0026C - A	12x12 White and Beige Flakes Floor Tile / Room X30	None Detected		100% Other	White Non Fibrous Heterogeneous
1702498PLM_70	floor tile				Ashed
0026C - B	12x12 White and Beige Flakes Floor Tile / Room X30	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_139	mastic				Dissolved
27	Samples Not Used	Not Submitted			
1702498PLM_71					
28	Samples Not Used	Not Submitted			
1702498PLM_72					
0029A - A	Mastic on 9x9 Light Blue with White Streaks / Room X33	None Detected		100% Other	Blue Non Fibrous Heterogeneous
1702498PLM_73	floor tile				Dissolved
0029A - B	Mastic on 9x9 Light Blue with White Streaks / Room X33	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_141	mastic				Dissolved
0029B - A	Mastic on 9x9 Light Blue with White Streaks / Room X33	None Detected		100% Other	Blue Non Fibrous Heterogeneous
1702498PLM_74	floor tile - ashed				Dissolved
0029B - B	Mastic on 9x9 Light Blue with White Streaks / Room X33	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_142	mastic				Dissolved

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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0029C - A	Mastic on 9x9 Light Blue with White Streaks / Room X34	None Detected		100% Other	Blue Non Fibrous Heterogeneous
1702498PLM_75	floor tile				Ashed
0029C - B	Mastic on 9x9 Light Blue with White Streaks / Room X34	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_143	mastic				Dissolved
0030A - A	9x9 Light Brown with White Streaks Floor Tile / Room X33	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1702498PLM_76	floor tile				Dissolved
0030A - B	9x9 Light Brown with White Streaks Floor Tile / Room X33	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_144	mastic				Dissolved
0030B - A	9x9 Light Brown with White Streaks Floor Tile / Room X33	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1702498PLM_77	floor tile				Dissolved
0030B - B	9x9 Light Brown with White Streaks Floor Tile / Room X33	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_145	mastic				Dissolved
0030C - A	9x9 Light Brown with White Streaks Floor Tile / Room X34	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1702498PLM_78	floor tile				Dissolved
0030C - B	9x9 Light Brown with White Streaks Floor Tile / Room X34	None Detected		100% Other	Black Non Fibrous Heterogeneous
1702498PLM_146	mastic				Dissolved

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EPA Method: 600/R-93/116 and 600/M4-82-020



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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0031A	Gold Sink Undercoating / Room X30	5% Chrysotile		95% Other	Gold Non Fibrous Heterogeneous
1702498PLM_79					Dissolved
0031B	Gold Sink Undercoating / Room X31	Not Analyzed			
1702498PLM_80					
0031C	Gold Sink Undercoating / Room X45	Not Analyzed			
1702498PLM_81					
0032A	Duct Mastic / Boy's Washroom X117	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1702498PLM_82					Dissolved
0032B	Duct Mastic / Custodial X109	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1702498PLM_83					Dissolved
0032C	Duct Mastic / Boy's Washroom X36	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1702498PLM_84					Dissolved
33	Samples Not Used	Not Submitted			
1702498PLM_85					
0034A	Grey Sheet Flooring / Room X20A	35% Chrysotile	55% Cellulose	10% Other	Beige Fibrous Heterogeneous
1702498PLM_86	unable to separate mastic				Teased

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Bulk Asbestos Analysis

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EPA Method: 600/R-93/116 and 600/M4-82-020



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Matthew Gibbs

Lab Order ID: 1702498
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Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0034B	Grey Sheet Flooring / Room X20A	Not Analyzed			
1702498PLM_87					
0034C	Grey Sheet Flooring / Room X120	Not Analyzed			
1702498PLM_88					
0035A - A	White Vinyl Floor Tile / X22	None Detected		100% Other	Yellow Non Fibrous Heterogeneous
1702498PLM_89	mastic 1				Dissolved
0035A - B	White Vinyl Floor Tile / X22	2% Chrysotile		98% Other	White Non Fibrous Heterogeneous
1702498PLM_147	floor tile				Dissolved
0035A - C	White Vinyl Floor Tile / X22	None Detected		100% Other	Beige Non Fibrous Heterogeneous
1702498PLM_148	mastic 2				Dissolved
0035B - A	White Vinyl Floor Tile / X22	None Detected		100% Other	Yellow Non Fibrous Heterogeneous
1702498PLM_90	mastic 1				Dissolved
0035B - B	White Vinyl Floor Tile / X22	Not Analyzed			
1702498PLM_149	floor tile				
0035B - C	White Vinyl Floor Tile / X22	None Detected		100% Other	Beige Non Fibrous Heterogeneous
1702498PLM_153	mastic 2				Dissolved

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Bulk Asbestos Analysis

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EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

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Analysis ID: 1702498_PLM
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Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0035C - A	White Vinyl Floor Tile / X22	None Detected		100% Other	Yellow Non Fibrous Heterogeneous
1702498PLM_91	mastic 1				Dissolved
0035C - B	White Vinyl Floor Tile / X22	Not Analyzed			
1702498PLM_154	floor tile				
0035C - C	White Vinyl Floor Tile / X22	None Detected		100% Other	Beige Non Fibrous Heterogeneous
1702498PLM_155	mastic 2				Dissolved
0036A	Drywall Joint Compound / Room X08	None Detected		100% Other	White Non Fibrous Heterogeneous
1702498PLM_92					Teased
0036B	Drywall Joint Compound / Room X23	None Detected		100% Other	White Non Fibrous Heterogeneous
1702498PLM_93					Teased
0036C	Drywall Joint Compound / Room X21	None Detected		100% Other	White Non Fibrous Heterogeneous
1702498PLM_94					Teased
0037A	Siporex Joint Compound / Room X04	2% Chrysotile		98% Other	Gray Non Fibrous Heterogeneous
1702498PLM_95					Dissolved
0037B	Siporex Joint Compound / Room X109	Not Analyzed			
1702498PLM_96					

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Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0037C	Siporex Joint Compound / Room X02	Not Analyzed			
1702498PLM_97					
0038A	Hard White Caulking / Interior Large Windows / Room X02	3% Chrysotile		97% Other	White Non Fibrous Heterogeneous
1702498PLM_98					Dissolved
0038B	Hard White Caulking / Interior Large Windows / Room X04	Not Analyzed			
1702498PLM_99					
0038C	Hard White Caulking / Interior Large Windows / Room X03	Not Analyzed			
1702498PLM_100					
0039A	Hard Grey Caulking / Gym Windows X100	4% Chrysotile		96% Other	Gray Non Fibrous Heterogeneous
1702498PLM_101					Dissolved
0039B	Hard Grey Caulking / Gym Windows X100	Not Analyzed			
1702498PLM_102					
0039C	Hard Grey Caulking / Gym Windows X100	Not Analyzed			
1702498PLM_103					
0040A	Soft Grey Caulking / Stairwell Exterior Door X39	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_104					Ashed

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Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0040B	Soft Grey Caulking / Stairwell Exterior Door X39	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_105					Ashed
0040C	Soft Grey Caulking / Stairwell Exterior Door X39	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_106					Ashed
0041A	Soft Grey Caulking / Gym Windows X100	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_107					Ashed
0041B	Soft Grey Caulking / Gym Windows X100	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_108					Ashed
0041C	Soft Grey Caulking / Gym Windows X100	None Detected		100% Other	Gray Non Fibrous Homogeneous
1702498PLM_109					Ashed
0042A	Soft White Caulking / Gym Door X100	None Detected		100% Other	White Non Fibrous Homogeneous
1702498PLM_110					Ashed
0042B	Soft White Caulking / Gym Door X100	None Detected		100% Other	White Non Fibrous Homogeneous
1702498PLM_111					Ashed
0042C	Soft White Caulking / Gym Door X100	None Detected		100% Other	White Non Fibrous Homogeneous
1702498PLM_112					Ashed

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Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0043A	Textured Plaster / Above Door X 14	2% Chrysotile		98% Other	Gray Non Fibrous Heterogeneous
1702498PLM_113	single layer				Crushed
0043B	Textured Plaster / Above Door X 14	Not Analyzed			
1702498PLM_114					
0043C	Textured Plaster / Above Door X 14	Not Analyzed			
1702498PLM_115					
0044A - A	Textured Plaster Soffit / Exterior	2% Chrysotile		98% Other	White Non Fibrous Heterogeneous
1702498PLM_116	finish				Crushed
0044A - B	Textured Plaster Soffit / Exterior	2% Chrysotile		98% Other	Gray Non Fibrous Heterogeneous
1702498PLM_150	base				Crushed
0044B - A	Textured Plaster Soffit / Exterior	Not Analyzed			
1702498PLM_117	finish				
0044B - B	Textured Plaster Soffit / Exterior	Not Analyzed			
1702498PLM_151	base				
0044C - A	Textured Plaster Soffit / Exterior	Not Analyzed			
1702498PLM_118	finish				

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Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0044C - B	Texttured Plaster Soffit / Exterior	Not Analyzed			
1702498PLM_152	base				

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Byron Stroble (153)

Analyst

Approved Signatory

1702498

Version 1-15-2012

Client: Pinchin Ltd.
Contact: M. Gibbs
Address: 6-875 Main St. W., Hamilton ON.
Phone: (289) 925-6907
Fax:
Email: mgibbs@pinchin.com
 jcozzitorto@pinchin.com
Project: 140 Waverly Drive
 Guelph, Ontario
Client Notes:
P.O. #: 200535.001
Date Submitted: Feb. 7, 2017
Analysis: PLM - Stop Positive
TurnAroundTime: 3 Days

Instructions:
 Use Column "B" for your contact info
 To See an Example Click the
 bottom Example Tab.
 Enter samples between "<<" and ">>"
 Begin Samples with a "<<" above the first sample
 and end with a ">>" below the last sample.
 Only Enter your data on the first sheet "Sheet1"
 Note: Data 1 and Data 2 are optional
 fields that do not show up on the official
 report, however they will be included
 in the electronic data returned to you
 to facilitate your reintegration of the report data.

Invoice to:
 J. Cozzitorto
 jcozzitorto@pinchin.com
 Scientific
 Analytical
 Institute
 4604 Dundas Dr.
 Greensboro, NC 27407
 Phone: 336.292.3888
 Fax: 336.292.3313
 Email: lab@sailab.com

Sample Number	Data 1 (Lab use only)	Sample Description	Data 2 (Lab use only)
<<			
0001A		Grey Flashing Caulking / Roof	
0001B		Grey Flashing Caulking / Roof	
0001C		Grey Flashing Caulking / Roof	
0002A		Brown Caulking / Roof Air Handling Unit	
0002B		Brown Caulking / Roof Air Handling Unit	
0002C		Brown Caulking / Roof Air Handling Unit	
0003A		Brown Flashing Caulking / Roof	
0003B		Brown Flashing Caulking / Roof	
0003C		Brown Flashing Caulking / Roof	
0004A		Dark Brown Exterior Caulking / Main Entrance Door X112	
0004B		Dark Brown Exterior Caulking / Main Entrance Door X112	
0004C		Dark Brown Exterior Caulking / Main Entrance Door X112	
0005A		Light Brown Caulking / NW Exterior Door X38	
0005B		Light Brown Caulking / NW Exterior Door X38	
0005C		Light Brown Caulking / NW Exterior Door X38	
0006A		Hard Grey Caulking / NE Exterior Door X12	
0006B		Hard Grey Caulking / NE Exterior Door X12	
0006C		Hard Grey Caulking / NE Exterior Door X12	
0007A		Soft Grey Caulking / Exterior Windows	
0007B		Soft Grey Caulking / Exterior Windows	
0007C		Soft Grey Caulking / Exterior Windows	
0008A		Hard Grey Caulking / Starwell Exterior Door X39	
0008B		Hard Grey Caulking / Starwell Exterior Door X39	
0008C		Hard Grey Caulking / Starwell Exterior Door X39	
0009A		Dark Brown Interior Caulking / Main Entrance Door X112	
0009B		Dark Brown Interior Caulking / Main Entrance Door X112	
0009C		Dark Brown Interior Caulking / Main Entrance Door X112	
0010A		Soft White Caulking / Room X08 Radiator	
0010B		Soft White Caulking / Room X08 Radiator	
0010C		Soft White Caulking / Room X08 Radiator	
0011A		Tan Caulking / Interior Vestibule Doors X14	
0011B		Tan Caulking / Interior Vestibule Doors X14	
0011C		Tan Caulking / Interior Vestibule Doors X14	
0012A		Hard Light Brown Caulking / Interior Vestibule Doors X14	
0012B		Hard Light Brown Caulking / Interior Vestibule Doors X14	
0012C		Hard Light Brown Caulking / Interior Vestibule Doors X14	
0013A		Hard White Caulking / Interior Vestibule Doors X14	
0013B		Hard White Caulking / Interior Vestibule Doors X14	
0013C		Hard White Caulking / Interior Vestibule Doors X14	
0014A		Soft Grey Caulking / Boy's Washroom Radiator X117	
0014B		Soft Grey Caulking / Boy's Washroom Radiator X117	
0014C		Soft Grey Caulking / Girl's Washroom Radiator X118	
0015A		Hard Grey Interior Caulking / Side Exit Corridor Door	
0015B		Hard Grey Interior Caulking / Side Exit Corridor Door	
0015C		Hard Grey Interior Caulking / Side Exit Corridor Door	
0016A		Fibreboard / Boy's Washroom X117	
0016B		Fibreboard / Boy's Washroom X117	
0016C		Fibreboard / Boy's Washroom X117	
	17	Samples Not Used	
	18	Samples Not Used	
0019A		12x12 Beige with Brown Streaks Floor Tile / Room X40	
0019B		12x12 Beige with Brown Streaks Floor Tile / Room X40	
0019C		12x12 Beige with Brown Streaks Floor Tile / Room X40	
	20	Samples Not Used	
	21	Samples Not Used	
0022A		12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	
0022B		12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	
0022C		12x12 Beige with Dense Brown Streaks Floor Tile / Room X42	
0023A		12x12 Brown with Light Brown Streaks Floor Tile / Room X42	
0023B		12x12 Brown with Light Brown Streaks Floor Tile / Room X42	
0023C		12x12 Brown with Light Brown Streaks Floor Tile / Room X42	
0024A		12x12 Dark Brown with White Streaks Floor Tile / Room X41	
0024B		12x12 Dark Brown with White Streaks Floor Tile / Room X41	
0024C		12x12 Dark Brown with White Streaks Floor Tile / Room X41	
0025A		Cellulose Drain Line / Custodial X46	
0025B		Cellulose Drain Line / Custodial X46	
0025C		Cellulose Drain Line / Custodial X46	
0026A		12x12 White and Beige Flakes Floor Tile / Room X30	
0026B		12x12 White and Beige Flakes Floor Tile / Room X30	
0026C		12x12 White and Beige Flakes Floor Tile / Room X30	
	27	Samples Not Used	
	28	Samples Not Used	

Accepted



Rejected



MCCP 2/8 1030A

1702498

0029A	Mastic on 9x9 Light Blue with White Streaks / Room X33
0029B	Mastic on 9x9 Light Blue with White Streaks / Room X33
0029C	Mastic on 9x9 Light Blue with White Streaks / Room X34
0030A	9x9 Light Brown with White Streaks Floor Tile / Room X33
0030B	9x9 Light Brown with White Streaks Floor Tile / Room X33
0030C	9x9 Light Brown with White Streaks Floor Tile / Room X34
0031A	Gold Sink Undercoating / Room X30
0031B	Gold Sink Undercoating / Room X31
0031C	Gold Sink Undercoating / Room X45
0032A	Duct Mastic / Boy's Washroom X117
0032B	Duct Mastic / Custodial X109
0032C	Duct Mastic / Boy's Washroom X36
	Samples Not Used
0034A	Grey Sheet Flooring / Room X20A
0034B	Grey Sheet Flooring / Room X20A
0034C	Grey Sheet Flooring / Room X120
0035A	White Vinyl Floor Tile / X22
0035B	White Vinyl Floor Tile / X22
0035C	White Vinyl Floor Tile / X22
0036A	Drywall Joint Compound / Room X08
0036B	Drywall Joint Compound / Room X23
0036C	Drywall Joint Compound / Room X21
0037A	Siporex Joint Compound / Room X04
0037B	Siporex Joint Compound / Room X109
0037C	Siporex Joint Compound / Room X02
0038A	Hard White Caulking / Interior Large Windows / Room X02
0038B	Hard White Caulking / Interior Large Windows / Room X04
0038C	Hard White Caulking / Interior Large Windows / Room X03
0039A	Hard Grey Caulking / Gym Windows X100
0039B	Hard Grey Caulking / Gym Windows X100
0039C	Hard Grey Caulking / Gym Windows X100
0040A	Soft Grey Caulking / Stairwell Exterior Door X39
0040B	Soft Grey Caulking / Stairwell Exterior Door X39
0040C	Soft Grey Caulking / Stairwell Exterior Door X39
0041A	Soft Grey Caulking / Gym Windows X100
0041B	Soft Grey Caulking / Gym Windows X100
0041C	Soft Grey Caulking / Gym Windows X100
0042A	Soft White Caulking / Gym Door X100
0042B	Soft White Caulking / Gym Door X100
0042C	Soft White Caulking / Gym Door X100
0043A	Textured Plaster / Above Door X 14
0043B	Textured Plaster / Above Door X 14
0043C	Textured Plaster / Above Door X 14
0044A	Textured Plaster Soffit / Exterior
0044B	Textured Plaster Soffit / Exterior
0044C	Textured Plaster Soffit / Exterior



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: Matthew Gibbs
Jessica Cozzitorto

Lab Order ID: 1703124
Analysis ID: 1703124_PLM
Date Received: 2/15/2017
Date Reported: 2/20/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0017A - A	12x12 Light Green with Dark Green Streaks Floor Tile / Room X45	3% Chrysotile		97% Other	Green Non Fibrous Homogeneous
1703124PLM_1	tile				Dissolved
0017A - B	12x12 Light Green with Dark Green Streaks Floor Tile / Room X45	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_16	mastic				Dissolved
0017B - A	12x12 Light Green with Dark Green Streaks Floor Tile / Room X44	Not Analyzed			
1703124PLM_2	tile				
0017B - B	12x12 Light Green with Dark Green Streaks Floor Tile / Room X44	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_17	mastic				Dissolved
0017C - A	12x12 Light Green with Dark Green Streaks Floor Tile / Room X32	Not Analyzed			
1703124PLM_3	tile				
0017C - B	12x12 Light Green with Dark Green Streaks Floor Tile / Room X32	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_18	mastic				Dissolved
0018A - A	12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	3% Chrysotile		97% Other	Gray Non Fibrous Homogeneous
1703124PLM_4	tile				Dissolved
0018A - B	12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_19	mastic				Dissolved

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Charmel Dozier (30)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: Matthew Gibbs
Jessica Cozzitorto

Lab Order ID: 1703124
Analysis ID: 1703124_PLM
Date Received: 2/15/2017
Date Reported: 2/20/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0018B - A	12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	Not Analyzed			
1703124PLM_5	tile				
0018B - B	12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_20	mastic				Dissolved
0018C - A	12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	Not Analyzed			
1703124PLM_6	tile				
0018C - B	12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_21	mastic				Dissolved
0020A - A	12x12 Light Brown with White Streaks Floor Tile / Room X40	3% Chrysotile		97% Other	Brown Non Fibrous Homogeneous
1703124PLM_7	tile				Dissolved
0020A - B	12x12 Light Brown with White Streaks Floor Tile / Room X40	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_22	mastic				Dissolved
0020B - A	12x12 Light Brown with White Streaks Floor Tile / Room X40	Not Analyzed			
1703124PLM_8	tile				
0020B - B	12x12 Light Brown with White Streaks Floor Tile / Room X40	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_23	mastic				Dissolved

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Charmel Dozier (30)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: Matthew Gibbs
Jessica Cozzitorto

Lab Order ID: 1703124
Analysis ID: 1703124_PLM
Date Received: 2/15/2017
Date Reported: 2/20/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0020C - A	12x12 Light Brown with White Streaks Floor Tile / Room X31	Not Analyzed			
1703124PLM_9	tile				
0020C - B	12x12 Light Brown with White Streaks Floor Tile / Room X31	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_24	mastic				Dissolved
0021A - A	12x12 White with Green Streaks Floor Tile / Room X44	3% Chrysotile		97% Other	White Non Fibrous Homogeneous
1703124PLM_10	tile				Dissolved
0021A - B	12x12 White with Green Streaks Floor Tile / Room X44	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_25	mastic				Dissolved
0021B - A	12x12 White with Green Streaks Floor Tile / Room X44	Not Analyzed			
1703124PLM_11	tile				
0021B - B	12x12 White with Green Streaks Floor Tile / Room X44	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_26	mastic				Dissolved
0021C - A	12x12 White with Green Streaks Floor Tile / Room X44	Not Analyzed			
1703124PLM_12	tile				
0021C - B	12x12 White with Green Streaks Floor Tile / Room X44	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_27	mastic				Dissolved

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Charmel Dozier (30)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020



NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: Matthew Gibbs
Jessica Cozzitorto

Lab Order ID: 1703124
Analysis ID: 1703124_PLM
Date Received: 2/15/2017
Date Reported: 2/20/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
0028A - A	12x12 Grey with White Streaks Floor Tile / Room X35	3% Chrysotile		97% Other	Gray Non Fibrous Homogeneous
1703124PLM_13	tile				Dissolved
0028A - B	12x12 Grey with White Streaks Floor Tile / Room X35	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_28	mastic				Dissolved
0028B - A	12x12 Grey with White Streaks Floor Tile / Room X35	Not Analyzed			
1703124PLM_14	tile				
0028B - B	12x12 Grey with White Streaks Floor Tile / Room X35	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_29	mastic				Dissolved
0028C - A	12x12 Grey with White Streaks Floor Tile / Room X35	Not Analyzed			
1703124PLM_15	tile				
0028C - B	12x12 Grey with White Streaks Floor Tile / Room X35	None Detected		100% Other	Black Non Fibrous Homogeneous
1703124PLM_30	mastic				Dissolved

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Charmel Dozier (30)

Analyst

Approved Signatory

1703/24

Version 1-15-2012

Client: Pinchin Ltd. Contact: M. Gibbs Address: 6-875 Main St. W., Hamilton ON. Phone: (289) 925-6907 Fax: Email: mgibbs@pinchin.com jcozzitorto@pinchin.com Project: 140 Waverly Drive Guelph, Ontario Client Notes: P.O. #: 200535.001 Date Submitted: Feb 14 2017 Analysis: PLM - Stop Positive TurnAroundTime: 5 Days	*Instructions: Use Column "B" for your contact info To See an Example Click the bottom Example Tab. Enter samples between "<<" and ">>" Begin Samples with a "<<" above the first sample and end with a ">>" below the last sample. Only Enter your data on the first sheet "Sheet1" Note: Data 1 and Data 2 are optional fields that do not show up on the official report, however they will be included in the electronic data returned to you to facilitate your reintegration of the report data.	Invoice to: J. Cozzitorto jcozzitorto@pinchin.com  4604 Dundas Dr. Greensboro, NC 27407 Phone: 336.292.3888 Fax: 336.292.3313 Email: lab@sailab.com

Sample Number	Data 1 (Lab use only)	Sample Description	Data 2 (Lab use only)
<<			
0017A		12x12 Light Green with Dark Green Streaks Floor Tile / Room X45	
0017B		12x12 Light Green with Dark Green Streaks Floor Tile / Room X44	
0017C		12x12 Light Green with Dark Green Streaks Floor Tile / Room X32	
0018A		12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	
0018B		12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	
0018C		12x12 Light Grey with Dark Grey Streaks Floor Tile / Room X45	
0020A		12x12 Light Brown with White Streaks Floor Tile / Room X40	
0020B		12x12 Light Brown with White Streaks Floor Tile / Room X40	
0020C		12x12 Light Brown with White Streaks Floor Tile / Room X31	
0021A		12x12 White with Green Streaks Floor Tile / Room X44	
0021B		12x12 White with Green Streaks Floor Tile / Room X44	
0021C		12x12 White with Green Streaks Floor Tile / Room X44	
0028A		12x12 Grey with White Streaks Floor Tile / Room X35	
0028B		12x12 Grey with White Streaks Floor Tile / Room X35	
0028C		12x12 Grey with White Streaks Floor Tile / Room X35	

Accepted ☒

Rejected ☐

Handwritten signature
 2/15 10PM



Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7420



Customer: Pinchin Ltd.
11-875 Main St West
Hamilton, Ontario L8S 4R9

Attn: M Gibbs
Jessica Cozzitorto

Lab Order ID: 1702474
Analysis ID: 1702474_PBP
Date Received: 2/8/2017
Date Reported: 2/10/2017

Project: 140 Waverly Drive Guelph, Ontario

Sample ID	Description	Mass (g)	Concentration (ppm)	Concentration (% by weight)
Lab Sample ID	Lab Notes			
L001	blue door frame / corridor door X116	0.0828	< 48	< 0.005%
1702474PBP_1				
L002	blue door / room X09	0.0496	140	0.014%
1702474PBP_2				
L003	white wall / boy's washroom X48	0.0805	280	0.028%
1702474PBP_3				
L004	brown door / room X42	0.0637	3500	0.35%
1702474PBP_4				

Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA ELPAT program. ELPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb).

Daniel Olson (4)

Analyst

Scientific Analytical Institute, Inc. 4604 Dundas Dr. Greensboro, NC 27407 (336) 292-3888

Laboratory Director

Client: Pinchin Ltd.
Contact: M. Gibbs
Address: 6-875 Main St W, Hamilton, ON
Phone: 2899256907
Fax:
Email: mgibbs@pinchin.com
jcozzitorto@pinchin.com
Project: 140 Waverly Drive
Guelph, Ontario
Client Notes: % lead by weight
P.O. #: 200535.001
Date Submitted: Feb. 7, 2017
Analysis: % lead by weight
TurnAroundTime: 3 Days

***Instructions:**
Use Column "B" for your contact info

To See an Example Click the
bottom Example Tab.

Enter samples between "<<" and ">>"
Begin Samples with a "<<" above the first sample
and end with a ">>" below the last sample.
Only Enter your data on the first sheet "Sheet1"

Note: Data 1 and Data 2 are optional
fields that do not show up on the official
report, however they will be included
in the electronic data returned to you
to facilitate your reintegration of the report data.

Version 1-15-2012

1702474

Invoice to:

Jessica Cozzitorto
jcozzitorto@pinchin.com

Scientific
Analytical
Institute



4604 Dundas Drive
Greensboro, NC 27407
Phone: 336.292.3888
Fax: 336.292.3313
Email: lab@sailab.com

Sample Number	Data 1 (Lab use only)	Sample Description	Data 2 (Lab use only)

<<

L001

L002

L003

L004

>>

blue door frame / corridor door X116

blue door / room X09

white wall / boy's washroom X48

brown door / room X42

Accepted ☒

Rejected ☐

DO/DOA
2-8-17

Certificate of Analysis

M. Gibbs

Pinchin Ltd. (Hamilton)
11-875 Main Street West, Unit 11, Hamilton, ON L8S 4R9

Printed: Feb 13, 2017

Report Description: 3 solid samples were submitted for the following chemical analysis

Project Name: Waverly Drive Public School
Project No.: 200535.001
Site Location: 140 Waverly Drive, Guelph, ON

Date Sampled: Feb 03, 2017
Date Tested: Feb 13, 2017
Sampled by: M. Gibbs

Report Number: 17-0242

No.	Analyte	Result	Units	MDL	Comments	Technique / Test Method
<u>1</u>	<u>Sample ID.:</u> PCB-01 - Grey Window Caulking, Exterior					
	PCBs in Solid	<0.5	mg/kg	0.5		LAB-M06 (EPA 3550C/8082A modified)
<u>2</u>	<u>Sample ID.:</u> PCB-02 - Brown Door Caulking, Exterior					
	PCBs in Solid	<0.5	mg/kg	0.5		LAB-M06 (EPA 3550C/8082A modified)
<u>3</u>	<u>Sample ID.:</u> PCB-03 - White Window Caulking, Interior					
	PCBs in Solid	8	mg/kg	0.5		LAB-M06 (EPA 3550C/8082A modified)
	Comment(s)	-	N/A	N/A	"mg/kg" is equivalent to "ppm"	N/A

Results relate only to the samples tested above, as received.

Approved By:

Son C.H. Le, B. Eng. (Chem.)

Lab Manager

Phone: (519) 740-1333 Ext.: 230

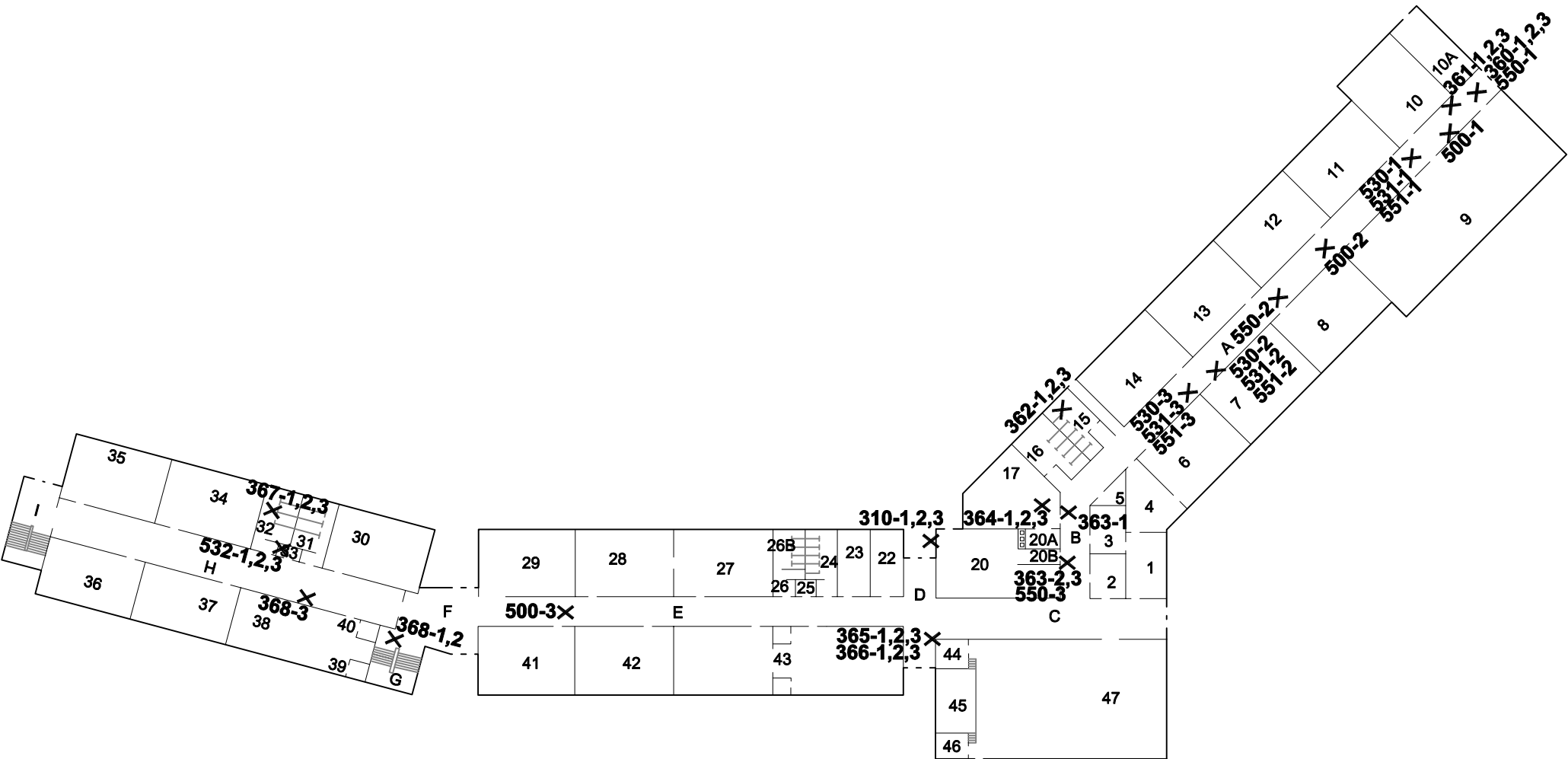
Fax: (519) 740-2320

Email: SonLe@aevitas.ca

The Analytical Chemistry Laboratory of Aevitas Inc. (Ayr) is accredited for specific tests in accordance with the recognised International Standard ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation (CALA) Inc. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009). The laboratory quality management system of Aevitas Inc. (Ayr) meets the principles of ISO 9001:2008.

All Analytical data is subject to uncertainty which, may vary with sample matrices, sample preparation techniques and instrumental parameters. As a general guideline, uncertainty may be expressed as approximately +/- 50% of the reported value at or near the Method Detection Limit (MDL) and +/-10% or less, of the reported result that is greater than 10 times the MDL. Method Detection Limits are defined as approximately 3 times the standard deviation value (at 99% confidence level), which is obtained from replicate analysis of a low-level standard as per the Ontario MOE - MISA Protocol for the Sampling and Analysis of Industrial / Municipal Wastewater (1999). MDL determination is based on undiluted samples with relatively low matrix interferences. Where dilutions are required, the reported MDL value will be scaled proportionally.

All testing procedures follow strict guidelines and quality assurance / quality control (QA/QC) protocols. QA/QC data is available for review at any time upon client's request.



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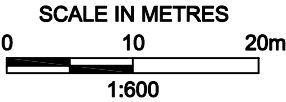
X SAMPLE

REFERENCE

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ENTITLED: Waverly Dr Floor Plan

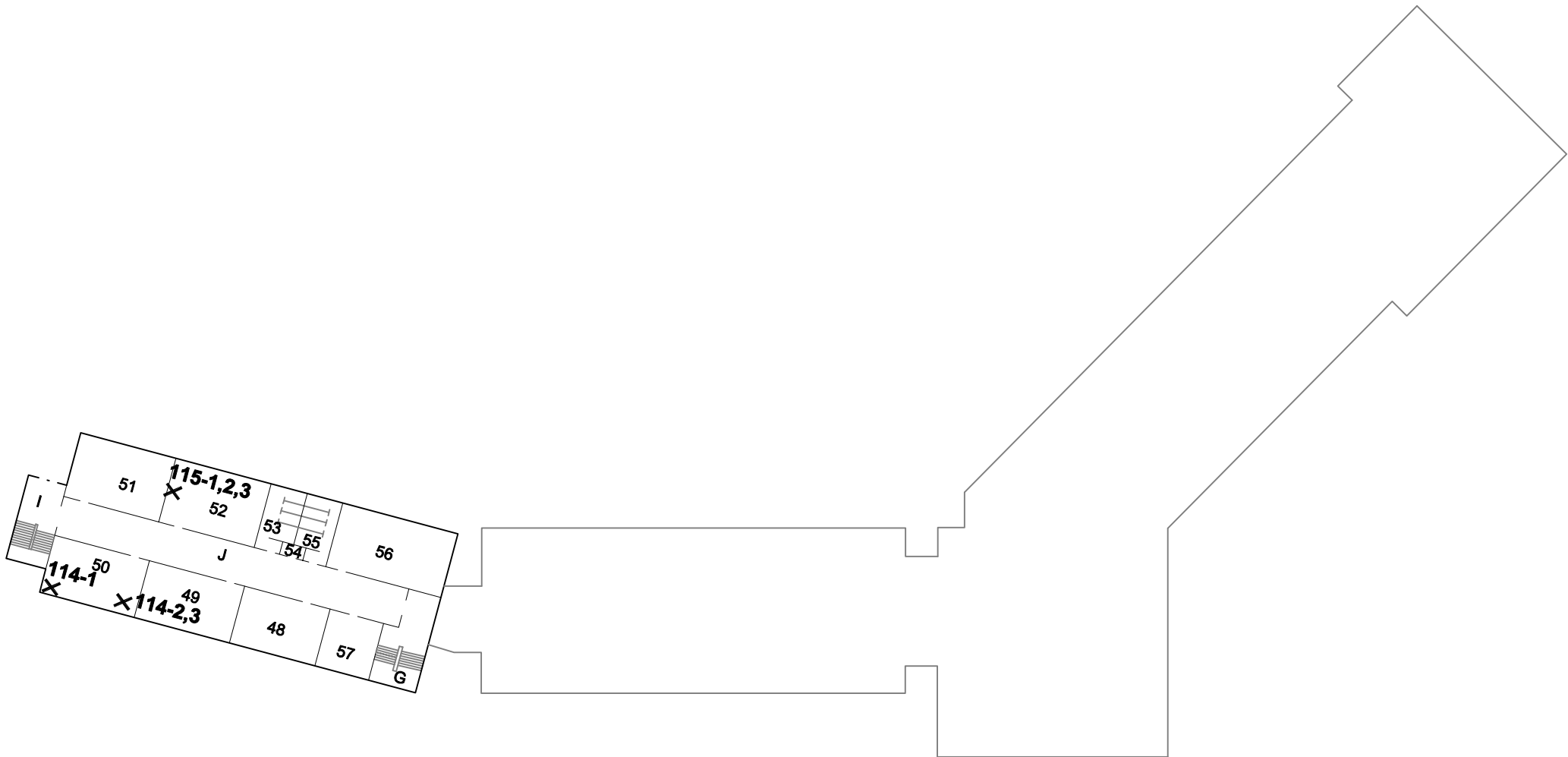
NOTES

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PROJECT		ASBESTOS SURVEY PROJECT UPPER GRAND DISTRICT SCHOOL BOARD 2434 - WAVERLY DRIVE PUBLIC SCHOOL			
TITLE		SAMPLE LOCATION PLAN (MAIN FLOOR)			
	PROJECT No. 06-1135-044		FILE No. 2434-061135044-D101		
	CADD LMK		SCALE AS SHOWN		
	CHECK		REV.		
			FIGURE 2		

Drawing file: 2434-061135044-D101.dwg Jun 16, 2007 - 11:14am



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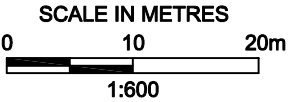
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PROJECT		ASBESTOS SURVEY PROJECT UPPER GRAND DISTRICT SCHOOL BOARD 2434 - WAVERLY DRIVE PUBLIC SCHOOL		
TITLE		SAMPLE LOCATION PLAN (SECOND FLOOR)		
 Golder Associates LONDON, ONTARIO		PROJECT No. 06-1135-044		FILE No. 2434-061135044-D101
		CADD	LMK	Oct. 10/06
		CHECK		
		SCALE	AS SHOWN	REV.
		FIGURE 3		

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PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this section and shall apply as if repeated here.

1.2 Work in Other Sections

- .1 Related Work Specified in Other Sections

Section	02 41 15	Selective Demolition and Removals
Section	04 22 00	Concrete Unit Masonry
Section	05 50 00	Metal Fabrications
Section	06 10 11	Rough Carpentry
Division 15		Mechanical
Division 16		Electrical

1.3 Reference Standards

CSA-A23.1-14 – Concrete Materials and Methods of Concrete Construction
CSA A23.2-14 – Test Methods and Standard Practices for Concrete
CAN/CSA-A3001: Portland Cement
CAN/CSA-A23.5-M86: Supplementary Cementing Materials
CAN/CSA-A362-93: Blended Hydraulic Cement
CSA G30.18-09 (R2014): Carbon steel bars for concrete reinforcement
CSA G30.3-M1983 (R1998): Cold-Drawn Steel Wire for Concrete Reinforcement
ASTM A820/A820M-16, Standard Specification for Steel Fibres for Fibre Reinforced Concrete.

1.4 Samples

- .1 At least (3) weeks prior to commencing work, inform the Consultant of the proposed mix design and proposed source of ready mixed concrete.
- .2 A sample of the finishes shall be prepared and remain as the minimum acceptable standard for the project.

1.5 Certificates

- .1 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.
- .2 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1.

1.6 Quality Assurance

- .1 The Contractor shall employ an independent inspection and testing company to carry out all testing and inspection as required. The Consultant will appoint the inspection and testing

- company. The cost of inspection and testing shall be paid by the Contractor, out of the Cash Allowance carried for this testing under Division 1.
- .2 Samples and methods of moulding shall conform to the requirements of CSA-A23.2.
 - .3 Additional testing shall be made if there is a distinct change in job conditions or if required by the Consultant or the authority having jurisdiction.
 - .4 Compression tests shall be performed in accordance with CSA-A23.2 and good practice.
 - .5 Failure to meet strength requirements will result in rejection of materials, strengthening or replacement of those portions that failed to develop the specified strength.
 - .6 Concrete slump shall be tested at time that cylinders are cast and at such other times deemed necessary.
 - .7 The addition of water and admixtures on the site is hereby prohibited and unacceptable for the project.**

1.7 Submittals

- .1 Submit shop drawings in accordance with Section 01300 Submittals.

1.8 Waste Management And Disposal

- .1 Designate a cleaning area for tools to limit water use and runoff.
- .2 Carefully coordinate the specified concrete work with weather conditions.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .5 Choose least harmful, appropriate cleaning method which will perform adequately.

PART 2 – PRODUCTS

2.1 Materials

- .1 Formwork: As specified in Section 03100.
- .2 Formwork Lumber:
 - .1 Plywood and wood formwork materials to CSA-A23.1. Formwork materials brought on site shall be new.
 - .2 Panels shall be fabricated for use as form panels, finished one side with form coating, with sealed edges and a minimum thickness of 17mm.

- .3 Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.
- .4 Form Coating: Formaseal, as manufactured by Sternson Construction Products.
- .5 Joint Tape: Non-staining, water impermeable, self-releasing.
- .6 Form Ties: Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface, and not leaving metal closer than 25mm to the surface of the concrete.
- .7 Tie Hole Plugs: 25mm dia. tapered P.V.C. hole plugs.
- .8 Reinforcing Steel: As specified in Section 03200.
- .9 Reinforcing Steel: Billet steel, grade 400R, deformed bars to CAN/CSA-G30.18 to sizes shown on structural drawings. Where none is shown, provide 15M bars at 300mm centres as minimum steel.
- .10 Wire Mesh: Welded Wire Fabric to sizes and locations shown on drawings. Where none is shown, provide 152x152xMW18.7xMW18.7 W.W.F. one layer as minimum.
- .11 Portland Cement: to CAN/CSA-A3001, Type GU.
 - .1 Note: CAN/CSA-A3001 divides cementitious materials into the following categories:
 - Type GU – General use hydraulic cement
 - Type MS – Moderate Sulphate-resistant hydraulic cement
 - Type MH- Moderate heat of hydration hydraulic cement
 - Type HE – High early strength hydraulic cement
 - Type LH – Low heat of hydration hydraulic cement
 - Type HS – High-sulphate resistant hydraulic cement
 - Type GUb – Blended general use hydraulic cement.
 - .2 The Cement designation for this project is intended for general application to this project primarily for slab patching. In the event specific locations other than slabs are requiring cast in place concrete, consult the Engineer in advance to confirm designation and mix design.
- .12 Water: to CSA-A23.1.
- .13 Aggregates: To CSA-A23.1. Coarse aggregates to be normal density. Use blend of 10mm and 20mm for coloured patterned concrete slabs.
- .14 Air Entraining Admixture: To CAN/CSA3-A23.5.
- .15 Chemical Admixtures: To CAN/CSA3-A23.5 water reducing type WN. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .16 Colour Admixtures: Integral coloured pigments to C-979-86. Two (2) colours to be selected by Consultants from manufacturer's standard range.

- .17 Non-Shrink Grout: Sternson M-Bed Superflow or approved equal.
- .18 Floor Hardener: Surflex TR trap rock hardener, shake on, by Euclid Chemical Company. Application rate of 5kg/m² (1.0 lb/ft²).
- .19 Interior Cure and Seal Compound: Interior slabs shall be W. R. Meadows "Intex". No resin-based compounds will be accepted.
- .20 Exterior Cure and Seal Compound: Exterior concrete slabs and gutters shall be W. R. Meadows "Sealtight CS-309".
- .21 Expansion Joint Filler: Shall be Sealtight asphalt expansion joint filler, W. R. Meadows.
- .22 Joint and Sawcut Filler: Shall be Loadflex by Sternson or Jointflex by CPD.
- .23 Joint Tape: Shall be Sealtight Gusset Tape by W. R. Meadows.
- .24 Premoulded Membrane: Shall be Sealtight 7100-312 (PMPC), W. R. Meadows.

2.2 Concrete Mixes

- .1 Proportion normal density concrete in accordance with CSA A23.1, to give following properties for concrete in foundation walls, footings, composite deck toppings and any other unspecified concrete:
 - .1 Cement: Type GU Portland cement, minimum 325 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 50 to 100 mm.
 - .6 Air content: 0 to 3%.
- .2 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give following properties: for concrete in slabs-on-grade, structural slabs and columns:
 - .1 Cement: Type GU Portland cement, minimum 325 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 32 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 60 to 100 mm.
 - .6 Air content: 0 - 3% maximum.
- .3 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in precast concrete toppings:
 - .1 Cement: Type GU Portland cement, minimum 275 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 10 mm.
 - .5 Slump at time and point of discharge: 60 to 100 mm.
 - .6 Air content: 0 - 3% maximum.

- .4 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in exterior structural slabs and sidewalks/curbs:
 - .1 Cement: Type GU Portland cement, minimum 275 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 32 MPa.
 - .4 Class of exposure: C-2.
 - .5 Nominal size of coarse aggregate: 20 mm.
 - .6 Slump at time and point of discharge: 60 to 100 mm.
 - .7 Air content: 5 to 8%.
- .5 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in grouted masonry blocks and concrete in metal pans.
 - .1 Cement: Type GU Portland cement, minimum 275 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 20 MPa.
 - .4 Nominal size of coarse aggregate: 10 mm.
 - .5 Slump at time and point of discharge: 50 to 100 mm.
 - .6 Air content: 0 - 3% maximum.
- .6 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give following properties: for concrete fill.
 - .1 Cement: Type GU Portland cement, minimum 250 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 10 MPa.
 - .4 Nominal size of coarse aggregate: 10 mm/20 mm.
 - .5 Slump at time and point of discharge: 100 mm.
 - .6 Air content: 0 - 4% maximum.
- .7 Proportion normal density concrete in accordance with CSA-A23.1 to give following properties for concrete slab on grade:
 - .1 Cement Type GU Portland cement, minimum 325 kg/m³
 - .2 Maximum 25% slag cement content.
 - .3 Nominal size of aggregate 19mm and 40mm.
 - .4 Slump at time and point of discharge: 60-80mm (without superplasticizer) (100-120mm with superplasticizer).
 - .5 Steel fibre reinforcing: 30 kg/m³ Dramix L 60/1.05
 - .6 New metallic floor hardener at a rate of 7.5kg/m²
 - .7 Minimum compressive strength at 28 days of 32 MPa.
 - .8 Air content: 0 to 4%.
- .8 Do not change job mix formula without prior approval of the Consultant.
- .9 In addition to 28 day strength tests, 7 days test may be carried out. If average strength at 7 days is less then 70% of specified 28 day strength, check mix at once and adjust to ensure required strength is obtained.

PART 3 - EXECUTION

3.1 Workmanship

- .1 All concrete shall be as set forth in CSA-A23.1 and shall be composed of cement, fine and coarse aggregates and water.
- .2 Concrete shall be delivered and discharged within 1½ hours after the introduction of the mixing water at the batch plant.
- .3 Mixing, placing, compaction, curing, hot and cold weather protection shall conform to CSA-A23.1. Use power vibrators in sufficient number and in location and duration to the Consultant's complete satisfaction as required.
- .4 Obtain the Consultant's approval before placing concrete. Provide 24 hour notice prior to placing of concrete.
- .5 Pumping of concrete is permitted only after approval of equipment and mix.
- .6 Ensure reinforcement and inserts are not disturbed during concrete placement in order to maintain proper coverage.
- .7 Prior to placing of concrete obtain the Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 Do not place load upon new concrete until authorized by the Consultant.

3.2 Formwork

- .1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1.
- .3 Align form joints and make watertight. Keep form joints to minimum.
- .4 Use 25mm chamfer strips on all vertical and horizontal corners of exterior retaining walls as indicated on drawings.
- .5 All surfaces of formwork which face concrete, which will be exposed to view are to be coated with protective form coating to minimize transfer of wood grain to finished concrete.

- .6 Clean formwork in accordance with CSA-A23.1 before placing concrete.
- .7 Re-use of formwork is subject to requirements of CSA-A23.1.
- .8 When forms are stripped during the curing period, cure and protect the exposed concrete.
- .9 Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.
- .10 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

3.3 Inserts

- .1 Co-ordinate and verify that the Electrical Contractor has set all ducts, boxes and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated on structural or civil drawings must be approved by the Consultant.
- .2 Co-ordinate and verify that the Mechanical Contractor has set all floor drains, cleanouts, trench drains to provide a smooth, flush appearance with the '**FINISHED FLOOR SURFACE**' and to ensure a positive and uniform slope towards the drains.
- .3 Do not eliminate or displace reinforcement to accommodate inserts or hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Consultant before placing of concrete.
- .4 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete. With the Consultant's approval, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be at least 100 mm in diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used. Protect anchor bolt holes from water accumulations. Set bolts and fill holes with non-shrink grout or epoxy (as noted on drawings).
- .5 Set hollow metal frames, plumbed, squared and braced with blocking in locations shown on drawings.

3.4 Grouting

- .1 Grout underside of steel column bearing plates with non-shrinking grout to manufacturer's instructions. Place grout to cover steel shims left in place.

3.5 Finishing

- .1 Finish all concrete surfaces in accordance with Section 03350.

3.6 Expansion Control

- .1 Expansion Joints: Install expansion joint material between slabs on grade and masonry walls, for interior slabs and at max. 6000mm spacing for exterior slabs and curbs, and between slabs

on grade and concrete curbs.

- .2 Control Joints: Sawcut control joints at a maximum spacing of 3000mm in each direction and where noted on drawings. Cut joints within 24 hours of placing and to a depth as detailed on drawings.

3.7 Exterior Round Columns

- .1 Form exterior round columns using smooth steel forms, manufactured in two half sections for ease of removal.
- .2 Resulting concrete surface to be shiny and smooth, free of blemishes and honeycombing.
- .3 Contractor to consult with engineer and consultant prior to column construction to review construction procedures and use of concrete admixtures.
- .4 Patching of concrete honeycombing and blemishes after form removal will not be acceptable.

3.8 Precast Concrete Slab Toppings

- .1 Install structurally bonded 50 ± thick precast slab toppings as detailed on structural drawings.
- .2 Bond concrete topping to precast concrete slabs via latex modified bonding agent installed in strict compliance with manufacturer's recommendations.
- .3 Finish concrete toppings true, level, and smooth via power float and power trowel unless indicated otherwise.
- .4 Provide depressions and roughened surfaces in designated areas as required to accommodate specific specified floor finishes.

3.9 Water/Vapour Control

- .1 Butt joints tight together and tight to foundation wall. Seal all joints with gusset tape including foundation wall junctions.
- .2 Protect during placing of concrete to ensure the integrity of the barrier is maintained. Repair immediately any penetrations or areas damaged in accordance with the manufacturer's recommendations.

3.10 Curing and Protection

- .1 Cure and protect newly finished slabs and steps in accordance with CSA A23.1.
- .2 Coat exterior slabs, curbs with curing compound and leave for 30 days. Apply sealer after curing period has expired.
- .3 Cure finished concrete surfaces in a manner which will leave the surface with a uniform

appearance and with a minimum of discolouration after drying. Ensure that curing compounds are compatible with adhesives for finishes to be applied later.

- .4 For all concrete slabs that are to remain exposed, curing compound is to be applied at a rate required for use as a sealer/hardener, in accordance with the manufacturer's instructions.

3.11 Field Quality Control

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Consultant in accordance with CSA-A23.1.
- .2 The Consultant will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .3 Inspection or testing by Consultant will not augment or replace contractor quality control nor relieve him of his contractual responsibility.

3.12 Tolerances

- .1 Cast-in-Place concrete shall be constructed within the dimensional tolerances specified in CSA-A23.1, as specified elsewhere in this section. Concrete floor slabs shall be constructed as moderately flat slabs and within the tolerances listed below.
- .2 Conform in line, level and plumbness to the following tolerances. These are maximum values.
- .3 Variation from vertical, in lines and surfaces of walls piers:

:	In height of 3m (10')	-	6mm (1/4")
- .4 Variation from level or from grades shown in floors grade:

:	In any 3m (10')	-	3mm (1/8")
:	In any bay up to 6m (20')	-	6mm (1/4")
:	In any 12m (40')	-	12mm (1/2")
- .5 Variation from straight or from correct position in walls:

:	In length up to 6m (20')	-	12mm (1/2")
:	In any 12m (40')	-	12mm (1/2")
- .6 Variation in size and location of sleeves, floor open and the like and in location of bolts, inserts and fastenings:

:		-	6mm (1/4")
- .7 Variation in location of bolts, inserts, sleeves and fastenings when in group:

:		-	3mm (1/8")
- .8 Variation in cross-section of slabs, walls and piers:

:	Maximum oversize	-	12mm (1/2")

: Maximum undersize - 6mm (1/4")

- .9 There shall be no variations from required level at junction of walls and floors.
- .10 Where drains occur, floors shall be properly and uniformly sloped to allow complete drainage of the area.

3.13 Duct Bank (Interior as applicable)

- .1 Excavate to elevations shown and form duct bank as shown on electrical drawings.
- .2 Place reinforcing steel as shown. Electrical Contractor to place ducts.

3.14 Defective Concrete

- .1 Concrete is defective when:
 - .1 Containing visible honeycombing or embedded debris.
 - .2 Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.
 - .3 Average 28 day strength of any three consecutive strength tests is less than specified minimum 28 day strength.
 - .4 Any 28 day strength test result in less than 88% of specified minimum 28 day strength.
 - .5 Cracking occurs in locations other than at control and construction joints.
 - .6 Curing is not carried out strictly according to the specifications.
- .2 Remove and reconstruct in entirety any defective concrete footing, slabs, walls as directed by the Consultant.

3.15 Cold Weather Protection

- .1 Refer to CSA Standards CSA-A23.1 and CSA-A23.2 Provisions and Publications. Include for tarped heated enclosures - no non-freeze additives such as calcium will be tolerated on this project.

END OF SECTION 03300

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

.1 Related Work Specified in Other Sections

Section 03 30 00	:	Cast-in-Place Concrete
Section 04 21 13	:	Masonry Veneer
Section 05 51 00	:	Structural Metal Framing
Section 05 50 00	:	Miscellaneous Metal
Section 07 52 16	:	SBS Modified Bitumen Roofing
Section 07 62 00	:	Sheet Metal Flashing & Trim
Section 07 92 10	:	Sealants
Section 08 11 14	:	Hollow Metal Doors & Frames
Section 08 50 50	:	Aluminum Windows

1.3 Qualifications

- .1 Execute work of this section only by a contractor who has adequate equipment and skilled tradesmen to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of at least five years.

1.4 Reference Standards

CAN/CSA-A5/A8/A362-93 - Blended Hydraulic Cement
CAN/CSA-A165 SERIES-04 (R2009) - Concrete Block Masonry Units
CAN/CSA A82-06 (R2011), ASTM C216-10 – Fired Masonry Brick Made from Clay or Shale
CSA A371-14 – Masonry Construction for Buildings
CSA S304.14 – Design of Masonry Structures
CSA-A23.1-14 - Concrete Materials and Methods of Concrete Construction

- .1 Install flashings in masonry as follows:
.1 Install flashings under exterior masonry bearing on foundation wall and at window lintels at and all locations shown on drawing in conjunction with masonry work.

1.5 Supervision

- .1 Work of this Section shall be executed under the continuous supervision and direction of a competent foreman for each class of work.
.2 One thoroughly experienced, reliable and competent tradesman shall be in charge of mortar mixing.
.3 Ensure that all items required to be built into masonry walls by all other trades are known and co-ordinated prior to commencement of work.

- .4 Consult the approved shop drawings for all sections of the specifications to determine the exact location of items to be built into masonry.

1.6 Submittals

- .1 Submit for approval clearly labelled samples of masonry materials to be used in the work. Submit for approval any alternative materials if requested by the Consultant.
- .2 Mock-up not required for this project.

1.7 Defects Defined

- .1 In addition to non-compliance with specified requirements or other contract requirements, the following will be considered defect:
 - .1 Shrinkage in individual units and erected walls.
 - .2 Spalling, efflorescence, cracking or chipping of units.
 - .3 Poor colour or texture blending of units.
 - .4 Surface deterioration dusting.
 - .5 Discolouration, crumbling and similar deterioration of mortar, grout.
 - .6 Failure of built in items to remain anchored.

1.8 Storage of Materials

- .1 Store cementitious material in accordance with CAN/CSA-A5/A8/A362. Store aggregates in accordance with CSA-A23.1. Stack masonry units to avoid chipping. Manufacturer's seals and labels shall be intact. Refer to cold weather protection Article 3.6 for requirements of preheating masonry materials prior to building in.

1.9 Wind Bracing

- .1 Brace walls during construction until the structure provides sufficient lateral support. **This is a mandatory requirement.**

1.10 Protection

- .1 Cover top of completed and partially completed masonry walls not protected by permanent work. Use waterproof coverings draped 600 mm (min.) down each side of wall and securely anchored.

PART 2 - PRODUCTS

2.1 Materials

- .1 Portland Cement:
 - .1 To CAN3-A5-M83.
- .2 Masonry Cement:

-
- .1 TO CSA A8-1970.
 - .3 Hydrated Lime:
 - .1 To ASTM C207-74.
 - .4 Aggregate:
 - .1 To CSA A82.56-M1976.
 - .5 Water: Verify that water used contains no salts to cause efflorescence.
 - .6 Concrete Masonry Units:
 - .1 Bubble cured units or Autoclaved units to meet requirements of CSA-A165 Series 14.
 - .2 Type H/15 A/M normal weight block.
 - .3 Size Metric
 - .4 Special Shapes - Supply corner block, "L" shape block, bullnose block, header block, lintel block and the like as shown on the drawings, or as required.
 - .7 Stone Sills: 4" thick x width of window x 6" wide Limestone, bevelled with drip, fine dressed, furnished as supplied by OSI Hard Surfaces, Mississauga, Ontario.
 - .8 Face Brick:
 - .1 Refer to Section 04 21 13.
 - .9 Insulation: As specified in Section 07220.
 - .10 Glass Fibre Board: Glass fibre insulation, semi-rigid board, density of 20.8 kg/m³ (1.3 lbs./cu.ft.).
 - .11 Bellows for Control and Expansion Joint: Bituminous membrane type compatible with wall membrane.
 - .12 Dampproof/Thru-Wall Flashing: Fibre reinforced membrane, coated one side with 0.61 kg/m² (2 oz./sq.ft.) copper, to meet quality standard of Copper-Bar by Gummed Papers Limited or Bituminous reinforced membrane manufactured by Monsey Bakor Inc.
 - .13 Asphalt Emulsions: As specified in CGSB 37-GP-2M.
 - .14 Air Barrier Membrane: As specified in Section 07220.
 - .15 Brick Vents: Flexible PVC offset "T" shape with vertical leg slotted to allow passage of air, for installation in vertical joints, to meet quality standard of GOODCO brick vent.
 - .16 Wall Reinforcing: As shown on Structural drawings.
 - .17 Cavity Wallbonding Box Tie: 4.76mm (3/16") galvanized high tensile steel wire, truss type reinforcing with box ties @ 400 o/c in two sections to form a hook and eye, Blok-Lok Limited or equivalent by Dur-O-Wal Limited.

- .18 Flexible Anchor: To suit conditions and to allow for differential movement between the structure and masonry work. Typically: 4.76 mm (3/16") diameter steel, galvanized, bent into an equilateral triangular shape with its apex flexibly secured to structure, and with its two legs terminating in 25 mm (1") inward bent hooks extending a minimum of 100 mm (4") into masonry anchored.
- .19 Wall Ties: 22 gauge galvanized corrugated steel.
- .20 Stud Anchors: 14 gauge, hot-dipped galvanized steel plate anchors with 4.76mm (3/16") diameter galvanized steel wire ties for cavity wall.
- .21 Bond Anchor: 4.76 mm (3/16") diameter steel galvanized with 50 mm (2") end bent 90°.
- .22 Galvanizing: To specified requirements of ASTM Specification A153, Class B.3 coatings, for all bolts and hardware, ASTM Specification A116, Class 3 coating, for masonry ties other than above.
- .23 Cleaner: Vanatrol as manufactured by C.P.D., Ratio 6:1 unless otherwise noted by brick/mortar/grout manufacturer. (MURIATIC ACID NOT ACCEPTED).

PART 3 - EXECUTION

3.1 General Workmanship

- .1 Employ properly qualified masons for laying up masonry units.
- .2 Distribute exposed masonry units of varying colours, tones and textures evenly over wall surface to avoid patches and streaks and to produce a pleasing appearance.
- .3 Gaining to meet spandrels, etc., leaving courses uneven or with visibly thicker mortar joints will not be acceptable. Any such work must be removed and rebuilt to approval of Consultant.
- .4 Construct masonry evenly in maximum lifts of 1200 mm per working day. Rake back ends of unfinished walls; do not tooth and bond new masonry.
- .5 Chases, fixtures, outlets must be built - not cut. Co-ordinate with Mechanical and Electrical.
- .6 Install aluminium and hollow metal door frames by building in lugs and filling voids with mortar. Keep frames free of mortar stains. Protect as required.
- .7 Chipped or blemished units may be used where concealed. Chipped, cracked or broken units are considered deficiencies where exposed to file and shall be removed and replaced.
- .8 Build masonry with accurately plumbed faces, truly horizontal bed joints and accurately aligned vertical joints.
- .9 Notwithstanding current trade practices in this regard, fill all vertical collar and bed joints

through the entire wall thickness solidly with mortar.

- .10 Cut masonry neatly with a carborundum saw where it comes in contact with the structure and where else required and build tightly against the structure except where expansion control and deflection joints are required. Build masonry up and neatly fit to all openings, and all anchors for frames for such openings shall be built securely into joints.
- .11 Do all cutting, fitting and patching in masonry work to receive work of other trades. Install items supplied by other trades to be built into masonry walls, plumb, level, rigid and secure. Build in all miscellaneous metal work, loose lintels, bearing plates, sleeves, anchor bolts, wood nailer and all other items which require building into the masonry. Set access doors with front face flush with final wall finish. Locate such fittings precisely as directed.

3.3 Existing Imperial Size Units

- .1 Applicable to renovation locations in portions of the existing school.
- .2 The original building is constructed in imperial sized units. Have regard for details on drawings pertaining to salvaging brick or block in specific locations, or cutting and bullnosing existing block or joining through means of control joint.
- .3 Regardless of salvage, where new openings are cut (or patched) into existing masonry, carefully cut units, fill open exposed cavities and grind exposed corners to a neat bullnose condition for exposed corners. Parge smooth the final bullnose corner after grinding and prior to block filler being applied by painter.
- .4 Where in-filling local areas of unit masonry use salvaged block to match sizes of existing units.
- .5 Where in-filling with new masonry and salvage of sufficient imperial units is not practical review condition in advance with the Architect in advance of the work. It may be approved to cut existing units in a neat line and remove any sharp edge by grinding. Install new masonry flush on exposed areas along a tooled, grouted, vertical control joint.

3.2 Lintels

- .1 Set loose lintels supplied under Section 05100 for bridging openings in masonry.
- .2 Bridge openings not exceeding 450 mm in width with 6 mm mild steel plate lintels bearing 100 mm on each side of opening. Width of plate shall be wall thickness less 25 mm. Joint at lintel to be dry packed. Provide minimum brick vents per lintel at 800 o/c.
- .3 Install concrete block lintels where indicated on drawings. Fill with 25 MPa concrete and reinforce as shown. Temporarily support until concrete is cured.

3.3 Structural Bearing

- .1 Install bearing pads in all load bearing walls to receive structural components by:
 - : Two courses of solid masonry units at least 400mm (16") in upper course and

800mm (32") long in lower course or by lintel blocks at least 800mm (32") long filled with 25MPa (3600 psi) concrete and reinforced with two 10mm (3/8") diameter bars, in bearing course only.

: Co-ordinate this work with fixing devices provided under the work of Section 05100.

3.4 Dampproof Course/Thru-Wall Flashings

- .1 Install bituminous membrane on walls and partitions rising from footings below grade and in locations indicated on Drawings. Lap and seal all joints. Install thru-wall flashings at all lintels, grade junctions and roof junctions and in locations indicated on the drawings. Lap and seal all joints.

3.5 Control Joints

- .1 Control joints shall be located at maximum spacings of 4800 to 6000 centres and be located as shown on the drawings.

3.6 Cold Weather Protection

- .1 Refer to the Ontario Masonry Contractor's Association's provision and publications. Include for tarped heated enclosures, heated mortar mixing pans - no non-freeze additives such as calcium will be tolerated on this project.

3.7 Bonding

- .1 Lay face brick and concrete block units coursing in running bond pattern. Lay soldier and header coursing. Corbel brick piers and friezes as shown on drawings.
- .2 Lay brick coursing to course every second block course. Course soldier coursing to course on three stretcher courses.
- .3 Construct quoins, header courses and soldier and corbelling to protrude 25mm.
- .4 Lay stone in random pattern. Dry pack solid all stone.
- .5 Cut brick to provide opening dimensions shown only as necessary. Cut ends are not to be exposed.
- .6 Anchor brick to back-up at 400 o/c vertical and horizontal maximum with ties.

3.8 Joints

- .1 Ensure cavity width is maintained and keep free of droppings. Back trowel to prevent build-up of mortar.
- .2 Rake brick joints to size and depth in accordance with recommended trade practices.
- .3 Keep control joints, expansion joints and air spaces free from mortar and droppings.

- .4 Construct Control Joints in locations shown. **DO NOT SAW CUT.** Sealing to be carried out in conformance with Section 07900. Install bellows to maintain membrane air barrier integrity. Keep joints free of mortar droppings.
- .5 Make joints of uniform thickness with vertical joints plumbed over each other. Do not butter corners of units, allow mortar scrapings in joints excessively or shift and tap units after mortar has initially set.
- .6 For solid masonry units completely fill with mortar both bed and vertical joints.
- .7 For hollow masonry units ensure that mortar covers all available bearing surfaces fully and fills vertical joints, except for weep and vent holes.
- .8 When work is resumed on walls previously laid with mortar either partially or totally set, remove loose masonry and mortar from top and adjoining surfaces. Remove mortar completely when masonry is removed and replaced with new.
- .9 Form tooled concave joints for concrete block walls wherever exposed to view, whether behind cabinets, fitments, and wall accessories, or not. When mortar has become "thumbprint" hard by a tool having a minimum 500mm long bearing surface to avoid uneven depressions. Clean off burrs with trowel or burlap.
- .10 Rake out joints at juncture of interior and exterior walls with columns, at intersections of walls and partitions where joint reinforcement is installed, and at other caulked joints.
- .11 Form reglets required for metal flashing in masonry.
- .12 Flush-in solidly with mortar between cavity filler strips and interior face of brick veneer.
- .13 Cut joints off flush where treatment is not otherwise specified. No mortar shall protrude from joints on wall surfaces to which insulation will be applied.
- .14 Install insulation using adhesive recommended by the manufacturer. Insulation is to be tight fitting with no joints.

3.9 Laying Masonry

- .1 Stop off horizontal runs of walls by racking back a half unit in each horizontal course: do not tooth.
- .2 Wet clay and shale masonry units before placing. Do not wet concrete units. Wet faces of work in place before laying new work. Units shall not have water adhering to their surfaces when laid; but shall be wet only to ensure that complete hydration takes place, during hot drying weather, and when unit absorption rates are greater than 0.025 oz/sq.in./ minute, so that the initial rate of absorption does not exceed above rate when laid.
- .3 Distribute masonry units of varying colours and textures to avoid spotty appearance over wall surfaces exposed to review. Do not use units which contrast too greatly with overall

range.

- .4 Use chipped and blemished units only where concealed. Do not use defective or broken units. Do not lay concrete units that will appear smooth or slick where exposed to view, whether painted or not.
- .5 Brace walls and piers continuously during construction until structure provides support.
- .6 Extend all walls to construction above except where otherwise noted on Drawings. Leave deflection space over non-load bearing walls as specified later.
- .7 Cope, cut and split concrete masonry units with power-driven abrasive discs. Cut units wherever electrical outlets, grilles, and pipes occur. Allow 4 mm minimum clearance around items which are incorporated in walls.
- .8 Lay hollow concrete masonry units so that effective shells rest and align one over the other. If they do not in bond courses, use solid bonding units.
- .9 Install solid masonry units at all locations required for fixing of handrails, metal partitions and accessories of all description.
- .10 Flush smooth with mortar masonry surfaces that flashings rest against to ensure that they are not punctured.
- .11 Install brick vents at 600 mm (24") o.c. in vertical joints of masonry courses that rest on dampproofing and thruwall flashing and at top of masonry wall at steel lintels.
- .12 Locate bearings and piers as indicated on Drawings; provide solid masonry units at bearings. Grout under bearing plates installed on masonry with non-shrink grout.
- .13 Co-operate at all times with persons carrying out the work of Section 07220, Cavity Wall Insulation.
- .14 Keep cavity spaces free of mortar in cavity walls.
- .15 Build, do not cut, chases. Do not incorporate chases in walls of 200mm (8") thick or less, nor locate them within 500mm (20") of lateral support provided for wall, nor exceed one-third of wall thickness for chase depth. Provide lintels over chases that exceed 500mm (20") in width and that are more than one-third of wall thickness in depth. Locate adjoining chases with a minimum clear distance between them of four times wall thickness.

3.10 Masonry Reinforcing

- .1 Reinforce all masonry walls using joint reinforcement in horizontal joints.
- .2 Place joint reinforcement continuously in horizontal joints. Lap a minimum of 150mm (6") at splices.

- .3 **Reinforcing Schedule**
- : **Inner Wythe of Cavity Walls (Non Load Bearing)**: Heavy duty joint reinforcement every second course between bonding ties.
 - : **Load-Bearing Exterior and Interior Walls**: Heavy duty joint reinforcement every block course.
 - : **Non-Load-Bearing Partitions**: Standard joint reinforcement every second course with additional course over all openings carried at least 800 mm (32") beyond jambs.
 - : Refer to Structural Drawings for size and placement of vertical reinforcing steel.
- .4 Do not reinforce face veneers.
- .5 Where changes in wall thicknesses occur extend horizontal reinforcement 500 mm (20") beyond on each side. Carry reinforcement all around every course in masonry cover to structural steel.
- .6 Do not carry reinforcement through control or expansion joints.
- .7 Wherever walls and partitions intersect one another, or each other, continue reinforcement through. Do not carry it through where lateral support anchors are installed, or intersection occurs at a solid pier.

3.11 Masonry Anchorage and Support

- .1 Anchor masonry construction to ensure its stability and to withstand loads imposed by intended use and by natural elements.
- .2 Anchor masonry construction at structural steel work with flexible anchor every 400mm (16") in height. Weld flexible tab section of anchor to structural steel.
- .3 Unless indicated or specified otherwise, space anchors at a maximum of 600mm (24") vertically and 800mm (32") horizontally.
- .4 **Wall Anchorage:**
- : **For Non-Load-Bearing Partitions**: Anchor partitions that abut or intersect other walls or partitions by corrugated galvanized wall ties spaced at not more than every third course apart vertically or by joint reinforcement.
 - : **For Load-Bearing Exterior and Interior Walls**: Anchor walls that face or abut other load-bearing walls or solid masonry piers by toothing, or blocking, with 100 mm (4") minimum and 200 mm (8") maximum offsets into which strap anchors are set at a maximum spacing of 800 mm (32") vertically. Use lateral support anchors, but with 75 mm (3") hooks. Extend anchors a minimum of 450 mm (18") into masonry at both sides of intersection. Where this is not possible, install cross pins in lieu of hooks to provide equivalent anchorage. At corners, provide true bonding of at least 50% of the units of one wall imbedded in the other. Provide for caulked joints at intersecting walls as part of the work of Section 07900.

- .5 Lateral Support: shall be provided for masonry walls and partitions as indicated on Drawings, specified, and required by jurisdictional authorities; perpendicular to wall faces; and either horizontally or vertically to wall panel edges. Provide lateral support for interior walls and partitions.
- : Horizontally: by wedging masonry against structure, by clips or dowel plates specified in Section 05500 at a maximum spacing of 1800mm (6'-0") o.c. where concealed in the final work or by continuous cover angles where exposed.
 - : Vertically: at junction with poured-in-place concrete by corrugated metal veneer anchors spaced at not more than every third course apart, one for every 4" or part thereof of masonry wall thickness, securely fastened to concrete by an approved method.
- .6 Deflection Space:
- : Provide a deflection space between tops of non-load-bearing walls and partitions and structures to prevent transference of structural loads to masonry.
 - : Fill deflection space with Type AF100 glass fibre board compressed to 50% of original thickness to completely fill space.
 - : Fill voids in accordance with Section 07950 for assemblies requiring a fire resistance rating:
 - : Deflection space shall be 1" unless otherwise designated on Drawings.
 - : Co-ordinate work with installation of lateral support specified in Section 05500.

3.12 Dampproof Flashing

- .1 Install dampproof flashing continuously through exterior masonry walls, under sills and elsewhere as indicated on Drawings. Lap joints 150 mm (6").
- .2 Flush up surfaces to receive dampproof flashing with mortar, and install flashing. Ensure that no coarse aggregate or other protrusions will pierce flashing, and protect it until work resumes.
- .3 Through-wall flashings shall be dressed through full thickness of exterior wythe, across airspace and turn-up at least 150 mm (6") against inner wythe applied with approved adhesive. Install flashings prior to application of cavity wall insulation to details as shown on Drawings.
- .4 When mortar bed for flashing has set resume laying of masonry.
- .5 Where flashing is exposed to view or must bridge air-space without support, use sheet metal flashings provided and installed as part of the work of Section 07560. Install sheet metal flashings after dampproof flashings but prior to others.

3.13 Mechanical Louvres, Grilles, Unit Ventilators

- .1 Construct openings in wall to accommodate sizes and details required by mechanical trades.

- .2 Seal completely around penetrations to prevent air infiltration.

3.14 Patching

- .1 Patch masonry walls damaged by installation of work specified under other Sections, and which have been rejected as defective or otherwise damaged.

3.15 Pointing and Cleaning

- .1 Point all holes in mortar joints and in concrete masonry unit faces.
- .2 Cut out defective mortar joints and repoint.
- .3 Wash down and brush brick and grout/mortar to remove mortar laitance and stains. Use specified cleaners only. Consult with brick/block/grout and mortar supplier for solution strength and recommendations.
- .4 Clean concrete masonry units with brushes and as otherwise recommended by the supplier to remove mortar and stains.
- .5 Do not use wire brushes for cleaning.
- .6 Should specified cleaning methods be insufficient, proceed with other methods only with approval of the Consultant.
- .7 Protect adjacent materials and work from damage while cleaning.

3.16 INSPECTION & TESTING

- .1 Refer to Section 01 11 00 – General Instructions & Summary of Work.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 – Cast-in-Place Concrete
- .3 Section 05 10 00 – Structural Metal Framing
- .4 Section 05 12 23 – Structural Steel for Buildings.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
 - .1 ASTM C126-[99], Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
- .2 Brick Industry Association (BIA).
 - .1 Technical Note No. 20-[2000], Cleaning Brick Masonry.
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA A82.1-[M87(R1999)], Burned Clay Brick (Solid Masonry Units Made From Clay or Shale).
 - .2 CSA A82.3-[M1978(R1998)], Calcium Silicate (Sand-Lime) Building Brick.
 - .3 CSA-A165 Series-[94(R2000)], CSA Standards on Concrete Masonry Units.

1.3 SUBMITTALS

- .1 Product Data.
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions.
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption for units proposed for use.

1.5 PRODUCT DELIVERY STORAGE AND HANDLING

- .1 Ensure that materials are delivered to job site in dry condition.

- .2 Except where wetting of bricks is specified, keep materials dry until use.
- .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 COLD WEATHER REQUIREMENTS

- .1 Comply with Clause 5.15.2 of CAN3-A371-M84.

1.7 HOT WEATHER REQUIREMENTS

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

1.8 PROTECTION

- .1 Until completed and protected by flashings or other permanent construction, keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

1.10 JOB MOCK UP

- .1 Construct mock-up panel of exterior masonry wall construction, 2000 mm x 2000 mm, showing all masonry materials and colors, fixtures, jointing, coursing, mortar and workmanship.

Part 2 Products

2.1 MANUFACTURED UNITS

- .1 **Clay Brick Masonry Units:**
 - .1 All units: Clay Brick, Grade "SW", passing Test Methods specified in CSA-A82. Size to match existing units at the school. Provide samples to match existing from:
 - .1 Brampton Brick, Brampton, Ontario, tel. (800) 462-7425.

- .2 **Field Brick "Type 1":** single colour to match existing brick in tone, colour range, surface texture. Receive samples from architect based on:
 - .1 Brampton Brick – smooth brown metric modular
- .3 All brick to be manufactured from single continuous run to ensure minimum colour and texture variations.
- .2 **Concrete Masonry Veneer Units:**
 - .1 Not required for this project.
- .3 Portland Cement:
 - .1 To CAN3-A5-M83.
- .4 Masonry Cement:
 - .1 TO CSA A8-1970.
- .5 Hydrated Lime:
 - .1 To ASTM C207-74.
- .6 Aggregate:
 - .1 To CSA A82.56-M1976.
- .7 Water:
 - .1 Ensure that water contains no salts which may cause efflorescence.
- .8 **Horizontal Masonry Reinforcing:** Welded truss type or ladder type, as specified from wire to CSA-G30, 3M, hot dipped galvanized after fabrication to ASTM A153, Class B2, minimum coating 457 G/m², wire size for all exterior walls and interior load bearing walls: exterior heavy duty 4.76 mm with hot dipped galvanized coating; Interior non load bearing walls: 3.66 mm with standard dipped galvanized finish 4.76 mm diameter. Reinforcing as per the following:
 - .1 Single wythe walls Dur-O-Wal DW 100;
 - .2 Double wythe walls (up to 390 in width) Dur-O-Wal DW 120;
 - .3 Double wythe walls (greater than 390) Dur-O-Wal DW 220;
 - .4 Cavity Walls Blok-Lok- Blok truss II - BL37 to accommodate a 90 mm cavity with 50 mm thick insulation.
 - .5 Similar reinforcing by Dur-O-Wal, Blok-Lok, and Hohmann & Barnard Inc. is acceptable.
- .9 **Horizontal Masonry Reinforcing, Cavity Wall Alternate:** Fero Slotted Block ties (type 1) 16 gauge sheet metal, hot dipped galvanized, insulation support, 4.76 mm Ø, V-tie, hot dipped galvanized with welded truss type or ladder type reinforcing for back up block, as specified.
- .10 **Reinforcing Bars:** billet steel to grade 400, deformed bars to CSA-G30.12.
- .11 **Thru-wall Flashing and Air/Vapour Barrier Sheet Membrane Treatment:** Self-adhering SBS modified bitumen membrane reinforced with non-woven fibrous glass.

Acceptable materials: Blueskin TW by Bakor Inc., Mississauga or sheet air/vapour barrier membrane as specified as in Section 07 26 00 – Sheet Vapour Retarders.

- .12 **Solid Concrete- filled Blocks:** Fill block courses solid with concrete at locations shown on drawings to receive epoxy anchors for basketball backstops. Refer to Architectural and structural drawings.
- .13 Lateral Support Anchors:
 - .1 Vertical:
 - .1 At intersecting and abutting load bearing walls, use prefabricated corners and tees to match horizontal reinforcing.
 - .2 At intersection of non-load bearing walls with load bearing or non-load bearing walls, use corrugated galvanized ties.
 - .3 At wood parapet and similar conditions, use model BL404 with BLT9 ties, all by BlockLok. Ensure ties extend a minimum of 50 mm into the brick or block outer wythe.
- .14 Bolts and Anchors: To CAN3-A370.
- .15 Mortar:
 - .1 Generally: Use materials only as specified in CSA A179. Ensure that weather and aggregate used in mortar, other than in walls buried in earth, will not cause efflorescence.
 - .2 Bonding Agent: Acrylic latex type by Sternson Limited, W.R. Meadows or Thoro Building Products. Use for all mortar except brick.
 - .3 Mixes: Mix mortars as specified in CSA A179 using the Proportion Specification. Add bonding agent in accordance with manufacturer's instructions.
 - .4 Colour Pigment:
 - .1 As manufactured by Harcos Pigments. Make allowance for full loading of 2 kgs. Per bag of 1-1-6. Allow for **1 colour** to be used with Brick Veneer Type 1, as selected by Consultant and remaining masonry to be natural mortar.
 - .5 Mortar Types:
 - .1 For masonry walls in contact with earth and bedding for bearing plates and lintels: Mortar Type "M".
 - .2 For load-bearing walls: Mortar Type "S".
 - .3 For brick: Mortar Type "N" (1:1:6) premixed "Betomix 1-1-6" Type "S" portland cement hydrated lime as supplied by Daubois Inc., Jiffy Mortar Systems. Mix on site with sand and water.
 - .4 For all other masonry walls, use regular Type "N" mortar.
 - .6 Grout: To CSA A179 Table 3.
- .16 Mortar Dropping Control Device: "Mortar Net" manufactured by Mortar Net USA (Telephone: 1-800-664-6638).
- .17 Weepholes: 90 mm x 90 mm x 10 mm purpose made PVC, designed to drain cavities and with mesh to prevent insects from entering. Colour to be chosen by Consultant from manufacturer's full range.

- .18 Date Stone: Date stone to be 190 x 290 x 90 deep solid granite. Font: Roman (or similar). Beveled edges. High polish finish. Refer to drawing AD 413 and Exterior Elevations.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

- .1 Build masonry plumb, level, and true to line, with joints in proper alignment.
- .2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.3 TOLERANCES

- .1 Clause 5.3 of CAN3-A371-M84 applies except as follows: Walls to receive thinset ceramic tile: plumb within 1:600.

3.4 EXPOSED MASONRY

- .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.

3.5 JOINTING

- .1 Except where indicated otherwise on drawings or details or as below, make concave joints, allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints. Where joints are concealed in walls and where walls are to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating, strike flush.

3.6 WEEPHOLES

- .1 Provide 10 x 90 x 90 mm PVC weepers at regular intervals at both top and bottom of walls as indicated on Drawings. Ensure weepers are clear and not blocked by mortar or mortar droppings.

3.7 JOINING OF WORK

- .1 Where necessary to temporarily stop horizontal runs of masonry, and in building corner, Step-back masonry diagonally to lowest course previously laid. Do not "tooth" new masonry. Fill in adjacent course before heights of stepped masonry reach 1200 mm.

3.8 CUTTING

- .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.
- .2 Make cuts straight, clean, and free from uneven edges. Use masonry saw where necessary.

3.9 BUILDING-IN

- .1 Build in items required to be built into masonry by other trades.
- .2 Prevent displacement of built-in items during construction. Check for plumbness, alignment, and correctness of position, as work progresses.
- .3 Brace door jambs to maintain plumbness. Fill door frame with concrete.

3.10 WETTING OF BRICKS

- .1 Except during winter, wet clay brick having an initial rate of absorption exceeding 1g/min/100mm²; wet to uniform degree of saturation, to 24 hours before laying, and do not lay until surface is dry.
- .2 Similarly, wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

3.11 SUPPORT OF LOADS

- .1 Except where drawing requirements are more stringent, comply with Clause 6.3 of CAN3-S304-M84.
- .2 Where concrete fill is used in lieu of solid units, use minimum 20 MPa concrete to Section 03300.
- .3 Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.

3.12 PROVISION FOR MOVEMENT

- .1 Leave 5 mm space below shelf angles.
- .2 Leave 6 mm space and do not use wedges between tops of non-load bearing walls and partitions and structural elements.

3.13 STEEL LINTELS

- .1 Install steel lintels above windows as shown on structural drawings. Centre over opening width.

3.14 CONTROL AND EXPANSION JOINTS

- .1 Except as noted following, control joints required at maximum of 6000 mm o.c. in continuous walls having no openings, intersections or column locations. Refer to

elevations for locations on exterior walls and advise Consultant of variances prior to executing the work. Control joints are not shown for clarity on the drawings for interior walls. If in doubt, request assistance from the Consultant.

- .2 At doorway locations, unless indicated otherwise on elevation drawings, use one side of doorway beyond lintel. Use building paper to prevent that end of lintel to bond.
- .3 Use standard block with concrete filled end core to form key. Line one side of core with building paper before filling core to prevent bonding. Complete vertical separation, full height and thickness of wall are required.
- .4 Stop masonry reinforcing at each side of the joints. Caulking specified in Section 07 92 10 – Joint Sealers.
- .5 At expansion joints in brick and veneer, install Rapid Expansion joint DA 2015, to leave vertical joint free of mortar to allow for horizontal expansion.

3.15 HORIZONTAL REINFORCING

- .1 Horizontal reinforcing at 400 mm o.c. (every 2nd course), except solid walls greater than, or equal to 340 mm in width. At 340 mm or greater, if applicable, horizontal reinforcing at 200 mm o.c. (every course). Use prefabricated corners and tees at all intersecting loadbearing walls.
- .2 Alternate: slotted block ties at 800 mm x 400 mm spacing, horizontal reinforcing as specified.

3.16 VERTICAL REINFORCING

- .1 Refer to section 04 20 00 Concrete Unit Masonry.

3.17 BONDING

- .1 Walls of two or more widths: bond using metal ties in accordance with subsection 5.6 of CAN3-A371-84.
- .2 Receive procedure with and obtain approval by Consultant.
- .3 In cavity walls, keep all cavity spaces free of mortar and debris by placing a wood strip on the ties. Retain strip on a wire line and pull up level and clean off droppings prior to placing next course of ties. Install mortar control device at 300 mm o.c. horizontally, in a staggered pattern so as to overlap each other on each side. Install in every 2nd course above foundation and shelf angles.

3.18 SOUND AND FIRE SEPARATION

- .1 All loadbearing and non-load bearing partitions shall carry to the underside of structure above.
- .2 All openings in partitions, even above ceilings shall be patched to maintain sound and fire separation.

- .3 In partitions and walls not required to be fire separations, fill space between partitions and structural elements with rock wool compressible filler to maintain complete sound separation.
- .4 In fire separations, spaces to be firestopped in accordance with Section 07 84 00 – Firestopping..
- .5 Use U.L.C. labeled mortar for all patching in fire separations.

3.19 THRU-WALL FLASHING AND THRU-WALL BUILDING PAPER @ CONTROL JOINTS

- .1 Install thru-wall flashing at ground floor elevation in all walls on foundations.
- .2 Leave 2” (50 mm) of thru-wall flashing or building paper hanging, projecting off all lintels and all required locations. Consultant will review prior to cutting.
- .3 Cutting protruding flashing: This procedure is to ensure that thru-wall flashing is installed where intended.

3.20 BASE COURSE DETAIL

- .1 Provide square base block in areas of porcelain tile installation for porcelain cove base and fitted corners. Contractor to grind upper 50mm of block corner to match upper courses of bullnose block walls Refer to Details

3.21 INSPECTION & TESTING

- .1 Refer to Section 01 11 00 – Summary of Work, section 1.41.

3.22 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 On a weekly basis and at completion of work remove all debris, cut blocks and bricks, and mortar droppings.
- .3 Power wash or brush exterior masonry surfaces at completion of work.
 - .1 soft clean cloths.
- .4 Clean concrete brick masonry as work progresses.
 - .1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of brick and finally by brushing.
- .5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 RELATED SECTIONS

.1	Section 03 30 00:	Cast-in-Place Concrete
.2	Section 04 20 00:	Concrete Unit Masonry
.3	Section 05 41 00	Cold Formed Metal Studs
.4	Section 05 50 00:	Miscellaneous Metal fabrications
.5	Section 07 44 56	Cementitious Composite Panels
.6	Section 07 46 13:	Preformed Metal Siding
.7	Section 07 52 16:	SBS Modified Bituminous Membrane Roofing
.8	Section 08 11 14:	Metal Doors and Frames
.9	Section 08 50 50:	Aluminum Windows
.10	Section 09 91 22:	Painting
.11	Division 15:	Mechanical
.12	Division 16:	Electrical

1.3 RELATED SECTIONS

- .13 Products Supplied Under Work of this Section and Installed Under Work of Other Sections
- | | | |
|------------------|---|---|
| Section 03 30 00 | : | To install anchor bolts and loose bearings plates |
| Section 04 20 00 | : | To install anchor bolts, loose bearing plates & anchors |
| Section 04 20 00 | : | To install loose lintels |

1.4 REFERENCE STANDARDS

CSA S16-14: Design of Steel Structures
CSA W59-13: Welded Steel Construction (Metal Arc Welding)
CSA G40.20-13: General Requirements for Rolled or Welded Structural Quality Steel
CSA G40.21-13: Structural Quality Steel
CSA W48-06 (R2011): Filler Metals and Allied Materials for Metal Arc Welding
CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles
ASTM F3125/F3125M-15a: Standard Specification for Structural Bolts, Steel, Heat Treated
830 MPa Minimum Tensile Strength
The Ontario Building Code, (O. Reg. 332/12)

1.5 SOURCE QUALITY CONTROL

- .1 Submit 2 certified copies of mill reports covering chemical and physical properties of steel used in this work.
- .2 Submit affidavits from the manufacturer or fabricator that materials supplied comply with this Specification.
- .3 The Owner will appoint an independent inspection and testing company to ensure that the Work of this Section is performed in accordance with the Specifications. The cost of all inspections/testing shall be paid for from the cash allowance allocated for this in Section 01050

- Allowances.

1.6 DESIGN OF DETAILS AND CONNECTIONS

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16, latest edition, to resist forces, moments and shears indicated.
- .2 For non-standard connections, submit sketches and design calculations stamped and signed by qualified professional Engineer registered in the Province of Ontario.
- .3 For standard connections, select details from CISC Handbook of Steel Construction to ensure structural adequacy.
- .4 Submit shop fabrication details stamped and signed by a qualified professional licensed in the Province of Ontario.

1.7 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01300 Submittals.
- .2 Indicate shop and erection details including cuts, copes, connections, holes, bolts and welds. Indicate welds by welding symbols defined in CSA-W59-13.
- .3 Submit copy of erection drawings to the Consultant for review and reference.
- .4 Submit all weld procedures pertinent to the work prior to or along with the first submission of shop drawings, for subsequent review and acceptance by the Consultant.

1.8 STORAGE AND HANDLING

- .1 Handle all materials with the necessary care to prevent damage to fittings, finishes and alignments.
- .2 Materials damaged due to faulty storage or handling shall be repaired or replaced, without additional expense to the Owner, all to the satisfaction of the Consultant.
- .3 Replace promptly all items verified as received in a damaged condition.

1.9 EXAMINATION

- .1 Examine surfaces with which Work is to be anchored or connected.
- .2 Report to the Consultant, all unsatisfactory conditions likely to prevent or prejudice the proper installation of the work.
- .3 Commencement of Work implies unconditional acceptance of substrate and surface and condition to which all members are to be anchored and secured.

1.10 QUANTITY OF ITEMS

- .1 Where a component, device, item or part of material is referred to in the singular number, such reference shall mean as many as are required to complete the work.

Part 2 Products

2.1 MATERIALS

- .1 Structural steel: to CAN/CSA-G40.21 Grade 350W for rolled sections and plates, Grade 350W for Hollow Structural sections.
- .2 Anchor bolts: to CAN/CSA-G40.21, Grade 300W.
- .3 Bolts, nuts and washers: to ASTM A325M.
- .4 Welding materials: to CSA W48 Series.
- .5 Shop paint primer: to CGSB 1-GP-40M. Refer to Formulas in Section 09 90 00.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA G164, minimum zinc coating of 600 g/m².

Part 3 - Execution

3.1 INSPECTION AND CO-ORDINATION

- .1 The Contractor shall field check all dimensions and elevations affecting his trade at the site. All discrepancies shall be reported to the Consultant before proceeding with the work.
- .2 The Contractor shall report in writing all defects in the work prepared under other sections of the Specifications which will affect the work of this Section. Commencement of the work will imply acceptance of previously prepared work.
- .3 Verify all requirements and dimensions of existing, proceeding and following Work before commencing fabrication.

3.2 FABRICATION

- .1 Fabricate structural steel, as indicated, in accordance with CAN/CSA-S16 and in accordance only with reviewed and stamped shop drawings.
- .2 Supply fastenings, anchors and accessories required for fabrication and erection of 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 absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.
- .3 Beams shall be rolled sections, combined as noted. Beam connections shall be standard double angle clip type, developing full strength of all the members.
- .4 Clean all steel members by scraping, wire brushing or other effective means to remove loose mill scale, rust, oil or other foreign matter. Surfaces shall be thoroughly dry before painting.
- .5 Apply one (1) shop coat of paint, conforming to CGSB 1-GP-40D primer, to all surfaces except surfaces to be in contact with or encased in concrete and surfaces and edges to be field

welded or high tension bolted.

- .6 Apply two (2) shop coats of paint, conforming to CGSB 1-GP-40D primer to all surfaces which will be inaccessible after assembling. Touch up all bolts, welds and surfaces of connecting members damaged during construction.
- .7 All steel exposed to weather including steel lintels in exterior walls shall be hot dip galvanized.
- .8 All members shall be assembled true and without twists or open joints. Shop connections shall be welded.
- .9 High tensile bolted connections, where used, shall be in accordance with CAN/CSA-S16 latest edition. Holes shall be accurately spaced and of size to allow insertion of bolts of 1.5 mm (1/16") diameter less than hole diameter.
- .10 Welding shall be executed so as to avoid damage or distortion to the work. Welds on exterior work shall be continuous to provide proper weathering; all welds on exposed finished work shall be ground smooth.
- .11 There shall be no burning of holes in members in the shop or field without the permission of the Consultant. If consent is given, burned members shall be finished to an acceptable appearance.
- .12 Mark materials in accordance with CAN/CSA-G40. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection. Shop mark bearing assemblies and splices for fit and match.

3.3 ERECTION

- .1 Erect structural steel as indicated in accordance with CAN/CSA-S16 latest edition and in accordance with shop drawings.
- .2 Continuously seal members by continuous welds where indicated. Grind smooth.
- .3 Obtain written permission of the Consultant prior to field cutting or altering of structural members.
- .4 Touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .5 Erection of structural steel on site shall be properly co-ordinated by the Contractor with the work of all other trades. Co-ordinate the work to incorporate all electrical appurtenances, and protect same from damage during erection.
- .6 Bolted assemblies for base connections shall not be tightened until at least 72 hours after the grout pad has been placed.
- .7 All bolts shall be tightened by using a suitable torque wrench, torquing as required in CAN/CSA-S16 latest edition.
- .8 Damaged work will not be accepted on site. Damaged work arriving on site will be returned to the shop for repair and/or refinishing.

- .9 All temporary supports shall be attached to the work in such a manner so as not to mar the surface on the finished section.
- .10 All steel shall be set accurately to the lines and elevations shown on the Drawings.
- .11 Assume full responsibility for the correct plumbing, alignment and setting of all members; set all guys, braces, etc., necessary to maintain the structure during erection, and until such time as the work of other trades is in place.

END OF SECTION 05 10 00

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 05 10 00 – Structural Metal Framing.
- .3 Section 05 31 00 - Steel Decking.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A36/A36M-[01], Specification for Structural Steel.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-85.10-[99], Protective Coatings for Metals.
 - .2 CAN/CGSB-1.40-[97], Anticorrosive Structural Steel Alkyd Primer.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
 - .1 CISC/CPMA 1-[73b], Quick-Drying, One-Coat Paint for Use on Structural Steel.
 - .2 CISC/CPMA 2-[75], Quick-Drying, Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA International)
 - .1 G40.20-04: General Requirements for Rolled or Welded Structural Quality Steel
 - .2 G40.21-04 (R2009): Structural Quality Steel
 - .3 CSA S16-09: Design of Steel Structures
 - .4 CSA S136-07: North American Specification for the Design of Cold-Formed Steel Structural Members
 - .5 CSA W47.1-09: Certification of Companies for Fusion Welding of Steel
 - .6 W48-06: Filler Metals and Allied Materials for Metal Arc Welding
 - .7 CSA W55.3-08: Certification of Companies for Resistance Welding of Steel and Aluminum
 - .8 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding)
 - .9 CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles
- .5 Master Painters Institute
 - .1 MPI-INT 5.1-[98], Structural Steel and Metal Fabrications
 - .2 MPI-EXT 5.1-[98], Structural Steel and Metal Fabrications
- .6 The Society for Protective Coatings (SSPC)
 - .1 SSPC SP-6/NACE No. 3-[00], Commercial Blast Cleaning

1.3 GENERAL INSTRUCTIONS

- .1 This specification section is a “Performance Specification”, outlining parameters, which shall apply to this work.
- .2 Refer to drawings and other sections of the specification.
- .3 The Contractor is to ensure that NO ASBESTOS containing materials are used in connection with the work of this section.

1.4 WORK INCLUDED

- .1 This section includes but is not limited to the product design, manufacturer, transportation, erection and related items such as; -
 - .1 Wind bearing studs
 - .1 Wall Studs
 - .2 Bridging
 - .3 Top and Bottom tracks
 - .4 Cross bracing for lateral loads
 - .5 Connections
 - .2 Include all anchorages, screws, blocking, inserts and similar accessories required for work under this contract.
 - .3 Supply information required for the installation of supports, inserts and similar accessories required for the work under this contract supplied and to be installed by others.

1.5 RELATED WORK

- .1 Non-load bearing partition and ceiling framing.

1.6 REFERENCE STANDARDS

- .1 All Codes, standard specifications and by-laws referred to in this specification shall be current editions including all revisions, supplements and addenda.
- .2 Conform to the Ontario Building Code and the Occupational Health and Safety Act.
- .3 Conform to the following CSA Standards:
 - .1 S136-07: . North American Standard for the Design of Cold Formed Steel Structural Members
 - .2 W47.1-09: Certification for Companies for Fusion Welding of Steel Structures
 - .3 W59-03 (R2008): Welded Steel Construction (Metal Arc Welding)
 - .4 S16-09: Design of Steel Structures

- .4 Conform to the following ASTM standards.
 - .1 A653/A653M-09a: Standard Specification for Steel Sheet Zinc-coated Galvanized) or Zinc-Iron Alloy coated (Galvannealed) by the Hot-Dip Process.
 - .2 A780-09: Standard Practice for Repair of Damaged and uncoated Areas of Hot-Dipped Galvanized Coatings
- .5 In the event of conflict between reference standards, codes, drawings and specifications the Contractor shall request clarification by the Consultant. The Consultant's decision as to which requirements govern shall be final and binding. Generally the more stringent provision shall govern. No extras to the contract will be approved due to such clarification.

1.7 DESIGN CRITERIA

- .1 Design shall be based on Limit States Design principles using factored loads and resistances.
- .2 Loads and load factors shall be in accordance with the Ontario Building Code.
- .3 Resistances and resistance factors shall be determined in accordance with the Ontario Building Code and CSA-S136.
- .4 Provide bridging at 1200 mm o.c. maximum for wind load bearing studs. Closer spacing may be required to satisfy structural requirements.
- .5 The spacing of members shall not exceed the following:
 - .1 Wind bearing studs 400 mm o/c Use lesser spacings as required by the design criteria.
- .6 Maximum deflections under specified loads for wind bearing studs shall conform to the following:
 - .1 Wall studs supporting masonry veneer, $L/720$.
 - .2 Wall studs supporting other finishes, $L/360$.
 - .3 Building sway due to all effects, $1/400$ of building height or $1/500$ of storey height.
- .7 Connections between Cold-Formed steel framing members shall be by bolts, welding, or sheet metal screws.

1.8 SOURCE QUALITY ASSURANCE

- .1 SUBMITTALS
 - .1 Submit 2 certified copies of mill reports covering chemical and mechanical properties, and coating designation correlated to the steel used on this project.
 - .2 If requested, submit representative pieces of all framing component parts including mechanical fasteners if used. The length of pieces submitted need not exceed 300 mm. Tag pieces with the name of the part, the manufacturer and the metal thickness exclusive of coating.
 - .3 Submit copies as directed of engineering calculations or data verifying the capacity of the members and the ability of the assemblies to meet the design requirements.

.2 SHOP DRAWINGS

- .1 Submit Copies of shop drawings as directed.
 - .1 Each shop drawing submitted shall bear the stamp and signature of a qualified Professional Engineer registered in the Province of Ontario.
 - .2 Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thicknesses exclusive of coating, coatings, and materials. Include connection details for attaching framing to itself and for attachment to the structure. Show splice details where permitted. Indicate dimensions, openings, requirements of related work and critical installation procedures. Show temporary bracing required for erection purposes.
 - .3 Indicate design loads.
- .2 Do not fabricate until all submittals are reviewed.
- .3 The review of shop drawings shall not relieve the Contractor of the responsibility of seeing that this work is complete, accurate and in conformity with the drawings and this specification.
- .4 Only shop drawings bearing the review stamps shall be kept at the site.
- .5 Submit product data for mechanical fasteners indicating sizes, load capacities and type of corrosion protection.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURERS as published by the Canadian Sheet Steel Building Institute.

2.2 MATERIALS

- .1 Refer to structural Drawings for sizes and gauge thickness.
- .2 Steel shall have metallic coatings that conform to ASTM Standard: A653/A653M.
- .3 Steel shall conform to the requirements of CSA-S136 and shall be identified as to specification, type, grade and mechanical properties.
- .4 Wall members forming part of the exterior building envelope shall have a minimum coating of Z180 galvanizing or other coatings providing equal or better corrosion protection.
- .5 Sheet metal screws shall have a minimum coating thickness of .008 mm of zinc or cadmium. Other coatings providing equal or better corrosion protection may be used.
- .6 Welding electrodes shall be of the 480 MPa minimum tensile strength series (e.g. E480XX, E480S-X).
- .7 Zinc rich paint for touching up welds and damaged metallic coatings shall be CARBOZINC 11 WB by CARBOLINE (or GALVAFROID by Meadows).
- .8 Metal Studs:
 - .1 Typically 152 mm deep 18 ga. Cold formed sheet steel studs conforming to CAN3 S136-M with Z25 galvanized. Refer to structural drawings.
 - .2 With knock outs in web for horizontal services and bracing.

- .9 Top and Bottom Runner Channels: 'C' channels, as per metal studs, thickness as required, designed.
- .10 Furring Channels: 22.2mm deep, 35 knurled face, minimum 0.53 core sheet thickness, Z275 galvanized.
- .11 Exterior Board Sheathing: Fiberglass-Mat Faced Gypsum Sheathing: DensGlass Sheathing as manufactured by Georgia-Pacific, LLC, to longest lengths practical, thickness 13mm, exterior grade.
- .12 Screws: Self-drilling, self-tapping, galvanized steel length and gauges to be designed.

Part 3 Execution

3.1 GENERAL

- .1 Fabrication and erection shall conform to the approved shop drawings.

3.2 WELDING

- .1 Companies engaged in welding shall be certified by the Canadian Welding Bureau to CSA Standards W47.1. Companies shall have welding procedures approved and welders qualified for base material types and thicknesses that are to be welded.
- .2 Welds shall conform to CSA W59.
- .3 For material less than 3 mm thick, shop drawings may show nominal weld leg sizes. For such material, the effective throats of welds shall not be less than the thickness of the thinnest connected part.
- .4 Touch-up welds with zinc rich paint.

3.3 SCREWS

- .1 Steel screws shall be of the minimum diameter indicated on the shop drawings.
- .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
- .3 Thread types and drilling capability shall conform to the manufacturer's recommendations.
- .4 Install concrete anchors in accordance with manufacturer's recommendations.

3.4 FABRICATION

- .1 Where specified, provide cut-outs centered in the webs of members to accommodate services. Unreinforced cut-outs shall be limited to the dimensions in Table 1 in CSSBI 50 M. the effect of cut-outs on the strength and stiffness of the member shall be considered.
- .2 Fabrication tolerances for members shall conform to Table 2 in CSSBI 50 M.
- .3 The steel thickness exclusive of coating shall be marked on each member by embossing, stamping with indelible ink or by colour coding.

3.5 STORAGE OF MATERIALS

- .1 Products shall be protected from conditions that may cause physical damage or corrosion.

3.6 ERECTION

- .1 Methods of construction may be either piece by piece (stick-built) or by fabrication into panels (panelized) either on or off site.
- .2 Cold-Formed steel framing shall be erected true and plumb within the specified tolerances. Temporary bracing shall be employed wherever necessary to withstand all loads to which the structure may be subject during erection and subsequent construction. Temporary bracing shall be left in place as long as required for the safety and integrity of the structure. The Erector shall ensure that during erection a margin of safety consistent with the requirements of the Ontario Building Code and CSA-S136 exists in the uncompleted structure.
- .3 Erection Tolerances
 - .1 For the purposes of this section, camber is defined as the deviation from straightness of a member or any portion of a member with respect to its major axis, and sweep is defined as the deviation from straightness of a member or any portion of a member with respect to its minor axis.
 - .2 For exterior studs, out of plumbness shall not exceed 1/500th of the member length. Out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
 - .3 For track, camber shall not exceed 1/1000th of the member length.
 - .4 Studs shall seat into top and bottom tracks. The gap between the end of the stud and the web of the track shall not exceed 1.5 mm for axial load bearing studs.
 - .5 Spacing of studs shall not be more than ± 3 mm from the design spacing.
- .4 Make all field measurements necessary to insure the proper fit of all members.
- .5 Cutting of members may be by saw or shear. Torch cutting is not permitted.
- .6 Holes that are field cut into lightweight steel framing members shall conform to the requirements of this specification.
- .7 Insulation equal to that specified shall be placed in all jamb and header assemblies that will be inaccessible after their installation into the wall. Ensure that insulation is kept dry and not compressed.
- .8 Handling and lifting of prefabricated panels shall not cause permanent distortion to any member or collateral material.

3.7 FIELD QUALITY CONTROL

- .1 INSPECTION
 - .1 Inspection and testing of materials and workmanship shall be carried out by a qualified Independent Inspection Agency appointed by the Architect.
 - .1 The cost of this additional inspection shall be paid for out of the Cash Allowances for Inspection and Testing.
 - .2 Any testing or inspection required because of an error by the Contractor or due to departure from the contract documents by the Contractor, shall be paid for by the Contractor.

- .3 Inspection shall include:
 - .1 Checking that mill test reports are properly correlated to materials.
 - .2 Sampling fabrication and erection procedures for general conformity to the requirements of the specification.
 - .3 Checking that the welding conforms to the requirements of the specification.
 - .4 Checking fabricated members against specified member shapes.
 - .5 Visual inspection of all welded connections including sample checking of joint preparation and fit-up.
 - .6 Sample checking of screwed and bolted joints.
 - .7 Sample checking that tolerances are not exceeded during fit-up or erection.
 - .8 Additional inspection and testing of welded connections as required by CSA W59.
 - .9 General inspection of field cutting and alterations required by other trades.
 - .10 Submission of reports to the Architect, the Structural Consultant, the Contractor and the authorities having jurisdiction covering the work inspected with details of deficiencies discovered.
- .4 The Contractor shall provide the necessary cooperation to ensure that the inspection can proceed.
- .5 The inspection provided in this section does not relieve the Contractor from responsibility for the performance of the contract. The Contractor is solely responsible for quality control and shall implement adequate supervisory and quality control procedures.
- .6 Materials or workmanship not conforming to the requirements of the contract documents may be rejected at any time during the progress of work.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 10 00 - Cast-in-Place Concrete.
- .3 Section 04 21 13 – Masonry.
- .4 Section 05 51 10 - Structural Metal Framing.
- .5 Section 05 41 00 – Cold Rolled Metal Studs.
- .6 Section 09 91 22 - Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-[02], Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.
 - .2 ASTM A269-[02], Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-[02], Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-[97], Anti-corrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-1.181-[92], Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.1-[01], Limit States Design of Steel Structures.
 - .4 CSA W48-[01], Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-[1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- .4 The Environmental Choice Program
 - .1 CCD-047a-[98], Paints, Surface Coatings.
 - .2 CCD-048-[98], Surface Coatings - Recycled Water-borne.

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 50 for tubes and Grade 44W for Plates and Flat Shapes.
- .2 Welding materials: to CSA W59.
- .3 Bolts and anchor bolts: to ASTM A307.
- .4 Stainless steel tubing: to ASTM A269, Type 302 or 304 alloy, Seamless welded with AISI No. 4 finish.
- .5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 PRIMERS, COATINGS AND SHOP PAINTING

- .1 Interior Steel in Dry Areas: Quick drying oil alkyd conforming to CISC/CPMA 2.75.
- .2 Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete: Hot dip galvanized conforming to CSA G164, minimum Z275 coating. Galvanizing of structural steel components and loose lintels: refer to Section 5120.

- .3 Galvanized Coating Touch-Up: W.R. Meadows "Galvafroid" or Kerry Industries "Z.R.C." zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.
- .4 Apply one shop coat(s) of primer or coating as indicated above and according to manufacturer's recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.
- .5 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.
- .6 Clean surfaces to be field welded; do not paint.

2.3 FASTENINGS

- .1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.
 - .1 For interior work, use cadmium-plated fastenings where other protection is not specified.
 - .2 For exterior work, use Type 300 or 400 stainless steel.

2.4 ANCHORS AND SHIMS

- .1 For exposed anchorage of aluminum, if applicable, use stainless steel and otherwise to match metal anchored. For non-exposed work, anchors and shims may be galvanized steel.

2.5 PIPE

- .1 To ASTM A53, extra strong steel pipe for bollards.

2.6 BITUMINOUS PAINT

- .1 Alkali-resisting to meet specified requirements of CAN/CGSB-1.108, Type 2. Use to insulate contact between dissimilar metals.

2.7 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.

- .6 Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crance-free, and flush without seams.

2.8 LIST OF MISCELLANEOUS METAL FABRICATIONS

- .1 This Section includes, but is not limited to the following list. Note: Galvanize all exterior items and other items noted. Prime paint all interior items.

.1 Anchors, Bolts, Inserts, Sleeves for work in this Section.

.2 ~~Galvanised~~Galvanized Metal Z Girts

.3 Misc. steel angles or plates required for millwork items.

~~3.4~~ Hangers and Supports (for work in this Section).

~~4.5~~ Lintels (if not by Structural Steel).

~~5.6~~ Non-structural steel components shown in architectural details

Part 3 Execution

3.1 GENERAL

- .1 Supply and install all miscellaneous metal work indicated on the Drawings and not indicated in work of other Sections in addition to items listed below.

3.2 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with the surround galvanizing.

3.3 GALVANIZED STEEL

- .1 Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with CSA G164, minimum Z275 coating.
- .2 Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with CSA G164.
- .3 Safeguard products against steel embrittlement in conformance with ASTM A143.
- .4 Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.
- .5 The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for new rough carpentry in accordance with Contract Documents.

1.2 Related Sections

1. Section 07 52 16 SBS Modified Bituminous Membrane Roofing
2. Section 07 62 00 Sheet Metal Flashing and Trim
3. Section 07 92 00 Joint Sealers

1.3 References

1. CSA B1111 – Wire Nails, Spikes and Staples
2. ANSI B18.6.1 – Slotted and Recessed Wood Screws
3. CSA O121 - Douglas Fir Plywood
4. CSA O151 – Canadian Softwood Plywood
5. OBC – Table 9.23.3.4 Nailing For Framing
6. CAN/CSA-080 - Wood Preservation
7. Graded lumber must be in accordance with rules and regulations of the National Lumber Grades Authority (NLGA).

1.4 Operations

1. Do not interrupt or delay *Owner's* operations.
2. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Provide perimeter barricades and tarpaulins, guardrails, overhead scaffolding and other necessary protection to ensure safety of occupants, public and site workers.
2. Temporarily protect interior spaces, where overhead work is proceeding, and provide dustproof and weatherproof partitions.

1.6 Shop Drawings

1. Submit shop drawings, stamped by a Professional Engineer, licensed in Province of Ontario, if members and securement are part of structural components.
-

1.7 Permits

1. If required, arrange and pay for all permits, notices and inspections necessary for the proper execution of work in this section.

1.8 Lumber Requirements

1. Dimensions of lumber must conform to dressed sizes specified in CAN/CSA-0141. Dimensions specified and shown are nominal sizes.
2. Moisture content of lumber at time of installation must be S-DRY - maximum 19% moisture content.
3. Lumber must be sound and free of splits and deficiencies, which impair strength and durability.

1.9 Securement

1. Members shall be framed, anchored, fastened, tied and braced to provide necessary strength and rigidity.
2. All nails shall be long enough so that not less than half their required length penetrates into the second member.
3. Individual pieces must be secured with minimum of 2 fasteners at all corners.
4. Splitting of wood members shall be minimized by staggering nails in the direction of the grain and by keeping nails a minimum of 50 mm (2 in.) in from edges
5. Nailing of framing shall conform to OBC Table 9.23.3.4 – Nailing For Framing.
6. Plywood roof sheathing shall be installed with the surface grain perpendicular to the framing.

2. PRODUCTS

2.1 Material

1. Wood Blocking: No.1 Grade, Pressure Treated, exterior grade 50 x 50 mm (2 in. x 2 in.) 50 x 100 mm (2 x 4 in.), 50 x 150 mm (2 x 6 in.), 50 x 200 mm (2 x 8 in.), 50 x 250 mm (2 x 10 in.) and 50 x 305 mm (2 x 12 in.).
 2. Plywood Sheathing: 13 mm (1/2 in.) and 19 mm (3/4 in.), exterior grade, as indicated on drawings and required.
 3. Concrete Board: 16 X 1220 X 2440 mm (5/8 x 48 x 96 in.) Cement Board by DuRock, polymer modified concrete with alkali-resistant fibre glass mesh.
 4. Fasteners: Are to be of sufficient length to penetrate concrete decks 50 mm (2 in.), metal decks 19 mm (3/4 in.) and wood decks 38 mm (1½ in.).
Acceptable Material:
-

1. Nails: No. 10 spiral shank, hot dipped galvanized.
2. Wood and Metal Deck Screws (Low profile head):
 1. Roofgrip #14 Buildex by ITW Construction Products
 2. #14 Heavy Duty Drill Point Fastener by Tru-Fast.
 3. Rawl #14 Deck Screw by Rawlplug Canada Ltd.
3. Masonry anchors (Robertson head):
 1. Tapcon Plus, 6 mm (1/4 in.) diameter, Climaseal coated by ITW Construction Products.
 2. Tap-Grip heavy-duty self-tapping concrete anchors by Perma-Grip Fasteners.
 3. Rawl PERMA-SEAL TAPPER, 6 mm (1/4 in.) diameter by Rawlplug Canada Ltd.
4. Steel: use special metal screws, minimum cadmium coating.
5. Mechanical Fasteners for Concrete Board:
 1. Factory Mutual (FM) Class 1, coated screws and 75 mm (3 in.) galvanized metal plate. Fasteners to be of sufficient length to penetrate metal deck 19 mm (3/4 in.), concrete/masonry 38 mm (1-1/2 in.) and minimum 25 mm (1 in.) into wood deck/planks. *Contractor* to confirm actual size(s).

3. EXECUTION

3.1 Preparation

1. Remove all deteriorated existing wood and wood not required to remain. Replace deteriorated members with new and secure as specified.
2. *Consultant* shall review structural components deemed not suitable.
3. Fasten loose, existing wood members with screws/fasteners to satisfaction of *Consultant*.

3.2 Installation

1. Lay out work to provide a uniform transition for insulation and membrane.
 2. Cut and fit members accurately. Mitre all corners, leaving no space or unevenness greater than 3 mm (1/8 in.) between components.
 3. Install continuous plywood sheathing, wood blockings, cants, studs, nailers and continuous shims where required and detailed.
 4. Erect members in position, align, level, square, plumb and secure permanently in place as specified. Brace work temporarily as required to maintain safely in place.
-

5. **Join members over solid substrate, with a minimum end bearing of 38 mm (1½ in.).**

3.3 Fastening

1. Secure new wood with minimum of 2 fasteners at 610 mm (24 in.) on centre staggered, and as follows:
 1. Into masonry: masonry anchors.
 2. Into wood: wood screws.
 3. Into metal: metal screws.
2. Secure new plywood with appropriate fasteners as follows:
 1. At 305 mm (12 in.) on centre along perimeter
 2. One fastener per 0.3 m² (3 sq. ft.) in field of plywood, each way.

3.4 Parapets/Perimeters/Walls/Curbs/Sleepers

1. Fabricate, construct and modify parapets, perimeters, walls, and curbs as detailed.
2. Where possible, maintain minimum height of 305 mm (12 in.) above finished roof surface for sleepers and curbs.

3.5 Dividers and Movement joints

1. At dividers and movement joints, neatly cut cement board to required dimensions. Cutting shall be done by 'scoring' with carbide tipped utility tool/knife or circular saw with carbide blade. Smooth cut-edges with a wood rasp.
2. Secure cement board to substrate using appropriate fasteners, screws and galvanized metal plates (FM Approved) at 205 mm (8 in.) on centre each way and along perimeters.
3. Maintain screws 13 mm (1/2 in.) from edges and maintain 3 mm (1/8 in.) gap between each piece of board.

3.6 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 11 – Rough Carpentry.
- .3 Section 09 91 22 - Painting.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-[99], Particleboard.
 - .2 ANSI A208.2-[94], Medium Density Fiberboard (MDF).
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1333-[96], Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
 - .2 ASTM D2832-[92(R1999)], Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .3 ASTM D5116-[97], Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 AWMAC Quality Standards for Architectural Woodwork [, 1994].
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .5 Canadian Standards Association (CSA)
 - .1 CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
 - .2 CSA O112.4-[M1977(R1999)], Standards for Wood Adhesives.
 - .3 CSA O112.5-Series-M-[1977(R1999)], Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
 - .4 CSA O112.7-Series M-[1977(R1999)], Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
 - .5 CSA O115-[M1982(R2001)], Hardwood and Decorative Plywood.
 - .6 CSA O121-[M89(R1998)], Douglas Fir Plywood.
 - .7 CAN/CSA O141-[91R1999], Softwood Lumber.
 - .8 CSA O151-[M1978(R1998)], Softwood Plywood.
 - .9 CSA O153-[M1980(R1998)], Poplar Plywood.
 - .10 CSA Z760-[94], Life Cycle Assessment.
- .6 Environmental Choice Program (EPC)

- .1 ECP-44-[92], Adhesives.
- .2 ECP-45-[92], Sealants and Caulking Compounds.
- .3 ECP-76-[98], Surface Coatings.
- .7 International Organization for Standardization (ISO)
 - .1 ISO 14040-[97], Environmental Management-Life Cycle Assessment - Principles and Framework.
 - .2 ISO 14041-[98], Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .8 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA LD-3-[95].
- .9 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress [, January 1996].
- .10 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [, 2000].

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .1 Scales: profiles full size, details 1/2 full size.
- .3 Indicate materials, thicknesses, finishes and hardware.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm samples of each type of paneling laminate, melamine and each type of solid wood or plywood to receive stain or natural finish.
- .3 Submit a typical prototype unit representative of the work of this section.
- .4 defective materials supplied by this Architectural woodworker, which appear during a two (2) year period following the date of substantial completion of the project.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Protect millwork against dampness and damage during and after delivery.
- .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

1.6 ACCEPTABLE MANUFACTURERS

- .1 Work provided by this section must be manufactured by one of the following approved manufacturers:
 - .1 Van Del Custom Millwork
 - .2 Second Generation Furnishings Inc.
 - .3 Hemming Wood's Commercial Millwork Inc.
 - .4 GL Industries
 - .5 Bez Industries Inc.
 - .6 Baywood Interiors Ltd.
 - .7 Archmill House Inc.

Part 2 Products

2.1 MATERIALS

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 10 % or less for interior work in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC premium grade, moisture content as specified.
- .2 Hardwood lumber: moisture content 10 % or less for interior work in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC premium grade, moisture content as specified.
 - .3 Species: to be Maple unless otherwise noted.
- .3 Hardwood plywood: to CSA O115, of thickness indicated, rotary cut face veneer, birch plywood, veneer core, No. 1 grade. Select veneers to provide book match veneer strips to be 240 mm wide minimum.
 - .1 Species: to be Birch or Maple, unless otherwise noted.
- .4 Nails and staples: to CSA B111, galvanized for exterior work, interior high-humidity areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where specified elsewhere.
- .5 Particle Board core: to CAN3-0188.1-M78, minimum 45 density, in thickness indicated.

2.2 PLASTIC LAMINATE

- .1 Conforming to CAN3-A172, General Purpose - standard grade (GP-S), 1.25 mm thick for tops, Post Forming - standard grade (PF-S) 1.25 mm thick for post forming. Balance all panels with 0.5 mm backing sheet (BK) by same manufacturer as face panel. Use waterproof adhesive capable of holding materials together without failure. Provide acid resistant grade where shown. "Matte" finish is typical.

- .2 Acceptable Manufacturers include: Nevamar-ARP abrasion resistant surface distributed by McFaddens, Wisonart, Formica or Arborite. Submit product data. Allow for maximum of **4 colours** from full range as chosen by Consultant.

2.3 MELAMINE FACED PARTICLEBOARD

- .1 To CAN3-0.188.1-M78, minimum 45 density, particleboard sanded faces, 13 mm, 16 mm, and 19 mm thickness, faced with laminated plastic on both sides. Melamine resin impregnated cover sheet with coloured and/or pattern paper inner layer. Thermally fuse to rigid particleboard substrate. Melamine faces shall be 8 mil thickness. Wood grain pattern to be “Hard Rock Maple” or “Fusion Maple”.
 - .1 Acceptable Material: Melamine faced particleboard as manufactured by Flakeboard, Formica or Arborite Division of Domtar Construction Materials Ltd., or CASE Systems, are of acceptable quality but colour/pattern requires approval prior to confirmation of full acceptance. No alternatives or substitutions are acceptable.

2.4 EDGE BANDING

- .1 Solid polyvinyl chloride (PVC), 3 mm thickness x full width of panel edge banding, colour/pattern to match finished face of melamine panel or as selected by Consultant. All exposed edges of banding to be radiused to 2 mm radius after installation on panels. Submit sample of edge-banded panel with radiused edges to Consultant for approval prior to fabrication of Architectural woodwork.
 - .1 Acceptable Material: Solid PVC edging as manufactured by “Woodtape” Edge-Banding.
 - .2 Acceptable Material: Solid PVC edging as manufactured by “Complast Inc.”
- .2 All exposed edges are to have edge banding, including front facing edges of shelves within units, doors and gables (including edges facing floor).

2.5 CABINET HARDWARE

- .1 Furnish and install all hardware to custom casework as follows:
 - .1 Cupboard Doors - 19 mm thick:
 - .1 Hinges 110° Blum or Hettich
 - .2 Roller Catches 807N 2G(SgDr) Onward
 - .3 Elbow Catches T03222 C15 (DhDr)
 - .4 Door Pulls CBH235-3 1/2” C32D
 - .5 Cupboard Locks 8703/8704 14a National
 - .2 Drawers - 19 mm thick:
 - .1 Drawer Slides “Accuride Slide” 3832-2G full extension with ball bearing rollers, 100lb. capacity
 - .2 Drawer Pulls CBH235-3 1/2” C32D
 - .3 Drawer Locks 8703 - 14a National
 - .3 Shelving:
 - .1 “System 32” Clip with 5mm holes, 32mm apart

- .2 Chrome Steel “L” clips with round pins for inserting in holes to adjustable shelving
- .4 Display Cabinet Shelving if shown on drawings or AD Drawings:
 - .1 Plaster strips KV255 Zinc Knap & Vogt
 - .2 Shelf Clips KV256 Zinc Knap & Vogt
- .5 Cupboard Doors – if shown on Drawings or AD drawings-35 mm thick.:
 - .1 Hinges F179 76x76 Stanley C15
 - .2 Roller Catches 504N Onward C26
 - .3 Surface bolt 043-4 X Angle Strike C15
 - .4 Door Pulls CBH245-4 1/2” C32D
 - .5 Cupboard Locks supplied and installed under Section 08710 – (keyed to classroom master)
- .6 Closet Rods and Flanges
 - .1 Rods: chrome finish, Ø 33 mm.
 - .2 Flanges: chrome finish, closed flanges at both ends of rods.
- .7 Shelf and Rod Steel, white enamel, model No. 1797, manufactured by Hager.
- .2 Acceptable alternates: equivalent cabinet hardware products by Blum, Hager & Stanley. 19mm Cabinet door hinges must be Blum or Hettich.
- .3 This section shall also include accessories such as rubber door silencers (2 per drawer or door), and other items necessary for the completion of the millwork.
- .4 Cabinet Keying: Key all cabinet and drawer locks alike for the entire school, except teachers’ closets.

2.6 MELAMINE CLAD CABINETWORK

- .1 All cabinet frames whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing. Melamine gables are not to be in contact with floor. All wood bases are to be wrapped with rubber base.
- .2 Maximum width between gables shall be 900mm.
- .3 Gables and panels shall be fabricated from 19 mm thick melamine surfaced panels with a P.V.C. edging applied to all exposed edges including exposed edge facing floor.
- .4 Bottoms shall be fabricated utilizing the same materials and edge finish as gables. Front edge will be edged with P.V.C. edging. All other edges will be thoroughly sealed and moisture proofed prior to attachment to gables.
- .5 Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.
- .6 Tops (applies to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables. Front edge will be edged with P.V.C. edging.

- .7 Toe kick rail shall have a 100 mm x 19 mm section, machined to receive four screw nails for attachment to bottom front edge of gables. Cabinet base shall be plywood attached to melamine cabinet separately, insuring the melamine particle core gables do not come in contact with the floor.
- .8 Backs in base cupboards shall be fabricated from a 13 mm thick melamine surfaced panels.
- .9 Backs in wall and tall cabinets shall be fabricated from 13 mm thick melamine surfaced panels securely glued and screw nailed into the check out provided in the backs of gables, tops, and bottoms.
- .10 Shelves under 600 mm long shall be fabricated from 19 mm melamine surfaced panels with a P.V.C. edging applied to front edge. Shelves over 600 mm long shall be fabricated from 19 mm plywood, maple veneer complete with hardwood edging. Provide clear coat finish. Shelves are to have ferrow sleeves inserted.
- .11 Doors shall be fabricated from 19 mm thick melamine surfaced panels. All four edges shall be P.V.C. edging.
- .12 Drawer fronts shall be fabricated from 19mm thick melamine surfaced panels. All four edges shall be P.V.C. edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.
- .13 Drawer bodies shall consist of box construction fabricated from 13 mm thick melamine surfaced panels front, sides and back with PVC edging on top edges. Joint front, sides and back with carefully fitted glued and tenoned joints. Alternately, Blum Metabox drawer body and side can be used.
- .14 Finish:
 - .1 Melamine surfaced panels shall be finished both sides in Hard Rock Maple.
 - .2 Miscellaneous solid hardwood pieces shall be sanded, then sealer coated, and sanded with two finish coats of catalytic type acid resistant varnish.
- .15 Millwork Counter Heights:
 - .1 Confirm all existing conditions with respect to window heights and other wall mounted equipment, existing millwork counter heights etc., for various locations in school prior to fabrication.

2.7 SHOP FABRICATION

- .1 Shop install cabinet hardware.
- .2 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .3 Shop assemble work for delivery to site in size easily handled and to insure passage through building openings.

2.8 PLASTIC LAMINATED TOPS

- .1 19 mm thick particle board core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue to a particleboard core. All countertop front face to return vertically 35 mm $\pm$. All front and backsplash edges to be rounded.
- .2 Underside to receive a backing sheet, sanded one side and bonded same as surfacing material.
- .3 Exposed edges to be finished with same material as used for the top.
- .4 Drip grooves to be cut into underside of the top where exposed edges occur.
- .5 Splash backs, curbs and curb shelves are to be of similar construction as the tops.
- .6 At all wall termination, provide backsplash return.

2.9 MOULDING AND TRIMS

- .1 Fabricate mouldings in maximum practical lengths to profile shown. Install with concealed fasteners.

2.10 FABRICATION

- .1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cut-outs for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .10 Apply laminate backing sheet to reverse side of core of plastic laminate work.

- .11 Apply laminated plastic liner sheet where indicated.

Part 3 Execution

3.1 INSTALLATION

- .1 Do Architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .3 Set and secure all material and components in place, rigid, plumb and square.
- .4 Provide heavy duty fixture attachments for wall mounted cabinets.
- .5 Use draw bolts in countertop joints.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- .7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .8 After installation, fit and adjust operating hardware for wood and laminated plastic cabinet doors, drawers and shelves.

3.2 CLEANING

- .1 Clean millwork and cabinet work inside cupboards and drawers and all outside surfaces.
- .2 Remove excess glue from surfaces.

3.3 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 04 21 13 – Masonry Veneer
- .3 Section 05 51 00 – Cold Formed Wind Bearing Metal Studs
- .4 Section 07 27 10 – Air Barriers.
- .5 Section 07 52 16 – SBS Modified Bituminous Membrane Roofing
- .6 Section 07 21 19 – Spray in Place Urethane Foam Insulation.

Have regard for Alternate Prices to be submitted for exterior cladding and exterior insulation which may affect the requirements for air barrier in this Section

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM E96-[00e1], Test Methods for Water Vapour Transmission of Materials.
- .2 Canadian General Standards Board (CGSB).
 - .1 CGSB 71-GP-24M-[77(R1983)], Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S604-[91], Type A Chimneys.
 - .2 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
- .4 Environmental Choice Program (EPC).
 - .1 CCD-016-[97], Thermal Insulation.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material [n appropriate on-site bins for recycling.

Part 2 Products

2.1 INSULATION

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701.
 - .1 RSI 2.175/R12.5.
 - .2 Thickness: As indicated on drawings.
 - .3 Edges: ship-lapped.
 - .4 For use at typical cavity wall construction and at miscellaneous detail locations calling for rigid insulation.
 - .5 Acceptable Material: “**Styrofoam Cavity-Mate**” as manufactured by Dow Chemical Canada Inc.
 - .6 Acceptable Material: “**Foamular C200**” as manufactured by Celfortec Inc. (Owen Corning).
 - .7 or approved equal.
- .2 Extruded polystyrene (XPS): to CAN/ULC-S701.
 - .1 RSI 2.65/R 15.
 - .2 Thickness: As indicated on drawings.
 - .3 Edges: Ship lapped.
 - .4 For use in cavity wall construction” below through-wall flashing below slab on grade as shown typical foundation details,
 - .5 Acceptable Material: “**Styrofoam SM**” as manufactured by Dow Chemical Canada Inc.
 - .6 Acceptable Material: “**Foamular C300**” as manufactured by Celfortec Inc. (Owen Corning).
- .3 Batt insulation: CAN/ULC-S702, Type 1.

- .1 Locations: in metal stud walls
- .2 Thickness: as indicated on drawings
- .3 Friction fit batt insulation.
- .4 For use in steel studs as indicated.
- .5 Acceptable Material: 'Mineral Wool' by Roxul
- .6 Or approved equal.

2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24.
 - .1 Bakor Air Bloc 21.
 - .2 Compatible with respective rigid insulation, air/vapour and waterproofing membranes and recommended by manufacturers of those products. Use Bakor 230-21 rigid insulation adhesive for rigid insulation in contact with Blueskin air vapour barrier.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 [type B] [and] [L] vents.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Consultant in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID PERIMETER FOUNDATION INSULATION INSTALLATION

.1 Not applicable to this project.

3.5 RIGID CAVITY WALL INSULATION INSTALLATION

.1 System Comprised of:

.1 Specified thickness of rigid ship-lapped insulation on Henry-Bakor Blueskin SA air/vapour barrier.

.2 Henry-Bakor Airbloc 21 adhesive to be applied to all sides of insulation and continuous layer to all insulation surfaces in contact with air/vapour barrier. Butter all sides and back to ensure full air barrier integrity. Apply adhesive to polystyrene in accordance with manufacturer's recommendations

.3 Butter Air Bloc 21 at all brick tie penetrations to ensure a complete seal

3.6 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 04 21 13 - Masonry.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 51 00 - Temporary Utilities.
- .4 Section 07 21 13 – Board and Batt Insulation.
- .5 Section 07 55 00 – Protected Membrane Roofing.
- .6 Section 07 62 00 – Sheet Metal Flashing & Trim.
- .7 Section 07 27 10 – Air Barriers.

Have regard for Alternate Prices to be submitted for exterior cladding and exterior insulation which may affect the requirements for air barrier in this Section

1.2 REFERENCES

- .1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-[1989], Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102-[1988(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1-[01], Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.
 - .4 CAN/ULC-S705.2-[02], Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.3 TEST REPORTS

- .1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.
- .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.4 QUALITY ASSURANCE

- .1 Applicators to conform to CUFCA Quality Assurance Program.

1.5 SAFETY REQUIREMENTS

- .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

- .1 Workers must wear [gloves] [respirators] [dust masks] [long sleeved clothing] [eye protection] [protective clothing] when applying foam insulation.
- .2 Workers must not eat, drink or smoke while applying foam insulation.

1.6 PROTECTION

- .1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.
- .2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and [24] hour after application to maintain non-toxic, unpolluted, safe working conditions.
- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Fold up metal banding, flatten and place in designated area for recycling.
- .4 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions and CAN/ULC-S705.2.
- .5 Divert metal drums from landfill to metal recycling facility as approved by Consultant and to CAN/ULC-S705.2.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

- .1 Insulation: spray polyurethane to CAN/ULC-S705.1.
 - .1 Density: 30.4 kg/m³ (1.9 lb/ft³) minimum.
 - .2 Compressive Strength: >185 KPa (per ASTM D1622)
 - .3 Tensile Strength: > 330 KPa (per ASTM D1623)
 - .4 Air Barrier Classification:

- .1 Type III (NRC) - permeance: 0.02 L/sec/m² maximum at 75 Pa pressure differential.
- .2 Air Barrier System Performance with leakage not exceeding 0.0054 l/m² @75 Pa pressure when tested in Accordance with CCMC Air Barrier System Requirements.
- .3 All manufacturers/applicators shall submit test data reports prior to acceptance.
- .5 Water Permeance: 125 ng/Pa.m².s @25mm specimen thickness
- .6 Submit manufacturer's Material Data Safety Sheets in accordance with and Sections 013300 – Submittal Procedures and 013530 – Health and Safety.
- .7 Thickness: 50 mm (2.0 in.) .
- .8 Acceptable material: Products meeting these specifications by BASF Canada Inc: "Walltite ECO". Installation shall only be by applicators specifically approved by the manufacturer/distributor.
- .9 Acceptable material: Heatlok 0240 and Polar Foam 7300, distributed by Demilic Inc., contact Clifford Strassburger, 1-519-896-9307.
- .10 Acceptable material: CertaSpray Closed Cell Foam, distributed by Certain Teed Insulation Canada Inc.
- .11 Acceptable materials: other manufacturers meeting or exceeding these specifications as approved in writing by the Architect following specification, WMIS and test data submission.
- .2 Primers: in accordance with manufacturer's recommendations for surface conditions.
- .3 Sheet Air/Vapour Barrier Transition Membrane and Thru-Wall Flashing:
 - .1 Self adhering SBS modified bitumen membrane reinforced with non-woven fibrous glass:
 - .1 Thickness: minimum 1.45 mm
 - .2 Water Vapour Permeance: 0.05 perms max value. (2.8 ng/Pa.m².s)
 - .3 Air Permeance: less than 0.01 l/m² at 75 Pa pressure differentials.
 - .4 Adhesion: 7 day min. Peel adhesion at 5 deg. C :
 - .1 to primed Concrete: > 20 N/cm
 - .2 to selfedge: > 20 N/cm
 - .3 to primed plywood: > 25 N/cm
 - .4 to metal: > 30 N/cm
 - .5 Submit manufacturer's Material Data Safety Sheets in accordance with and Sections 01333 – Submittal Procedures and 013520 – Health and Safety.
 - .6 Acceptable Material: Blueskin SA by Bakor and Blueskin TW as thru-wall transition at masonry locations.
 - .2 Overlap typically minimum 150 mm on all adjacent layers/materials or as detailed.

Part 3 Execution

3.1 APPLICATION

- .1 For use as a transition membrane in locations where board or batt insulation is impractical due to material shape or access to cavities. Apply only over a suitable, stable substrate to ensure adhesion. Do not use excess thicknesses which block intended masonry ventilation cavities or weepers.
- .2 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions. Use primer where recommended by manufacturer.
- .3 Apply sprayed foam insulation in thickness as indicated.

3.2 WORKMANSHIP

- .1 Certification
 - .1 Installation is to be only by certified CUFCA/NECA applicators and manufacturer of the product being applied. Applicator shall provide proof of both approvals.
- .2 Examination
 - .1 Install insulation after building substrata materials are dry, thoroughly clean and capable of providing a firm, uniform bonding surface and temperatures are within the range recommended by product manufacturers.
 - .2 Verify that surfaces and conditions are suitable to accept work required in this section.
 - .3 Report, in writing, defects in surfaces or conditions which may adversely affect the performance of products installed under this section to the Consultant; prior to commencement of work.
 - .4 Do not commence work until defects have been corrected.
- .3 Preparation-Sprayed Insulation:
 - .1 Mask and cover adjacent areas to protect from overspray.
 - .2 Apply primers for special conditions as required by foam manufacturer.
 - .3 Clean work area prior to commencing spray operations.
- .4 Preparation-Peel & Stick Membrane:
 - .1 Prime all surfaces using Blueskin Primer by Bakor or primer specifically approved by membrane manufacturer. Allow primer to dry. Apply primer only to areas to receive membrane within the same working day, or reprime surfaces.
- .5 Application-Sprayed Insulation:
 - .1 Apply insulation to clean surfaces in accordance with CAN/CGSB 51-39-92 and manufacturer's printed instructions. Use primer where recommended by manufacturer. Ensure full adhesion to transition membrane.
 - .2 Completely fill jambs of all hollow metal frames with insulation and ensure continuous contact with sheet membrane used at head of frames.

- .6 Application-Peel & Stick membrane:
 - .1 Ensure membrane widths capable of sealing to all door opens at heads of frames.
 - .2 Lap sides and ends a minimum of 100 mm or as per details. Ensure full adhesion as per details.
 - .3 Position membrane for alignment with release film in place. Roll back, remove release film and press firmly in place. Roll all areas and laps with a steel or polyurethane roller.
 - .4 Seal ends of membrane to substrate using Polybithume by Bakor. or product approved specifically by membrane manufacturer.
- .7 Tolerance
 - .1 Maximum variation from required thickness for sprayed insulation: 6 mm.

3.3 LOCATIONS

- .1 As exterior insulation **Alternative Price** to rigid insulation: refer to alternative systems in Section 07 41 43 - Cementitious Composite Panels and Section 07 46 13 Preformed Metal Siding.
- .2 For use as a transition membrane in locations where board or batt insulation is impractical due to material shape or access to cavities. Apply only over a suitable, stable substrate to ensure adhesion. Do not use excess thicknesses which block intended masonry ventilation cavities or weepers.
- .3 On all structural steel in concealed locations exterior to insulated wall assemblies where steel penetrates through thermal barrier of wall forming a "cold bridge, whether shown on drawings or not.
- .4 Concealed within Soffit Conditions: Refer to drawings.
- .5 Jambs of Hollow Metal Frames: Refer to Section 081115 – Door Schedule.
- .6 Behind Metal Siding/composite panels: Refer to Section 074143 –Composite Panels.
- .7 All other miscellaneous locations to ensure integrity of a continuous air/vapour barrier and insulation layer.

END OF SECTION

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Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation methods providing [primary] air vapour barrier materials and assemblies.
- .2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations.

1.2 RELATED SECTIONS

- .1 Section 04 21 13 – Masonry
- .2 Section 05 51 00 - Structural Metal Framing
- .3 Section 07 51 12 – Built-Up Bituminous (BUR) Roofing.
- .4 Section 07 46 13 – Preformed Metal Cladding Siding.
- .5 Section 07 44 56 – Cementitious Composite Metal Panels
- .6 Section 07 21 13 - Board and Batt Insulation
- .7 Section 07 21 19 – Spray in Place Urethane Foam Insulation.
- .8 Section 07 62 00 – Sheet Metal Flashing & Trim.

1.3 REFERENCES

- .1 Canadian Construction Documents Committee
 - .1 CCDC 2 - Stipulated Price Contract.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13M-[M87], Sealing Compound, One Component, Elastomeric Chemical Curing.
 - .2 CAN/CGSB-19.18M-[M87], Sealing Compound, One Component, Silicone Base Solvent Curing.
 - .3 CAN/CGSB-19.24M-[M90], Multi-Component, Chemical Curing Sealing Compound.
 - .4 CGSB 19-GP-14M-[76], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .3 NBCC 1995; Part 5 - Environmental Separation
- .4 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Submit manufacturer=s product data sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit manufacturer=s installation instructions in accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY ASSURANCE

- .1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials and installation.
- .2 Maintain one copy of documents on site.

1.6 QUALIFICATIONS

- .1 Applicator: Company specializing in performing work of this section with documented experience with installation of air/vapour barrier systems. Completed installation must be approved by the material manufacturer. .
- .2 Applicator: Company who is currently licensed by National Air Barrier Association or certifying organization must maintain their license throughout the duration of the project.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer=s written instructions.
- .3 Avoid spillage. Immediately notify Consultant if spillage occurs and start clean up procedures.
- .4 Clean spills and leave area as it was prior to spill.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.9 PROJECT ENVIRONMENTAL REQUIREMENTS

- .1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.10 SEQUENCING

- .1 Sequence work to permit installation of materials in conjunction with related materials and seals.

Part 2 Products

2.1 SHEET MATERIALS

- .1 Refer to technical data sheets for physical properties of product.
- .2 Sheet Seal Type [1]: Self-Adhesive bitumen laminated to high-density polyethylene film, nominal total thickness of 1 to 4 mm as indicated.
 - .1 Acceptable material: Henry Bakor Blueskin SA, adhesive grade membrane, use 'peel and stick' Blueskin where Air-Bloc 21 not present or equal Blueskin SA or TG or Soprema 'Soprasedal Stick.'
 - .2 Sealant and Adhesive as recommended by Manufacturer.
 - .3 Transition membrane adhesive to be used with Bakor Air-Bloc 21.
 - .4 Air Barrier Membrane to be used with Bakor Air-Bloc 21.
 - .5 Acceptable materials: with same characteristics as above by W.R. Grace and Soprema.

2.2 SEALANTS

- .1 Sealants in accordance with Section 07 92 10 - Joint Sealing.
- .2 Primer: Recommended by sealant manufacturer and Appropriate to application.
- .3 Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer and compatible with adjacent materials.

2.3 ADHESIVES

- .1 Adhesive over DensGlas Sheathing use Blueskin Adhesive
- .2 Adhesive for Rigid Insulation to membrane Air Barrier to be 'Air-Bloc 21' by Bakor.

2.4 ACCESSORIES

- .1 Thinner and cleaner for As recommended by sheet material manufacturer.
- .2 Stick-Clips: Perforated Galvanized steel anchors.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section.
- .2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer=s requirements.

- .3 Report any unsatisfactory conditions to the Consultant in writing.
- .4 Do not start work until deficiencies have been corrected. Commencement of Work implies acceptance of conditions.

3.2 PREPARATION

- .1 Remove loose or foreign matter which might impair adhesion of materials.
- .2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure all substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION

- .1 Install materials strictly in accordance with manufacturer's instructions.
- .2 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.4 PROTECTION OF WORK

- .1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished Work is protected from climatic conditions.

3.5 SCHEDULES

- .1 Review use and requirement for exterior wall based on alternative Rigid Insulation or Foamed in Place Insulation.
- .2 Wall Air/Vapour Barrier Over Exterior Surface of Gypsum Sheathing: to be used with compatible adhesive.
- .3 Window Frame Perimeter: Lap sheet seal from wall air seal surface with 75 mm of full contact over firm bearing to window frame with 25 mm of full contact. Edge seal with compatible sealant.
- .4 Wall and Roof Junction: Lap sheet seal to wall seal material with 150 mm of contact over firm bearing to roof air seal membrane with 100 mm of full contact. Seal with compatible sealant.

- .5 Roof System Air/Vapour Barrier Over Steel Deck: refer to roofing Sections.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

.1	Section 05 41 00	Cold Formed Metal Studs
.2	Section 05 51 00	Structural Metal Framing
.3	Section 05 50 00:	Miscellaneous Metal Fabrications- Z Girts
.4	Section 07 52 16:	SBS Modified Bituminous Membrane Roofing
.5	Section 08 50 50:	Aluminum Windows
.6	Division 15:	Mechanical
.7	Division 16:	Electrical

1.3 ALTERNATIVE PRICE CLADDING

- .1 In conjunction with Drawings and final direction from the Board Project Manager provide an ALTERNATIVE Price for the use of Cementitious Metal Panels in lieu of Preformed Metal Siding on the new exterior wall system.
- .2 Basic description of wall system composition:
 - .1 Composite Panels mechanically on EPDM separation membrane fastened to
 - .2 Galvanized Z-girt furring– dimensions per drawings – on
 - .3 13 mm DensGlas exterior sheathing on
 - .4 18 ga., 152 mm Cold Formed channels c/w batt insulation
 - .5 Insulation on Exterior sheathing to be:
 - a. Foamed in Place Insulation and Air Space with air space or
 - b. Rigid Board insulation on Blueskin SA air/vapour barrier with air space
- .3 Review Alternative systems consultant and Project Manager with respect to cost, timing and execution prior to ordering materials.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A653/A653M-09a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .2 Canadian Standards Association (CSA):
 - .1 CAN/CSA-G40.20/G40.21M-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

1.4 DESIGN REQUIREMENTS

- .1 Design exterior cementitious composite wall, soffit and canopy panels to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads, imposed and other loads.
- .2 Design soffit system to accommodate expansion and contraction of soffit elements without causing buckling, failure of joints, undue stress on fasteners or other effects detrimental to appearance or performance.
- .3 Design cementitious composite panels in accordance with climatic design data for Oakville contained in the Ontario Building Code.
- .4 Design cementitious composite panel system to prevent rattling and vibration of panels, overstressing of fasteners and clips, and other detrimental effects on the system.
- .5 Design miscellaneous, additional structural framing members as required to complete composite panel system, where not indicated on Contract Drawings.

1.5 SUBMITTALS

- .1 Product data:
 - .1 Submit copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Shop drawings: Submit shop drawings in accordance with Section 01 33 00 indicating elevations, details, profiles, dimensions, thickness of materials, finishes, methods of joining, joint location, methods of anchoring, anchors, types of sealants, details of other pertinent components of the work, and compliance with design criteria and requirements of related work.
 - .3 Samples: Submit two 300 x 300 mm samples of panels in the selected colours and finish for approval.
 - .4 Closeout Submittals: Provide maintenance instructions for incorporation into Operation and Maintenance Manual, specified in Section 01 78 00.

1.6 QUALITY ASSURANCE

- .1 Retain a licensed Professional Engineer, registered in Province of Ontario, to perform following services for composite panel Work:
 - .1 Design of cementitious composite panel system.
 - .2 Review, stamp, and sign shop drawings.
 - .3 Conduct shop and field inspections and prepare and submit inspection reports.
- .2 Installers qualifications: Perform Work of this Section by a company that has a minimum of ten years proven experience in the installation of composite building panel units of a similar size and nature and that is approved by manufacturer. Submit to Consultant, applicator's current certificate of approval by the material manufacturer as proof of compliance.
- .3 Mock-up:
 - .1 Fabricate, deliver, and erect a 1220 mm high x 3050 mm long mock-up panel of composite panel system in location acceptable to Consultant.
 - .2 Demonstrate finish, anchoring devices, air/vapour retarder sealing, and quality of workmanship.
 - .3 Mock-up may form part of final Work, if acceptable to Consultant. Remove and dispose of mock-ups which do not form part of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Handle, transport, and store composite panel work as required by fabricator to prevent staining, soiling, and damage.
- .2 Store composite panel work to clear ground or other bearing surfaces, to prevent overstress, warp, twist, accumulation of water and snow in depressions and holes, and to afford free movement of air on all sides of each unit.

1.8 EXTENDED WARRANTY

- .1 Submit warranty for composite panel Work in accordance with General Conditions, except that warranty period is extended to 20 years.
 - .1 Against leaking, warping, twisting, joint, and finish failure.
 - .2 Coverage: Complete replacement including affected adjacent parts.

Part 2
2.1

Products
MATERIALS

- .1 Composite panels:
 - .1 Smooth cement panels with composite core made of synthetic fibres, cement and active adhesives, manufactured under pressure.
 - .2 Panel thickness: 12 mm thick.
 - .3 Panel size: 1220 mm x 3050 mm.
 - .4 Density: Minimum 1,500 kg/m³.
 - .5 Finish and colour: Standard finish, in two colours as approved by the Consultant. Provide samples for the Consultant's approval.
 - .6 The following is a list of acceptable products to submit for approval:
 - .1 'Cemfort S' by Arkea-Systems Inc. (1-877-929-2226)
 - .3 'Eternit – EterColour' by Etex Group (dist. by Engineered Assemblies Incorporated, 905-816-2218)
 - .4 'Natura' by Engineered Assemblies Inc. (905 816-2218)
 - .5 'Synstone' by Concrete Cladding Systems Ltd. (1-877-607-8304)
 - .6 'fibre C' by Sound Solutions (416 740-0303)
 - .7 'CemTrade – Cemval Matrix' by Dunleavy Cordun Associates Inc. (416 789-5002 or 877-737-3633)
 - .8 Swisspearl FRC panels by GFRC Canada, Toronto (647 290 4864)
 - .10 Solid Colour – To be selected from manufacturer's full range: Allow for 2 colours.
- .2 Structural shapes, plates, sag rods, and similar items: CAN/CSA-G40.20-G40.21-M, Grade 350W. Provide all additional structural supports not shown on Drawings as required.
- .3 Girts: Minimum 1.2 mm thick galvanized zinc-coated steel to ASTM A653/A653M, Grade A coating Z275.
 - .1 Preformed galvanized metal sheet, 1.22 mm thick minimum base steel nominal thickness, notched or perforated for drainage.
 - .2 Subgirt depth to suit insulation thickness and cavity behind panel systems.
 - .3 Girt locations as determined and approved by Structural Engineer.
 - .4 Cavity behind panel to be at least 25 mm of unrestricted space.
 - .5 EPDM for use between the panel and the vertical girt; type as recommended by the panel manufacturer.
- .4 Fasteners: Exposed tamperproof factory prefinished or stainless steel fasteners as recommended by panel manufacturer.
- .5 Bottom joint to include PVC flat strip in colour as selected by the Consultant.
- .6 Sealants: Sealant as approved by panel manufacturer in colour matching the panel as closely as possible. Sealant colour to be approved by Consultant.

2.2

FABRICATION

- .1 Fabricate cementitious composite panels in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fabricate panels in accordance with reviewed shop drawings, flat, true, free of marks, without visible distortion and with edges straight and true. Make all planes true, and corners square and bend of minimum radius.
- .3 Form panels to dimensions indicated with tolerances to accommodate expansion and contraction between panels and structure members. Accurately form shaped panels.

Part 3

Execution

3.1

EXAMINATION

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.
- .2 Verify that backup construction is aligned for proper installation of wall panels before commencing erection.
- .3 Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.

3.2

INSTALLATION

- .1 Supply and install miscellaneous, additional structural framing members, required to complete composite panel system, where not indicated on Contract Drawings.
- .2 Install composite panels, supports, and related items to lines and elevations indicated and in strict accordance with reviewed shop/erection drawings and manufacturer's printed instructions. Carefully co-ordinate work with other Sections.
- .3 Erect wall, soffit and canopy panel systems in accordance with manufacturer's instructions and under direct supervision of the manufacturer in straight lines, true, level, and plumb.
- .4 Maximum deflection of the building including the frame to be within L/360.
- .5 Finished work shall be securely anchored, free of distortion, free of surface imperfections and uniform in colour.

3.3

SEALANT

- .1 Prepare substrate surface and mask as recommended by sealant manufacturer.
- .2 Seal around all openings and all other locations indicated or required to provide weathertight and watertight seal.

3.4

REPAIR

- .1 Remove damaged, defectively finished, or tool marked components and replace with new to Consultant's approval.

3.5

CLEANING

- .1 Clean soiled panel surfaces in accordance with manufacturer's written instructions.
- .2 Clean soiled panel surfaces and replace elements not acceptable to Consultant.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements for the installation of preformed metal cladding/siding and screen work.

1.2 RELATED SECTIONS

- .1 Section 05 41 00 Cold Formed Metal Studs
- .2 Section 05 51 00 Structural Metal Framing
- .3 Section 05 50 00: Miscellaneous Metal Fabrications- Z Girts
- .4 Section 07 52 16: SBS Modified Bituminous Membrane Roofing
- .5 Section 08 11 14: Metal Doors and Frames
- .6 Section 08 50 50: Aluminum Windows
- .7 Section 09 91 22: Painting
- .8 Division 15: Mechanical
- .9 Division 16: Electrical

1.2 ALTERNATIVE PRICE CLADDING

- .1 In conjunction with Drawings and final direction from the Board Project Manager provide an ALTERNATIVE Price for the use of Cementitious Metal Panels in lieu of Preformed Metal Siding on the new exterior wall system.
- .2 Basic description of wall system composition:
 - .1 Cementitious Metal Panels mechanically fastened to
 - .2 Galvanized Z-girt furring– dimensions per drawings – on
 - .3 13 mm DensGlas exterior sheathing on
 - .4 18 ga., 152 mm Cold Formed channels c/w batt insulation
- .3 Review Alternative systems consultant and Project Manager with respect to cost, timing and execution prior to ordering materials.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A653/A653M - 09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A775/A775M - 07b, Standard Specification for Epoxy-Coated Steel Reinforcing Bars
- .2 American National Standards Institute (ANSI).
 - .1 ANSI B18.6.4-1998 (R2005), Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
- .3 Canadian General Standards Board (CGSB).
 - .1 CGSB 93.5-92, Installation of Metal Residential Siding, Soffits and Fascia.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G40.20/G40.21M-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

- .3 CSA S136-07, Cold Formed Steel Structural Members.

1.4 DESIGN REQUIREMENTS

- .1 Design metal siding system in accordance with CSA S136, and to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads.
- .2 Design metal siding system in accordance with Climatic Design Data contained in Ontario Building Code.
- .3 Design metal siding system to limit deflection under design loads, to L/240.
- .4 Design metal siding system to prevent restriction of thermal induced movement which would induce deformation such as warping, buckling, and failure of joint seals and fasteners. Design metal siding system to prevent vibration when subject to the effects of wind.
- .5 Design miscellaneous, additional structural framing members and sag rods, required to complete metal siding system, where not indicated on Contract Drawings.

1.5 SUBMITTALS

- .1 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate arrangement of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural support members or support wall.
 - .3 Clearly detail and indicate locations of all Z clips, J-closures and edge trims.
 - .4 Describe in shop drawing details, suitable accommodation for the removal and joining of future cladding as described in 1.2.7 of this section and on drawings.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.
- .3 Reports: Submit written field inspection and test report results after each inspection.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

- .1 Retain a licensed Professional Engineer, registered in Province of Ontario, to perform following services for metal siding Work:
 - .1 Design of metal siding Work.
 - .2 Review, stamp, and sign shop drawings.
 - .3 Conduct shop and field inspections and prepare and submit inspection reports.

- .2 Mock-up:
 - .1 Fabricate, deliver, and erect one full scale 1200 mm wide x 1800 mm high mock-up panel of metal siding construction, in location acceptable to Consultant.
 - .2 Demonstrate finish, colours, and quality of workmanship.
 - .3 Mock-up may form part of final Work, if acceptable to Consultant. Remove and dispose of mock-ups which do not form part of Work.
- .3 Pre-installation meeting: Arrange with manufacturer's representative, Contractor, and Consultant to inspect substrates, and to review installation procedures 48 hours in advance of installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Stockpile panels tilted to provide water run-off, free from ground contact on firm, level, non-staining supports extending full width of sheet and spaced not more than 450 mm apart. Cover components with opaque polyethylene sheet. Vent to allow air movement.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert used metal cut-offs from landfill by disposal removed for disposal at the nearest metal recycling facility.
- .2 Divert reusable materials for reuse at nearest used building materials facility.
- .3 Divert unused caulking, sealants, and adhesive materials from landfill through disposal at hazardous material depot.

1.9 EXTENDED WARRANTY

- .1 Submit a warranty for metal siding system, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURERS

- .1 Prefinished single skin metal siding system:
 - .1 Acceptable Products: by VicWest Steel Inc., minimum 20 ga. (0.91 mm) “7/8” Corrugated Series siding.
 - .2 Apply over 16 mm exterior grade plywood backup sheathing.
 - .3 Acceptable alternates to be approved within the tender period if meeting or exceeding these specifications.
 - .4 PDVF “10,000” series coating
 - .5 Allow for 2 colours from manufacturers full standard range
 - .6 Stainless Steel exposed fasteners in prefinished colours to match siding

2.2 MATERIALS – METAL SIDING

- .1 For copings and flashings, provide prefinished metal 24 gauge thickness, colours as specified in Section 076200- Sheet Metal Flashing and Trim.
- .2 Provide metal sub-girt framing as required for rain screen installation.
- .3 Structural shapes, plates, sag rods, and similar items: CAN/CSA-G40.20-G40.21-M, Grade 300W.
- .4 Hollow structural sections: CAN/CSA-G40.20/G40.21-M Grade 350W, Class H.
- .5 Screws: to ANSI B18.6.4, stainless steel Type 304; nylon head colour same as exterior sheet.
- .6 Powder actuated fasteners: galvanized, peened ballistic point, plastic cap of same color as exterior sheet.
- .7 Sealants: in accordance with Section 079210- Joint Sealers, colour selected by Consultant. Allow for one (1) colour from manufacturers full range to match adjacent metal.
- .8 Gaskets: soft pliable arctic grade vinyl, extruded profile.
- .9 Touch-up paint: as recommended by panel manufacturer and Baycoat, compatible with prefinished coating.
- .10 Isolation coating: alkali resistant bituminous paint or epoxy resin solution.
- .11 Insulation: As noted on Drawings and in Section 072113 – Board Insulation, and sections pertaining to Insulation and Sheet Air/Vapour Barrier transition membrane.

2.3 COMPONENTS – METAL SIDING

- .1 Exterior sheet: factory preformed coated metal, to profiles and thicknesses as indicated.
- .2 Exterior corners: of same profile, material and finish as adjacent siding material, shop cut and brake formed to required angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.
- .3 Exposed joint ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back if joint, exposed components color matched to siding.
- .4 Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, eaves, soffits sill and corners, of same material and finish as exterior siding, brake formed to shape. Exposed cut edges of metal profiles will not be accepted.
- .5 Sub-girts: zinc coated to ASTM A653, G90 coating designation, profile as indicated to accept exterior sheet with structural attachment to building frame.

Part 3 Execution

3.1 GENERAL

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install cladding in accordance with CGSB 93.5, reviewed shop drawings and manufacturer's written instructions.
- .2 Supply and install miscellaneous, additional structural framing members, required to complete metal siding system, where not indicated on Contract Drawings.
- .3 Maintain joints in exterior siding, plumb, true to line, tight fitting, hairline joints.
- .4 Attach metal siding system components to prevent warping, buckling, and deformation induced by restriction of thermal induced movement.
- .5 Install sub-girts to masonry walls prior to the installation of the Urethane foam insulation
- .6 Install exterior finish siding to internal sub-girts with concealed fasteners.
- .7 Ensure any dissimilar materials are isolated from each other with purpose manufactured products.
- .8 Coordinate with mechanical Sections as required for ensure metal solar wall system is connected to fan inlet and ventilation system.
- .9 Provide notched and formed closures, sealed to arrest direct weather penetration at vertical profiles for exterior siding. Ensure continuity of "pressure equalization" of rain screen principle.
- .10 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.
- .11 Supply and install flashing at connection between roof and preformed metal siding.
- .12 Touch up marred surfaces with air dry formulation to match pre-finished siding if approved by Consultant, otherwise remove and replace damaged metal siding.

3.3 CONTROL JOINTS

- .1 Construct control joints, as indicated.
- .2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.
- .3 Use mechanical fasteners to secure sheet expansion joints materials.
- .4 Assemble and secure wall system to structural frame so stresses on sealants are within manufacturer's recommended limits.

3.4 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Wash down exposed surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
- .3 Remove excess sealant with recommended solvent.

END OF SECTION

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for SBS Modified Bituminous Membrane Roofing in accordance with Contract Documents.
2. Section also includes for removal and disposal of designated roof areas and components not required to remain at Place of the Work

This Section shall coordinate with the following sections found elsewhere in this specification Binder:

3. Description of Work

1. **Roof Replacement: Areas 1A, 4A and 6A**
2. **New Roof Drains and Roof System at Sumps – Area 2**
3. **Two New Roof Access Ladders: Area 2 to Area 1 and Area 4 to Area 3**

1.2 Related Sections

This Section is responsible to coordinate with work of the all of the following Sections found elsewhere in this Specification Binder:

1.	Section 06 10 00	Rough Carpentry -ROOFING
2.	Section 07 62 00	Sheet Metal Flashing and Trim
3.	Section 07 92 00	Joint Sealers-Roofing

1.3 References

1. CAN/CSA A123.4 - Bitumen for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems.
 2. CGSB-37-GP-56 - Membrane, Modified, Bituminous, Prefabricated and Reinforced for Roofing.
 3. CGSB 37-GP-9 - Primer, Asphalt for Asphalt Roofing, Dampproofing and Waterproofing.
 4. CAN/ULC-S701 Thermal Insulation, Polystyrene, Boards and Pipe Covering
 5. CAN/ULC-S702 – Mineral Fibre Thermal Insulation for Buildings.
 6. CAN/ULC-S704 - Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 7. CAN/ULC S770 - Standard Test Method for Determination of Long-term Thermal Resistance of Closed-cell Thermal Insulating Foams
 8. CAN/ULC-S706 – Wood Fibre Thermal Insulation for Buildings.
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9. CAN/ULC–S107-03 – Fire Test of Roof Covering
10. CAN/ULC–S126-06 – Fire Spread Under Roof Deck Assemblies
11. ASTM E108 – Standard Test Methods for Fire Tests of Roof Coverings
12. ASTM D312 - Standard Specification for Asphalt Used in Roofing
13. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
14. Canadian Roofing Contractors Association (CRCA) – Specification Manual.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.
2. *Contractor* shall undertake all reasonable measures to reduce vibration and noise level on the roof decks during work hours.
3. Should specific complaints be issued by *Owner* to this matter, *Consultant* reserves the right to have *Contractor* proceed with other facets of the Work.

1.5 Shop Drawings and Other Submittals

1. Submit to *Consultant* for review, shop drawings, prior to commencement of work. Provide six (6) copies of the shop drawings. Indicate on shop drawings all insulation layers, slopes, crickets, insulation sumps and drainage patterns.
2. Submit Shop Drawings for Tapered Insulation indicating on shop drawings all insulation layers, slopes, crickets, insulation sumps and drainage patterns.
3. Submit Shop Drawings for: Gas Line Supports and Roof Access Ladders designed and stamped by Professional Engineer licensed in province of Ontario.
4. Submit Shop Drawings for Metal Deck indicating type, size – length and width, thickness, coating, fasteners, securement, etc. Shop Drawings and design shall be provided and stamped by Professional Engineer licensed in province of Ontario.
5. **Submit Material List and all Shop Drawings to *Consultant* for review prior to ordering materials and commencing Work.**
6. Construction Schedule: Submit required schedule within 10 days of contract award.

1.6 Quality Assurance

1. Skilled trades and *Contractors* having a minimum of five (5) years related experience shall execute roofing Work.
 2. *Contractors* shall be approved applicators of system specified. Documentation shall be provided prior to commencing Work.
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1.7 Roof System Compliance

1. Submit a document issued by Authorities having jurisdiction certifying that roof system meets requirements of CAN/ULC-S107 "Fire Tests of Roof Coverings", Class A, B or C.
2. The membrane system is based on a 2-ply SBS Modified Bituminous Membrane System by Soprema Inc. *Alternates by Henry Company Canada (Bakor) or Johns Manville are acceptable.*

1.8 Insulation Requirements

1. Polyisocyanurate Roof Insulation Manufacturers shall be members of Polyisocyanurate Insulation Manufacturers Association (PIMA). Manufacturers shall submit documentation listing their LTTR values based on CAN/ULC and ASTM test methods for 2014.
2. ***When insulation thickness exceeds 69 mm (2.7 in.), it shall be installed in multiple layers. Minimum thickness for bottom layer shall be 33 mm (1.3 in.) and 38 mm (1.5 in.) for top layer.***
3. ***In multiple layer applications, if thicknesses greater than 38 mm (1.5 in.) are required, thicker layer shall be installed in bottom followed by minimum 38 mm (1.5 in.) top layer.***

1.9 Warranty

1. Provide Standard Form of Warranty including all labour, material and workmanship and a Preventative Maintenance Manual.
 2. Warranty shall be for a **period of two (2) years** from date of Substantial Performance, as certified by *Consultant*.
 3. Provide **ten (10) year roof membrane manufacturer's Warranty for labour, materials and workmanship** with a No Dollar Limit from date of Substantial Performance.
 4. Repair leaks into building or roofing assembly within 24 hours of notification. Repair all roof membrane deficiencies, including ridges, blisters, splits and bare spots.
 5. Carry out all repair work during the warranty period as directed by the *Consultant* and at no additional cost to the *Owner*. *Contractor* shall extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship.
 6. Defects shall include but will not be limited to: leaking; failure to stay in place; lifting; blow off; deformation; and breaking of weathertight seals.
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1.10 Delivery, Storage and Handling

1. All Products shall be delivered, stored and handled in accordance with the Contract Documents, be in original manufacturer wrapping with labels intact and clearly identifying the product.
2. All modified bitumen membranes that will be used for installation on a daily basis must be stored at a minimum of 15°C (58°F) for a period of at least 4 hours prior to application. Stand rolled materials on end and protect edges.
3. Products transported, stored or handled in a manner that contradicts the Contract Documents, shall not be installed at the Place of the Work, shall be marked and removed from site.
4. Bills of lading for bulk loads of liquid asphalt shall be submitted to *Consultant* showing; Type of Asphalt, Quantity of Asphalt, Equiviscous temperature (EVT), Final Blowing Temperature (FBT) and Flash Point Temperature (FPT) of Bitumen.
5. Insulation, bituminous felts, vapour retarders and roofing membranes must be kept dry under protective coverings or stored in trailers.
6. **Plastic wrapping installed at the factory is not to be used as an outside storage cover.** Emulsions must be maintained at temperatures above freezing.
7. Immediately remove and dispose of wet materials off site. Do not hoist materials with straps/ropes that damage materials. Use specialty supports.
8. Hoist material to roof surface on a daily basis, for same day use. **Do not 'drop' materials during handling and installation.**

1.11 Environmental Requirements

1. Do not install roofing when temperature remains below 0°F (-18°C) for torch applications and 23°F (-5°C) for asphalt applications.
2. Removal and installation of any roof components during inclement weather is not permitted.

1.12 Scaffolding, Ladders and Conveyances

1. Provide scaffolding, ladders and conveyances required for execution of Work and in accordance with the Contract Documents. Provide all hoisting equipment and barricades required to complete the Work.
2. Construct and maintain scaffolding in accordance with authorities having jurisdiction. If required, have scaffolding designed and stamped by Professional Engineer licensed in Province of Ontario.

1.13 Safety Requirements and Barriers

1. *Contractor* shall provide upstanding barrier protection at all perimeters, eaves and parapets. **Mesh, screen and tarpaulins shall also be provided to prevent debris**
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from blowing or falling over edge. Barriers shall be adequately constructed and secured to prevent toppling over.

2. Fire extinguishers must be on site within 3 m (10 ft.) and at same level as torch applicator. Maintain adequate fire watch (as recommended by membrane manufacturer) after each days roofing operations cease.
3. **Prior to leaving site, use digital thermometer to scan roof surface temperature for 'any hot spots' and address them accordingly. A minimum 2 hr. fire watch shall be implemented after torching**

1.14 Protection

1. On a daily basis, provide interior protection to equipment, services, material, floors and walls by use of polyethylene or drop sheets, tape, tarps, plywood sheathing or other means to effectively protect contents.
2. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned shall be replaced at no cost to *Owner*.
3. Protect work of other sections from damage while performing roofing work. Provide tarpaulins and other coverings, as required, to protect lower and adjacent walls, finishes and surfaces. Additional protection shall be provided if instructed by *Consultant*.
4. Work is to be performed on occupied buildings. Take all reasonable precautions to protect against entry of elements and persons to unauthorized areas.
5. Prevent bitumen, precipitation and debris entering openings and drains during work. Prevent damage to site, roads, curbs and building elements.
6. Protect finished roof surfaces with minimum 13 mm (1/2 in.) plywood sheathing with 25 mm (1 in.) polystyrene insulation board on underside.
7. Damaged areas and surfaces shall be repaired to satisfaction of *Consultant* at no additional cost to *Owner*.

1.15 Temporary Facilities

1. Provide temporary storage facilities for materials, tools and equipment. Location to be approved by *Owner*.
 2. Provide temporary washroom facilities for workers. Secure portable washrooms to adjacent fences or walls to prevent toppling over.
 3. Ground work stations shall be fully enclosed by temporary fencing and be manned at all times.
 4. **Kettles and disposal bins shall be located minimum 2 m (6'-6") away from building walls.**
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1.16 Fastenings

1. Fasteners, anchors and adhesives shall be of appropriate size and type and must be used in sufficient quantity to provide positive and permanent anchorage of component.
2. Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted.
3. **Powder-actuated** fastening devices are not permitted on this project. Only low velocity plunger-type devices are permitted.

1.17 Available Information / Existing Roof Systems

1. Available Project Information was obtained from **limited cut-tests**.
2. **Bidders shall confirm all existing assemblies and dimensions.**
3. **This information is provided to Bidders as a guideline only and Bidders shall not hold Alspex Building Consultants Inc., Owner or any other third party liable for any errors or omissions resulting from this information.**
4. Available Project Information **will not** form part of Contract Documents.

5. Existing Roof System

1. Area 1A

Surfacing:	Bitumen & Gravel
Roof Membrane:	4-ply Bituminous Felt & Bitumen
Overlay Insulation:	50 mm (2 in.) Fibreboard
Vapour Retarder:	2-Ply Bitumen & Bituminous Felt
Deck:	Concrete on Metal Pan

2. Area 4A & 6A

Surfacing:	Coal Tar & Gravel
Roof Membrane:	4-ply Bituminous Felt & Coal Tar
Deck:	Concrete

3. Area 2

Surfacing:	Granules
Roof Membrane:	2-ply Modified Bituminous Membrane
Overlay Insulation:	13 mm (1/2 in.) Fibreboard
Base Insulation:	63 mm (2-1/2 in.) Polyisocyanurate
Vapour Retarder:	2-Ply Bitumen & Bituminous Felt
Deck:	Rapidex (Cell Block)

1.18 New Roof System(s)

1. New Roof System(s) at Place Of The Work are as follows and include all miscellaneous items;

1. Roof Area 1A, 4A & 6A

- New Sheet Metal Flashing, Trim & Sealants
- New 2-ply Modified Bituminous Membrane Flashings
- New 2-ply Modified Bituminous Membrane
- New Overlay Board
- New Tapered Insulation – Minimum 25 mm (1 in.)
- Existing Metal Deck

2. Roof Area 2

- New 2-ply Modified Bituminous Membrane
 - New Overlay Board
 - New 50mm (2 in.) Polyisocyanurate
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2. PRODUCTS

2.1 Material

1. Primer:
 1. Asphalt Cutback Primer
 2. Modified Membrane Primer: Elastocol 500 by Soprema Inc.
 3. Pitch Primer: Universal Primer as manufactured by Millennium Adhesive Company and supplied by Soprema Inc.
 2. Insulation and Overlay Board Adhesive: Low-rise, two-part polyurethane adhesive. 'Duotack' by Soprema Inc.
 3. **Tapered Insulation Areas 1A, 4A, 6A:** Fabricated from rigid closed cell polyisocyanurate foam core, bonded with **all fibre glass reinforced facer on each side** to layouts and slopes (0.5%, 0.75%, 1.0%, 2.0% or 4.0%) as indicated on drawings. **Minimum thickness 25 mm (1 in.)**. Acceptable Suppliers:
 1. Accu-Plane Enterprises Inc.
 2. Posi-Slope Enterprises Inc.

Note: Filler pieces shall not exceed 63 mm (2.5 in.) per layer.
 4. **Base Insulation Area 2:** 50 x 1220 x 1220 mm (2 in. x 4 ft. x 4 ft.), comprising of rigid closed cell polyisocyanurate foam core, bonded with **all fibre glass reinforced facer on each side**. Minimum long-term thermal resistance for 2014 material (LTTR) of RSI 0.99 (R 5.6) per 25 mm (1 in.) thickness.
 1. AC Foam III by Atlas Corporation Ltd.
 2. SOPRA-ISO PLUS by Soprema Inc.
 3. H-Shield CG by Hunter Panels
 5. Overlay Board: 6.4 x 1220 x 1525 mm (1/4 in. x 4 ft. x 5 ft.) semi-rigid protection board composed of a mineral fortified asphaltic core formed between two saturated fibreglass felts, 'Sopraboard' by Soprema Inc.
 6. Modified Bituminous Membrane Base Sheet:
 1. Sopralene Flam 180 by Soprema Inc.
 7. Modified Bituminous Membrane Base Sheet Flashings:
 1. Sopralene Flam 180 by Soprema Inc. – for flange flashings
 2. Sopralene Flam Stick and Elastocol Stick Primer (where torching is not safe).
 8. Modified Bituminous Membrane Liquid Flashings: Polyurethane/bitumen resin 'Alsan Flash' and fabric reinforcement by Soprema Inc.
 9. Modified Bituminous Membrane Cap Sheet **(White Granules):**
Sopralene Flam 250 GR by Soprema Inc.
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10. Modified Bituminous Membrane Cap Sheet Flashings (**White Granules**): Sopralene Flam 250 GR by Soprema Inc.
11. Round Top Cap Nails: Ardox spiral shank with 25 mm (1 in.) steel washer
12. Bulk Granules: Coloured granules in bulk to match cap sheet.
13. Rough Carpentry: As per Section 06 10 00 – Rough Carpentry.
14. Metal Flashing: As per Section 07 62 00 – Sheet Metal Flashing and Trim.
15. Sealants: As per Section 07 92 00 – Joint Sealers.

2.2 Roofing Accessories

1. Roof Drains: Prefabricated Aluminum Roof Drain complete with nuts and bolts, clamping ring, aluminum locking drain strainer and mechanical (MJ) connections, minimum 75 mm (3 in.) diameter **or to suit maximum on site diameter**. Acceptable Material:
 1. RD-4A Vandalproof Roof Drain by Thaler Metal Industries Ltd.
 2. Precast Concrete Pavers: 50 x 610 x 610 mm (2 x 24 x 24 in.) "Brooklin Roof Ballast" slabs with Built-In Pedslab Pedestal System", as manufactured by Brooklin Concrete Products Limited. Colour to be natural with standard diamond texture.
 3. Paver Pedestals: 25 mm (1 in.) "Roofmate" as manufactured by Dow Chemical Canada Ltd.
 4. Mineral Batt Insulation: 'Roxul' Mineral Batt, of size and thickness to suit site requirements.
 5. Termination Bar: Extruded Aluminum, 3 mm (11 gauge) core nominal thickness, 25 mm (1 in.) wide.
 6. Overflow Scuppers (Where Shown on Drawings): Fabricated from 0.71 mm (24 gauge) stainless steel. To be a minimum 200 mm wide x 100 mm high (8 x 4 in.) with continuously soldered seams with a 150 mm (6 in.) wide apron/flanges. To be capped with prefinished metal.
 7. Roof Access Ladders: Pre-engineered Aluminum Access Ladder (or galvanized steel) **and Powder Coated**, with cage (if required), walkthrough landing/platform at top with guard rails/toe board, offset bracket, fasteners, etc. and designed by Professional Engineer licensed in province of Ontario, and in accordance with Ministry of Labour Guidelines for Fixed Access Ladders. Acceptable Supplier:
 1. Portable Pipe Hangers
 2. Approved Alternate.
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3. EXECUTION

3.1 Workmanship

1. Do work in accordance with Canadian Roofing Contractors Association Roofing Specifications Manual (CRCA) and Manufacturer's requirements **except as specified within Contract Documents and to approval of Consultant.**
2. More stringent requirements shall govern.

3.2 Examination and Preparation

1. Examine site conditions and surfaces to ensure that they are in satisfactory condition for the commencement of Work of this section.
2. Ensure that substrates are smooth, clean and dry. Clean surfaces of all substances, which may be detrimental to new roof system. Clean adhesives with solvent and allow vapours to dissipate prior to membrane application.
3. Application of the Work, or any part of it will constitute acceptance of conditions upon which work is to proceed.

3.3 Primer

1. Apply primer to curbs, wall, wood and metal at a minimum rate of 0.3 to 0.5 litres/m² (0.96 to 1.6 fl.oz./sq.ft) with roller or spray. Do not allow primer to puddle.
2. Prevent primer from entering building interior through openings and joints by installing self-adhesive membrane at perimeters, walls, curbs and other openings.
3. Allow primer to cure prior to application of new roofing membrane or membrane flashings as detailed. Do not accelerate drying time by use of flame.
4. Self-adhesive membrane must be applied same day as primer.

3.4 Tapered Insulation – Areas 1A, 4A and 6A

1. Install tapered insulation in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners, joints staggered.
 2. Install insulation ensuring panels are tightly butted and walk insulation into hot asphalt to achieve solid bond, immediately after placement.
 3. Do not lay more insulation than can be covered with roof membrane base sheet on same day. Insulation, which is damaged by moisture, shall be marked and promptly removed from site.
 4. **Tapered sump shall be installed in its entirety the same day.** Under no circumstance shall sump be installed in more than one application as to build-in a high point within sump area.
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5. Install insulation ensuring panels are tightly butted and walk insulation into hot asphalt to achieve solid bond, immediately after placement.
6. Do not lay more insulation than can be covered with roof membrane base sheet on same day.
7. Insulation, which is damaged by moisture, shall be marked and promptly removed from site.

3.5 Base Insulation – Area 2

1. In conjunction with plumbing contractor, lay out location of new drains, which shall be cored by mechanical contractor.
2. Neatly cut out existing roof system for a 1220 x 1220 mm (4' x 4') centred around drain and remove material to vapour retarder. The cut-out shall be chalk lined and neatly trimmed to allow for new insulation to fit tight. Any voids shall be filled with spray foam insulation.
3. Apply base insulation in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 150 mm (6 in.) on centre.

3.6 Overlay Board – All Areas

1. Apply overlay board in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 150 mm (6 in.) on centre in field of roof and at 100 mm (4 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.
2. Allow adhesive to slightly rise and then embed overlay board into place and weigh down till good adhesion is attained.
3. Do not lay more boards than can be covered with roof membrane on same day. Boards that are damaged shall be marked and promptly removed from site.
4. Stagger side and end joints to underlying insulation joints.
5. Do not lay more boards than can be covered with roof membrane base sheet on same day. Boards that are damaged shall be marked and promptly removed from site.

3.7 Roof Membrane Base Sheet

1. Unroll modified base sheet and allow sheets to relax minimum 15 minutes and burn plastic film in zigzag fashion as per manufacturer's requirements and approval of Consultant.
 2. Align base sheet dry with laps centred over drain area and working upslope with laps to shed water. Position membrane with minimum 75 mm (3 in.) side laps and 150 mm (6 in.) end laps. Cut-off corners at end laps to be covered by next roll. Stagger end joints in sheets minimum 305 mm (12 in.).
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3. Fully torch membrane base sheet in general conformance with details commencing from low point and working up-slope. Laps shall be installed to shed water. Terminate onto perimeters/vertical transition 25 mm (1 in.).
4. Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps.
5. Apply membrane base sheet without blisters, voids, wrinkles, buckles, fishmouths or any evidence of a lack of full adhesion and deficiency. Deficiencies must be repaired to satisfaction of *Consultant*.
6. Do not step or walk on felts during or immediately after application until bitumen has set.

3.8 Roof Membrane Base Sheet Flashings

General Application Guidelines

1. Apply appropriate primer to surfaces that are to receive membrane flashings at rates recommended by manufacturer. Allow primer to 'flash off' prior to membrane flashing application.
2. Apply membrane base sheet flashings in general conformance with details commencing from low point and working up-slope. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Laps shall be installed to shed water.
3. Apply base sheet 1 m (3.25 ft.) wide strips. Extend base sheet a minimum of 150mm (6 in.) beyond toe of cant (or vertical transition) and onto field of roof.
4. **At wall and curbs, provide mechanical fasteners within laps of base sheet flashing, prior to applying succeeding sheet. Fasteners shall be installed at maximum 100 mm (4 in.) on centre commencing from 200 mm (8 in.) above roof membrane.**
5. Extend modified bituminous base sheet over parapet, perimeter and eaves, down outside face of walls 38 mm (1 ½ in.) onto the lower substrate. Secure membrane flashing with large headed galvanized nails at 150 mm (6 in.) on centre.
6. At exterior face of parapets / perimeters, apply self-adhesive base sheet flashing, to provide continuous cover over exposed wood and joints between substrates as detailed. Overlap self-adhesive base sheet under overhang of membrane base/cap sheet flashings at top edge of parapets / perimeters.
7. Repair defects in applications with additional piece of self-adhesive base sheet. Carry out repairs to satisfaction of Consultant.

Torching Applications (At Safe Locations Only)

8. **Fully torch base sheet flashing to substrate.** Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side/end laps. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Stagger side laps from membrane base sheet 350 mm (12 in.).
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9. Provide 3 mm (1/8 in.) bitumen bleed out at all side and end laps. Thoroughly and effectively press membrane to attain full contact and adhesion.

Self-Adhesive Applications

10. Apply self-adhesive base sheet flashing onto primed surfaces and roll into place with adequate pressure to ensure full contact and adhesion with substrate. Membrane must be rolled into place using manufacturer's approved roller.
11. Peel back 100 to 150 mm (4 to 6 in.) of the silicone release paper to hold the membrane in place. Gradually peel back remaining silicone release paper, pressing down on membrane with an aluminum applicator to ensure good contact and adhesion.
12. Heat weld exterior 25 mm (1 in.) of all side and end laps providing a 3 mm (1/8 in.) bitumen bleed out.
13. **Thoroughly and effectively roll membrane using manufacturer's recommended steel roller to attain full contact and adhesion.**

3.9 Reinforcement Gussets

1. Apply gussets at every angle, on inside and outside corners in accordance with manufacturer's requirements.
2. Install self-adhesive or thermofusible gussets before application of membrane base sheet flashing,
3. Install self-adhesive or thermofusible gussets over base sheet flashing and before application of membrane cap sheet flashing.

3.10 Roof Membrane Cap Sheet

1. Base sheet application shall be reviewed by manufacturer and *Consultant* prior to proceeding with membrane cap sheet.
 2. Apply membrane cap sheet commencing from centre of drain or low end and working upslope. **Fully torch cap sheet** to base sheet and extend to edge of perimeter, after base sheet flashing has been completed.
 3. Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Laps shall be installed to shed water.
 4. Maintain minimum 50% stagger from base sheet. Use chalklines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.
 5. Apply loose granules in areas where excess heat welding has occurred. Apply heat to affected area, place granules and embed them into warm membrane.
 6. Apply membrane cap sheet without voids, wrinkles, buckles, fishmouths or any evidence of a lack of full adhesion. Repair defects to satisfaction of *Consultant*.
-

3.11 Roof Membrane Cap Sheet Flashings

1. Apply membrane cap sheet flashings in general conformance with details commencing from low point and working up-slope.
2. Membrane base sheets/flashings with a poly on top face shall have poly burned off prior to applying cap sheet flashings. Maintain minimum 50% stagger from base sheet flashing. Use chalklines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.
3. Fully torch modified bituminous cap sheet flashing to attain full bond.
4. Terminate cap sheet 13 mm (1/2 in.) back from outside edge of parapet blocking and past base sheet flashing 50 mm (2 in) onto flat of roof.
5. Provide 3 mm (1/8 in.) bleed out at all side laps. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Laps shall be installed to shed water.
6. At wall terminations, install and secure termination bar to adequately restrain the flashings. Secure termination bar at maximum 305 mm (12 in.) on centre. Apply sealant bead along entire length of termination bar.
7. Repair defects in applications with additional piece of torch grade base sheet. Carry out repairs to satisfaction of Consultant.

3.12 Membrane at Drains – Areas 1A & 4A

1. At existing locations, remove exiting drain and expose drain pipe without damage. Cut opening through membrane base sheet, insulation, thermal barrier, vapour retarder and centre drain over pipe. Apply mastic on underside of flange.
 2. Insert drain body into existing or new rain water leader until flange is flush with roof membrane. Secure new drains with mechanical (MJ) connection and underside with deck clamp.
 3. **Note: Overlay board to be completely cut-out under drain flange.**
 4. Flash drain flange with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange.
 5. New membrane cap sheet shall extend through drain area and circular cut-out provided for required drainage.
 6. Install clamping ring and aluminum strainer over raised bosses and install screws to tighten ring against membrane and flashings until secure. Ensure roof drains are clear of debris and free draining at project completion.
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3.13 Membrane at Drains - Area 2

1. Existing membrane base & cap sheet shall be torched to provide a seal prior to new applications to underside substrate.
2. Existing granulated cap sheet shall be cleaned and have the granules 'embedded' for a width not less than 460 mm (18 in.) beyond cut-out area.
3. Apply one ply torch grade base sheet over repair area extending membrane minimum 305 mm (12 in.) beyond repair area each way onto existing cap sheet.
4. Apply one ply torch grade cap sheet over repair area extending membrane minimum 150 mm (6 in.) beyond new membrane base sheet each way.
5. Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Laps shall be installed to shed water.
6. Maintain minimum 50% stagger from base sheet. Use chalklines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.
7. Apply loose granules in areas where excess heat welding has occurred. Apply heat to affected area, place granules and embed them into warm membrane.
8. Apply membrane cap sheet without voids, wrinkles, buckles, fishmouths or any evidence of a lack of full adhesion. Repair defects to satisfaction of Consultant.

3.14 Parapets/Perimeters/Walls/Sleepers/Curbs

1. Construct parapet, perimeters, wall and curbs as detailed with new wood framing in accordance with Section 06 10 00 – Rough Carpentry.
2. Provide 2-ply membrane flashings at all noted locations. Membrane flashings shall fully encapsulate all wood/sleepers in accordance with this section.
3. Provide metal cap flashings at sleepers and curbs prior to re-installing units.

3.15 Existing / New Roof Access Ladders

1. Existing access ladders shall be removed and disposed off site. Seal openings with mortar or sealant.
 2. Provide new roof access ladders where indicated on drawings and install in accordance with reviewed shop drawings. Exact locations to be verified on site by *Owner* and *Consultant*.
 3. Install cage commencing from 2200 mm (7 ft.) above grade. Install security ladder guard commencing from 610 mm (24 in.) above ground.
 4. All work to be in accordance with governing regulations and Ministry of Labour guidelines.
 5. At top and bottom of ladder provide required precast pavers on leveled pedestals.
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3.16 Precast Pavers

1. Install new precast paver to required layout. Saw cut to fit at corners/walls or core hole where required to fit penetrations and field dimensions. No piece shall be smaller than 150 mm (6 in.) x 610 mm (2 ft.)
2. Set pavers on pedestals and adequately balance pavers so that 'rocking' does not occur. Pedestal shall be minimum 150 mm (6 in.) wide by 205 mm (12 in.) long. Maintain continuous drainage under all pavers.

3.17 Quality Control

1. *Owner* may retain an independent *Consultant* to carry out periodic supervision.
2. If requested by *Consultant*, take cut-test samples of roofing membrane and membrane flashings, wrap and label samples, identify locations and submit to *Consultant* for review and testing.
3. *Contractor* shall make an allowance for **minimum of one cut test per day** and all required patching to match existing assembly. Samples must be a minimum 305 x 305 mm (12 x 12 in.) and include all new roof components including asphalt pour and gravel.
4. Failed test results will require remedial work acceptable to *Consultant* and may entail complete removal and replacement of failed areas.

3.18 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.
2. Remove all stains, asphalt, caulking or other adhesive from all surfaces.

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for sheet metal flashing and trim Work in accordance with Contract Documents.

1.2 Related Sections

1. Section 06 10 00 Rough Carpentry for Roofing
2. Section 07 52 16 SBS Modified Bituminous Membrane Roofing
3. Section 07 92 00 Joint Sealers - Roofing

1.3 References

1. ASTM A 525M, Standard Specification for Sheet Steel, Zinc Coated (Galvanized) by the Hot Dipped Process, General Requirements.
2. Canadian Sheet Steel Building Institute (CSSBI) Bulletin No. 9, Core and Maintenance of Pre-finished Sheet Steel Building Products.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of flashing and sheet metal type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Mock-Up

1. Fabricate mock-ups in minimum 2440 mm (8 ft.) lengths with reviewed materials, approved methods including, joints, seams, expansion joints, starter strips and fasteners.
2. Mock-up, if accepted, shall represent the minimum standard for work. Mock-up may be included as part of final work

1.8 Quality Assurance

1. Flashing and Sheet Metal Work shall be executed in accordance with SMACNA Architectural Sheet Metal Manual - 1993 (Addendum No. 1 – October 31, 1997), by skilled trades having a minimum of five (5) years related experience.
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1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Warranty shall be submitted against defects in workmanship and materials.
2. *Contractor* must extend the Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to leaking, failure to stay in place, lifting, deformation and breaking of weathertight seals.
3. Provide all additional Warranties that may be available from manufacturer.

2. PRODUCTS

2.1 Material

1. Prefinished steel sheet: Galvanized steel, 0.71 mm (24 gauge) core nominal thickness, conforming to ASTM A525, Z275 zinc coated (galvanized) to designation G90 by the hot dip process, with a prefinished coat. Profiles as detailed.
 2. Prefinished Coat: Perspectra Plus Series, factory applied coating. Colour to be approved by *Owner* from standard colours listed in General Colour Card.
 3. Starter strips: Fabricated from prefinished steel sheet, 0.87 mm (22 gauge) core nominal thickness. Minimum 100 mm (4 in.) wide face or as detailed and to be continuous.
 4. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) Aluminum Bar.
 5. Fasteners: In accordance with Section 06 10 00 – Rough Carpentry
 6. Touch-up paint: As supplied and recommended by sheet steel manufacturer.
 7. Exposed Sheet Metal Fasteners: Self-Drilling Hex Head with washer and colour coded cap
 8. Cap, Counter and Fascia Metal to be fabricated to layouts and details shown on drawings and to extent required.
 9. Sealants: In accordance with Section 07 92 23 – Joint Sealers for Roof Replacment
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3. EXECUTION

3.1 Fabrication

1. Shop fabricate flashing, sheet metal and trim in accordance with requirements of SMACNA and the Contract Documents. Form sheet metal on bending brake, shaping, trimming and hand seaming on bench.
2. Form sections square, true, and accurate to size. Flashings shall be free from distortion, oil canning, twists, buckles, discolouration and other defects detrimental to appearance and performance.
3. Double back all edges a minimum of 13 mm (1/2 in.).
4. Form joints with S-locks and make allowances for movement. Mitre and form standing seams at all corners. Make allowance for movement at joints.
5. Fabricate cap flashings, counter flashings and starter strips to details shown and where required.
6. Fabricate metal in 2400 mm (8 ft.) maximum lengths with an unbroken face less than 225 mm (9 in.). Form flashings with an exposed unbroken face exceeding 225 mm (9 in.) and a girth greater than 610 mm (24 in.) in 1220 mm (4 ft.) maximum lengths.
7. **Provide horizontal stiffening rib "V" on all face metal exceeding 225 mm (9 in.) in girth and where shown on drawings.**
8. Provide an 'S-Lock' joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.
9. 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.
10. Sheet metal coming in contact with a metal of a different type must be back painted with two (2) coats of isolation coating.

3.2 Sheet Metal Flashing and Trim

1. Provide a continuous starter strip for all metal cap and counter flashings and gravel stops secured at a maximum 405 mm (16 in.) on centre.
 2. Install flashings and sheet metal that includes but not limited to; cap flashings, counter flashings, curb and sleeper counter flashings, starter strips and other miscellaneous trim work in accordance with Contract Documents.
 3. Parapet and perimeter cap flashings shall be installed with a **minimum 5% positive slope** to interior of roof. Slope to be provided by installation of continuous wood shims, plywood and wood blockings as detailed and in accordance with Section 06 10 00 – Rough Carpentry.
-

4. Saw cut new reglet or re-use existing (where approved by *Consultant*), into masonry surfaces to accommodate installation of sheet metal flashings. Reglet is to be a minimum 19 mm wide x 25 mm deep (3/4 in. x 1 in.).
5. Install sheet metal work with concealed fasteners. Install exposed fasteners only when and where permitted by *Consultant*. Install fasteners in an approved manner as to prevent water penetration at point of fastening and to be evenly and neatly distributed. Provide fasteners with washers.
6. At reglets, return top edge of flashings into reglet 25 mm (1 in.). Secure flashings with pin grips spaced at maximum 405 mm (16 in.) on centre and apply sealant bead to shed water.
7. Provide continuous termination bar at top edge of membrane flashings. Fasten termination bar to substrate at a maximum 305 mm (12 in.) on centre with appropriate fasteners.
8. Fasteners are to be located a minimum of 305 mm (12 in.) above the roof membrane – where possible.
9. End joints of adjacent lengths shall be completed using 'S-Lock' joints. This shall be accomplished by inserting the end of one length in a 25 mm (1 in.) deep "S" lock formed in the end of the adjacent length. Concealed portion of the "S" lock shall extend 25 mm (1 in.) outwards and shall be nailed to substrate.
10. Top edge of counter flashing shall be inserted under cap flashings.
11. Provide two exposed fasteners on interior side of cap flashing, evenly spaced per 2400 mm (8 ft.) length

3.3 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

Part 1 General

1.1 RELATED WORK

- .1 Fire stopping and smoke seals within mechanical assemblies (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Division 26 and 33 respectively.

1.2 REFERENCES

- .1 Underwriter's Laboratories of Canada (ULC)
 - .1 ULC-S115-[1995], Fire Tests of Firestop Systems.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

1.6 SYSTEM DESCRIPTION

- .1 Firestopping Materials: CAN4-S115M ASTM E814 to achieve a fire protection rating as noted on Drawings.
- .2 It is the intent of this Section that in conjunction with Divisions 15 and 16 a competent, single source be responsible for the firestopping and smoke seals of the entire project.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Company specializing in manufacturing products of this Section with minimum five years documented experience.
- .2 Applicator: Approved, licensed and supervised by the manufacturer of firestopping materials. Company with minimum five years documented experience.

- .3 Product: Manufactured under ULC Follow-up Program. Each container or package shall bear ULC label.

1.8 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for fire protection ratings.
- .2 Provide certificate of compliance for authority having jurisdiction indicating approval.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer's labels and seals intact.

1.10 PROJECT AND SITE CONDITIONS

- .1 Application temperature and ventilation as per Manufacturer's instructions.

1.11 SEQUENCING AND SCHEDULING

- .1 Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

Part 2 Products

2.1 MATERIALS

- .1 A/D Firebarrier Firestop Systems, by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.
- .2 Mineral Wool Backing Insulation: ULC labeled, preformed non-combustible material (A/D Firebarrier Mineral Wool) by A/D Fire Protection Systems Inc.
- .3 Retainers: Clips to support mineral wool.
- .4 Firestopping Sealant: ULC labeled, single component silicone based, A/D Silicone Firebarrier Sealant by A/D Fire Protection Systems Inc.
- .5 Firestopping Seal: ULC labeled, single component water-based seal, A/D Firebarrier Seal by A/D Fire Protection Systems Inc.
- .6 Firestopping Foam: ULC labeled, two components silicone foam, A/D Firebarrier RTV Foam by A/D Fire Protection Systems Inc.
- .7 Firestopping Mortar: ULC labeled, non-combustible fibre reinforced, foamed cement mortar, A/D Firebarrier Mortar by A/D Fire Protection Systems Inc.

- .8 Damming Material: In accordance with tested assembly being installed as applicable and as acceptable to authorities having jurisdiction.

Part 3 Execution

3.1 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.
- .5 Verify that openings are ready to receive the Work of this Section.
- .6 Confirm compatibility of surfaces to receive firestopping and smoke seal materials.
- .7 Beginning of installation means acceptance of existing surfaces and substrate.

3.2 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to a neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.
- .6 Apply in sufficient thickness to achieve rating to uniform density and texture.
- .7 Protect installed material until cured or set.

3.3 INSPECTION

- .1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Top of fire-resistance rated masonry and gypsum board partitions.
 - .3 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .6 Openings and sleeves installed for future use through fire separations.
 - .7 Around mechanical and electrical assemblies penetrating fire separations.
 - .8 As required at tops of walls to provide a rated smoke and fire seal between fire compartments. Confirm materials and methods with local building inspector prior to proceeding.
 - .9 Provide a rated gypsum board (type X GB) enclosure around any steel joists which interrupt any required fire separations of wall to roof, as required, to continue required fire separation to roof.

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for joint sealers in accordance with Contract Documents.

1.2 Related Sections

1. Section 06 10 00 Rough Carpentry
2. Section 07 52 16 SBS Modified Bituminous Membrane Roofing
3. Section 07 62 00 Sheet Metal Flashing and Trim

1.3 References

1. Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualifications Board for Joint Sealant.
2. CAN/CGSB-19.24 - Multi-Component, chemical curing sealing compound.
3. CAN/CGSB-19.13 - Single Component, elastomeric, chemical curing sealing compound.
4. CGSB 19-GP-14 - Sealing Compound, One-Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of sealant type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Quality Assurance

1. Skilled trades with minimum five years related experience shall execute Work.

1.8 Mock-Up

1. Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, sealant and tooling. Mock-up may be included as part of finished work.
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1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Guarantee shall be submitted against defects in workmanship and materials.
2. *Contractor* must extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion and staining of adjoining or adjacent materials on surfaces.
3. Provide all additional Warranties that may be available from manufacturer.

1.10 Environmental Requirements

1. Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants.
2. Materials must be stored at minimum of 20°C (68°F) immediately prior to application. Sealant applications must be carried out when ambient temperature is above 0°C (32°F).

2. PRODUCTS

2.1 Material

1. All materials in a sealant system shall be compatible with each other and with substrate.
 2. Colour(s) of sealants shall be selected to match adjacent substrate and shall be approved by *Consultant* or *Owner*.
 3. Elastomeric Sealants: One part elastomeric, non-sag urethane based sealant, for masonry to masonry, masonry to metal junctions. Acceptable Material:
 1. Dymonic as manufactured by Tremco Incorporated.
 2. Precast Wall (Vertical Joints) - Three-component, chemically curing, epoxidized polyurethane sealant, 'Dymeric 240' by Tremco Incorporated.
 4. Silicone sealants: Silicone based sealant, for metal to metal junctions. Acceptable Material:
 1. Spectrum 2 as manufactured by Tremco Incorporated.
 2. Dow Corning 999-A Silicone Building & Glazing Sealant by Dow Corning Canada Inc.
 5. Butyl sealants: Butyl rubber and polyisobutylene blend sealant. Butyl sealant to be compatible with modified bituminous membrane flashings. Acceptable Material:
 1. Tremco Butyl Sealant as manufactured by Tremco Incorporated.
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2. Modified Membrane manufacturer's approved sealant.
6. Joint Backing: Polyethylene, urethane, neoprene or vinyl, extruded foam recommended by the sealant manufacturer. Circular shape with diameter 25% greater than joint width before installation.
7. Void Filler: Glass fibre insulation with a nominal density of 14 kg/m³ (Sized for 25% compression).
8. Primer: As recommended by sealant manufacturer to assure adhesion of compound and to prevent staining of substrate materials.
9. Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant as recommended by sealant manufacturer.
10. Bond Breaker Tape: Polyethylene bond breaker tape, which will not bond to sealant.

3. EXECUTION

3.1 Removal of Existing Sealants

1. Remove existing sealants, backing material, dust, oil, grease, oxidation, millscale, coatings and all other loose material by cutting, brushing, scrubbing, scraping and grinding.
2. Rake out joints, cracks and crevices to receive sealant, to a depth measuring half the joint width. Clean out existing reglets to satisfaction of *Consultant*.

3.2 Preparation

1. Examine joint sizes and conditions to establish correct depth to width ratio for joint backing and sealant. Clean joint surfaces of deleterious material and substances including dust, rust, oil grease, and other matter that may impair work.
2. Ensure joint surfaces are dry and frost free. Prepare substrate as recommended by sealant manufacturer ensuring adjacent surfaces are not damaged.
3. Commencement of Work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.

3.3 Priming

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

3.4 Sealant Application

1. Install joint backing all joints prior to applying sealants. Diameter of backing material shall be 25% more than width of joint.
2. **Maintain minimum 2:1 width to depth ratio for sealant.**
3. Apply bond breaker tape where joints are of insufficient size to install joint backing or at 90° junctions or where required by sealant manufacturer or *Consultant*. Ensure bond surface area meets the minimum required size recommended by sealant manufacturer.
4. Apply sealant in continuous beads, in solid contact to underlying surfaces with sufficient pressure to fill voids and joints solid.
5. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities. Superficial skin bead is not acceptable.
6. Tool exposed surfaces before skinning occurs to attain concave shape using approved tools.
7. Cure sealant in accordance with the manufacturer's requirements. Do not cover up sealants until proper curing has taken place.

3.5 Clean-up

1. Clean adjacent surfaces immediately and leave work neat and clean.
2. Remove excess and droppings using recommended cleaners as work progresses.
3. Remove bonding tape after initial set of sealant.
4. Remove all excess material, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .3 Section 08 11 14 – Steel Doors and Frames.
- .4 Section 04 21 13 – Masonry.
- .5 Section 07 46 13 – Preformed Metal Siding.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919-[02], Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-[1984], Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-[M87], Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-[M90], One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-[E(2)1993], Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Instructions to include installation instructions for each product used.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .5 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .6 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.
- .7 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .8 Fold up metal banding, flatten, and place in designated area for recycling.

1.7 PROJECT CONDITIONS

- .1 Environmental Limitations:

- .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
 - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.9 WARRANTY

- .1 Submit a warranty that caulking work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces, in accordance the General Conditions of the Contract, but for two (2) years total. Contractor shall supply all labour, materials, tools and equipment to repair and/or replace any work judged to be defective by the Consultant and sealant manufacturer at no additional cost to the owner for a period of 2 years from the date of Substantial Completion.
- .2 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the sealant for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of 10 years

Part 2 Products

2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Primers: type recommended by sealant manufacturer.
- .2 Joint Fillers:
 - .1 General: compatible with primers and sealants, outsized 30 to 50%.
 - .2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
 - .3 Neoprene or butyl rubber: round solid rod, Shore A hardness 70.
 - .4 Polyvinyl chloride or neoprene: extruded tubing with 6 mm minimum thick walls.
 - .5 Bond breaker: pressure sensitive plastic tape which will not bond to sealants.
 - .6 Sealant Type A: One component, chemical curing, conforming to CAN2-19.13-M82, Class C-2-25-B-N; multi-component, chemical curing, conforming to CAN2-19.24-M80, Type 2, Class B. Acceptable products shall be “Dymeric 511” as manufactured by Tremco Ltd, “Sikaflex-2C/NS” as manufactured by Sika Canada Inc., “Contractors Weatherproofing Sealant” as manufactured by Dow Corning or equivalent as selected by Consultant.
 - .7 Sealant Type B: Multi-component, chemical curing mildew resistant conforming to CGSB 19-GP-22M.
 - .8 Sealant type C: Multi-component, acrylic emulsion base, conforming to CGSB 19-GP-17M.
 - .9 Sealant type D: One component, polyurethane base, chemical curing, conforming to CAN2-19.13-M82, Class C-1-25-B-N; or multi-component, chemical curing, conforming to CAN2-19.24-M80, type 1.
 - .10 For exterior aluminum to masonry, aluminum to wood and aluminum to metal joints: high performance, single component modified elastomeric joint sealant conforming to CAN2-19.24-M80. Acceptable Materials: Sonolastic Ultra by Degussa.
 - .11 For interior aluminum to masonry, aluminum to wood and aluminum to metal joints: high performance, single component low odour sealant conforming to CAN/CGSB-19.13-M87. Acceptable materials: Spectrem 2 by Tremco.
- .3 Color of Sealants: to be selected by Consultant. Allow for a total of two (2) colours for Type A, two colours for Type B, two colours for Type C and one colour for Type D. Locations as directed on site by Consultant.
- .4 Joint cleaner: xylol, methylethyl-ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.
- .5 Vent tubing: 6 mm inside diameter extruded polyvinyl chloride tubing.

2.3 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

- .2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

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

3.3 PRIMING

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

3.4 BACKUP MATERIAL

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

3.5 MIXING

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

3.6 APPLICATION

- .1 New Work:
 - .1 Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.
 - .2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

- .3 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.
- .4 Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.
- .5 Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm.
- .6 Install joint filler to achieve correct joint depth.
- .7 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .8 Apply bond breaker tape where required to manufacturer's instructions.
- .9 Prime sides of joints to sealant manufacturer's instructions immediately prior to caulking.
- .2 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
 - .9 Apply sealant to joints between window or door frames to adjacent building components around perimeter of every external window or door opening, to control joints in masonry walls and where indicated. In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum to 1500 mm o.c. vertically. Position tube to drain to exterior.
 - .10 Apply sealant to close gaps at all junctures of all interior walls meeting exposed ceilings. Provide required foam backer rods to ensure integrity of sealant bead when applied to juncture. Tool finish smooth to receive paint finish.
 - .11 Use sealants specified in the following locations:
 - .1 Type A: Joints between windows or door frames and adjacent building components; control and expansion joints and all other locations where sealing is required, except in locations designated for Type B, C and D. Ensure that sealant chosen (from the several specified under "MATERIALS") for each location is recommended by manufacturer for use on surfaces encountered.
 - .2 Type B: Joints between splash backs and walls.
 - .3 Type C: Joints between interior metal door frames and partitions.
 - .4 Type D: Joints in horizontal surfaces between concrete slabs.
- .3 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.

- .2 Do not cover up sealants until proper curing has taken place.
- .4 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

3.7 WORK INCLUDED

- .1 Work shall include but not limited to the following areas:
 - .1 exterior and interior hollow metal frames and screens; both sides;
 - .2 exposed control and expansion joints in masonry walls, masonry corners, joints in front of steel lintels bearing on exterior brick jambs;
 - .3 joints at all washroom vanities, hair dryers, hand dryers, electrical panels, access doors and adjacent surfaces. (Use sanitary caulking.)
 - .4 joints between masonry and concrete surfaces.
 - .5 joints between gypsum board and masonry, or other materials.
 - .6 joints between louvres and other surfaces.
 - .7 exterior siding, prefinished metal fascia, flashing and trim.
 - .8 penetrations through roofs, floors and walls other than firestopping
 - .9 at all other locations on drawings, except as noted below.
- .2 Sealing of joints to the underside of exposed precast slab to be by precast installer.
- .3 Sealing of all joints at top of walls meeting exposed flat or sloped precast ceilings to be included in this section.

3.8 REQUIRED INSPECTION

- .1 Contractor to engage exterior sealant manufacturer's representative to review in order to provide manufacturer's warranty. Manufacturer's representative shall review substrate conditions as prepared on site and prior to the application of the sealant. If requested, manufacturer to supply a written copy of this warranty.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 07 92 10 – Joint Sealing: Caulking of joints between frames and other building components.
- .3 Section 08 71 10 – Door Hardware - General: Supply of finish hardware, including weatherstripping and mounting heights.
- .4 Section 09 91 22 – Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M-[01a], Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B29-[92(1997)], Specification for Refined Lead.
 - .3 ASTM B749-[97], Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma-[84], Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-[M1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames, [1990].
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, [1990].
- .5 National Fire Protection Association (NFPA)
 - .1 NFPA 80-[99], Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252-[99], Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN4-S104-[80(R1985)], Fire Tests of Door Assemblies.
 - .2 CAN4-S105-[85(R1992)], Fire Door Frames Meeting the Performance Required by CAN4-S104.

- .7 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .8 CAN/ULC-S702-[97], Thermal Insulation, Mineral Fibre, for Buildings.
- .9 CAN/ULC-S704-[01], Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 WORK INCLUDED

- .1 A single manufacturer shall fabricate products included within the scope of this Section.
- .2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).
- .3 Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Consultant.
- .4 Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Consultant.
- .5 Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Consultant.

1.5 RELATED WORK

- .1 Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.
- .2 Supply and installation of wood, plastic or composite core doors.
- .3 Supply and installation of builders' hardware except as specified for acoustic assemblies.
- .4 Drilling and tapping for surface mounted or non-templated builders' hardware.
- .5 Caulking of joints between frame product and other building components.
- .6 Supply and installation of gaskets or weather-strip.
- .7 Supply and installation of louvers or vents.

- .8 Supply and installation of glazing materials.
- .9 Site touch-up and painting.
- .10 Wiring for electronic or electric hardware.
- .11 Field measurements.
- .12 Fasteners for frame product in previously placed concrete, masonry or structural steel.
- .13 Steel lintels, posts, columns or other load-bearing elements.
- .14 Field welding.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, or louvred, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing and fire rating finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.

1.7 REQUIREMENTS

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

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site for recycling.
- .3 Divert unused paint and sealant materials from landfill to official hazardous material collections site approved by Consultant.
- .4 Do not dispose of unused paint and sealant materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused wood materials from landfill to recycling facility approved by Consultant.
- .7 Damaged or broken glazing materials are not recyclable. These materials must not be disposed of with materials destined for recycling.

1.9 TESTING AND PERFORMANCE

- .1 Door constructions covered by this specification shall be certified as meeting Level "A" (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .2 Fire labeled 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 CAN4-S106. 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 labeling due to design, hardware, glazing or any other reason, the Consultant shall be so advised before manufacturing commences.
- .4 Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.
- .5 Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders' or electronic hardware and glazing materials and their impact on the scope of work.
- .6 Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
- .7 Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.10 TEST REPORTS

- .1 All alternates to this specification shall be submitted to the Consultant for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:
 - .1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level "A".

- .2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.
- .2 All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.11 WARRANTY

- .1 All steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.
- .2 All steel door and frame product shall be warranted against rust perforation for a period of ten (10) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.
- .3 Finish paint adhesion on all door and frame product shall be warranted for a period of ten (10) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

Part 2 Products

2.1 MATERIALS

- .1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.
 - .1 Acceptable Manufacturers, meeting these exact specifications: S.W. Flemming, Trillium Steel Doors Limited, Baron & Artec and Daybar Steel Doors and Frames.
- .2 Door Cores:
 - .1 Honeycomb:
 - .1 Structural small cell (25.4 mm maximum) kraft paper "honeycomb". Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m³ (minimum), sanded to the required thickness.
 - .2 Polystyrene:
 - .1 Rigid extruded, fire retardant, closed cell board, density 16kg/m², thermal values: RSI 1.06 minimum, conforming to ASTM C578.
 - .3 Temperature Rise Rated (TRR):
 - .1 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.

- .4 Adhesives:
 - .1 Honeycomb Cores and Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
- .5 Interlocking Edge Seams:
 - .1 Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.
- .6 Polystyrene Cores:
 - .1 Heat resistant, epoxy based, low viscosity, contact cement.
- .3 Primer:
 - .1 Rust inhibitive touch-up only.
- .4 Exterior Top Caps:
 - .1 Rigid polyvinylchloride (PVC) extrusion.

2.2 DOOR FABRICATION

- .1 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.
- .2 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the Consultant's schedules or drawings.
- .3 Exterior doors shall be lock seam, flush.
- .4 Face sheets for exterior doors shall be fabricated from (16) gauge steel.
- .5 Longitudinal edges of exterior doors shall be fully welded, ground smooth with no visible seams.
- .6 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge.
- .7 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
- .8 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.
- .9 Stiffened, insulated and sound deadened with Fleming's propriety core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Consultant's schedules.
- .10 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams and tack-welded every 150 mm and filled flush.

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- .11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
 - .12 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
 - .13 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.
 - .14 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.
 - .15 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.
 - .16 Unless ineligible due to design, size, hardware or glazing specified on the Consultants' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Consultant.
 - .17 Exterior doors and high traffic doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m³ density loose batt type fiberglass material to suit fully welded design. All high traffic doors shall have continuous hinges.
 - .18 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
 - .19 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .20 Doors shall be factory reinforced only for surface mounted hardware.
 - .21 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
 - .22 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
 - .23 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.
 - .24 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.

- .25 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.
- .26 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.
- .27 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.
- .28 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
- .29 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
- .30 Where electrically or electronically operated hardware is specified on the Consultants' schedules or details of the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.
- .31 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

2.3 GLAZING

- .1 Where 6mm thick glazing materials are specified on the Consultants schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.
- .2 Where other than 6mm glazing is specified on the Consultant's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.
- .3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

2.4 LOUVER

- .1 Where specified on the Consultant's schedules or details, non-labeled doors shall be prepared on accordance with the louver manufacturer's details.
- .2 Where specified on the Consultant's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.
- .3 Louvers shall be supplied and installed by others.

2.5 FINISHING

- .1 Remove weld slag and splatter from exposed surfaces.

- .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
- .3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
- .4 Primer shall be fully cured prior to shipment.

2.6 PANELS

- .1 Panels shall be fabricated from the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.7 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.8 PAINT

- .1 Field paint steel doors and frames in accordance with Section[s] [09 91 23 - Interior Painting], [09 91 13 - Exterior Painting]. Protect weatherstrips from paint. Provide final finish shall be free of scratches or other blemishes.

2.9 FRAMES FABRICATION GENERAL

- .1 Steel:
 - .1 Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.
- .2 Primer:
 - .1 Rust inhibitive touch up only.
- .3 Miscellaneous:
 - .1 Door Silencers: GJ-64, Single Stud rubber/neoprene type
 - .2 Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion
 - .3 Fiberglass: Loose batt type, density: 24kg/m³ (minimum), conforming to ASTM C665.
- .4 General:
 - .1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Consultants' schedules or details.
 - .2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.
 - .3 Exterior frame product shall be supplied profile welded (PW)

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- .4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
 - .1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.
 - .2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m³ loose batt type fiberglass material.
 - .5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.
 - .6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.
 - .7 Interior frame product shall be supplied profile welded (PW)
 - .8 Knocked-down and knocked-down drywall frames shall not be acceptable.
 - .9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
 - .10 Frame product shall be square, free of defects, wraps or buckles.
 - .11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"
 - .12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
 - .13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.
 - .14 Mullions shall be fabricated with continuous 20 gauge galvalume steel internal reinforcing clips.
 - .15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.
 - .16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.
 - .17 Where required due to site access, as indicated on the Consultants' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when

shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.

- .1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.
 - .2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.
 - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.
- .18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.
- .19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.
- .20 Unless ineligible due to design, size, hardware or glazing specified on the Consultants' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Consultant.
- .21 All removable mullions are key operated hardware mullions. Refer to Door and Door Finish schedules. All fixed mullions are to be hollow metal.
- .22 Hardware Preparations:
- .1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.
 - .2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Frame product shall be reinforced only for surface mounted hardware.
 - .4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
 - .5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).
 - .6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.
 - .7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
 - .8 Strike reinforcements shall be 16 gauge steel minimum.
 - .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.

- .10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.
- .11 Where electrically or electronically operated hardware is specified on the Consultants schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and inter-connected with CSA Approved 12.7mm diameter conduit and connectors.
- .12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.
- .23 Anchorage:
 - .1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.
 - .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
 - .3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or “T” type anchors as conditions dictate.
 - .4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.
 - .5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
 - .6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or “Z” type stud type anchor.
 - .7 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcing and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.
 - .8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.
 - .9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.
 - .10 Where indicated on the Consultants’ schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.
- .24 Finishing:

- .1 Remove weld slag and spatter from exposed surfaces.
- .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
- .3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
- .4 Primer shall be fully cured prior to shipment.

2.10 SIZES AND TOLERANCES

- .1 All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames" as follows:
 - .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.
 - .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2 mm.
 - .3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± 1.2 mm.
 - .4 Manufacturing tolerances on formed frame profiles shall be ± 0.8 mm for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be ± 1.6 mm and ± 0.4 mm respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, -0.

2.11 HARDWARE LOCATIONS

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.
- .2 Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be located as shown on Door Leaf Elevations AD800.
- .4 Preparations not noted above shall be as per hardware manufacturer's templates.
- .5 Hardware preparation tolerances shall comply with the ANSI A115 series standards.

Part 3 Execution

3.1 SITE AND PROTECTION OF MATERIALS

- .1 The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.
- .2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier, All damage shall be noted on the carriers' Bill of Landing.
- .3 Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.
- .4 Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 INSTALLATION GENERAL

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.
- .3 Install doors and frames in accordance with the Door and Hardware Institute "Installation guide for doors and hardware".
- .4 Set frame product plumb, square, aligned, without twist at correct elevation.
- .5 Frame Product Installation Tolerances:
 - .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be $\pm 1.6\text{mm}$.
 - .2 Squareness tolerance, measured through a line 90^0 from one jamb at the upper corner of the product, to the opposite jamb, shall be $\pm 1.6\text{mm}$.
 - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be $\pm 1.6\text{mm}$.
 - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be $\pm 1.6\text{mm}$.
- .6 Fire labeled product shall be installed in accordance with NFPA-80.
- .7 Secure anchorages and connections to adjacent construction.
- .8 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for

openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.

- .9 Frame product in unit masonry shall be fully grouted in place.
- .10 Install doors maintaining clearances outlined in Section 2.4.
- .11 Install louvers and vents.
- .12 Adjust operable parts for correct clearances and function.
- .13 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
- .14 Any grout or other bonding material shall be cleaned from products immediately following installation.
- .15 Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.
- .16 Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.
- .17 Finish paint in accordance with Section 099116 and 099123.
- .18 Install glazing materials and door silencers.

3.3 INSPECTION

- .1 In accordance with Section 01005, upon assignment of an inspection agency the following inspections shall be performed:
 - .1 review of shop drawings for compliance with specification
 - .2 shop inspection during production. Should inspection notification not be given suitable to review fabrication, destructive testing of one or more doors will be undertaken either in the shop or on site at no additional cost to the Owner. Doors destroyed for invasive inspection shall be replaced as part of the contract price.
- .2 On notification of initial door inspection, contractor shall notify inspector to witness installation practice and at periodic points for duration of installation period.

3.4 FINISH REPAIRS

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

3.5 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

END OF SECTION

END OF SECTION

REMARK NOTES:

1. ALL DIMENSIONS OF NEW DOORS AND/OR ASSEMBLIES SHALL BE CONFIRMED IN FIELD PRIOR TO FABRICATION
2. **EXISTING ASSEMBLY:** GRIND AND SAND AS REQUIRED TO REMOVE ALL SURFACE RUST. FILL ANY HOLES IN H.M. FRAME AND H.M. DOOR AS REQUIRED. PRIME AND PAINT EXISTING DOOR AND FRAME.
3. NEW EXTERIOR HM DOORS TO BE INSULATED, BUT HM SCREENS ARE NOT INSULATED. NEW GLAZING AT EXTERIOR DOORS TO BE INSULATED GLASS UNITS, TEMPERED INNER AND OUTER LITES
4. REUSE EXISTING ROUGH OPENING & LINTEL
5. MODIFY SIDELITE ASSEMBLY (ADD HORIZ. HM MULLION, ADD INSULATED PANEL AND NEW INSULATED TEMP. GLAZING). PRIME AND PAINT DOOR AND FRAME ASSEMBLY. SEE DETAILS
6. INSTALL SAFETY GLASS FILM ON EXISTING G.W.G. SIDELITES (FILM ON INTERIOR SIDE OF DOOR)
7. INSTALL SAFETY GLASS FILM ON EXISTING G.W.G. DOOR LITES (FILM ON INTERIOR SIDE OF DOOR)
8. REPLACE EXISTING GWG GLAZING UNIT (WITHIN EX. DOOR ASSEMBLY) WITH 6mm TINTED LAMINATED SAFETY GLASS (FILM ON INTERIOR SIDE OF DOOR)

DOOR #		DOOR							FRAME					REMARKS	
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC		GLASS
X00	A	REUSE EX. DOOR				A	HM	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1
X00	B	DEMOLISHED - INFILL WITH NEW WALL ASSEMBLY REFER TO ARCH. DWGS.													
X01	A	REUSE EX. DOOR				A	WD		EX.GWG	1	WD		REUSE EX. FRAME		NOTE 1, 7
X02	A	REUSE EX. DOOR				A	WD		EX.GWG	1	WD		REUSE EX. FRAME		NOTE 1, 7
X03	A	REUSE EX. DOOR				A	WD		EX.GWG	1	WD		REUSE EX. FRAME		NOTE 1, 7
X04	A	REUSE EX. DOOR				A	WD		EX.GWG	1	WD		REUSE EX. FRAME		NOTE 1, 7
X05	A	REUSE EX. DOOR				A	WD		EX.GWG	1	WD		REUSE EX. FRAME		NOTE 1, 7
X06	A	REUSE EX. DOOR				A	WD		EX.GWG	1	WD		REUSE EX. FRAME		NOTE 1, 7
X07A	A	REUSE EX. DOOR				A	HM		EX.GWG	1	HM		REUSE EX. FRAME		NOTE 1, 7
X07B	A	REUSE EX. DOOR				A	HM		EX.GWG	1	HM		REUSE EX. FRAME		NOTE 1, 7
X07	A	REUSE EX. DOOR				A	HM	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1, 7
X08	A	REUSE EX. DOOR				A	HM	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1, 7
X09	A	REUSE EX. DOOR				A	HM	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1, 7
X10	A	REUSE EX. DOOR				A	HM	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1, 7
X12	A	2x1000	2150		Y	B	HM	P	TG	2	HM	P		TG	NOTE 3,4,8
X12	B	REUSE EX. DOORS				C	HM	P	EX.GWG	2	HM	P	REUSE EX. FRAME		NOTE 1,5,6, 7
X13	A	915	2150			B	HM	P	TG	1 (SIM)	HM	P		TG	NOTE 1, 2, 3, 8 DEPENDS ON EXT. FACAD RENO
X14	A	REUSE EX. DOORS				B	HM	P	EX.GWG	4	HM	P	REUSE EX. FRAME		NOTE 1, 4, 7, 8, 9
X14	B	REUSE EX. DOORS				B	HM	P	EX.GWG	4	HM	P	REUSE EX. FRAME		NOTE 1, 4, 7, 8, 9
X17	A	900	2150			F2	HM	P		8	HM	P	REUSE EX. FRAME		NOTE 1, 3

DOOR #		DOOR							FRAME					REMARKS	
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC		GLASS
X18	A	900	2150			F2	HM	P		8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X19	A	900	2150			F2	HM	P		8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X20A	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X20A	B	900	2150			H	HM	P		8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X20A	C	900	2150			H	HM	P		1	HM	P		REUSE EX. FRAME	NOTE 1, 3
X20A	D	900	2150			H	HM	P		1	HM	P		REUSE EX. FRAME	NOTE 1, 3
X21	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X22	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X23	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X24	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X25	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X26	A	900	2150			F	HM	P	TG	8	HM	P		REUSE EX. FRAME	NOTE 1, 3
X27	A	REUSE EX. DOORS				C	HM	P	EX.GWG	7	HM	P		REUSE EX. FRAME	NOTE 1, 5, 6, 7,8
X27	B	REUSE EX. DOORS				C	HM	P	EX.GWG	7	HM	P		REUSE EX. FRAME	NOTE 1, 5, 6, 7,8
X27A	A	REUSE EX. DOORS				B	HM	P	TG	2 (SIM)	HM	P		REUSE EX. FRAME	NOTE 1, 5, 6, 8
X27A	B	REUSE EX. DOORS				B	HM	P	TG	2 (SIM)	HM	P		REUSE EX. FRAME	NOTE 1, 5, 6, 8
X28	A	REUSE EX. DOORS				H	WD	P		1	HM	P		REUSE EX. FRAME	NOTE 1
X29	A	REUSE EX. DOORS				B	HM	P	EX.GWG	9	HM	P		REUSE EX. FRAME	NOTE 1, 7
X29	B	REUSE EX. DOORS				B	HM	P	EX.GWG	9	HM	P		REUSE EX. FRAME	NOTE 1, 7
X30	A	REUSE EX. DOORS				G	WD	P		1	HM	P		REUSE EX. FRAME	NOTE 1
X30	B	760	2150			B	HM	P	TG	10	HM	P		REUSE EX. FRAME	NOTE 2, 3, 8
X30	C	REUSE EX. DOORS				G	WD	P		1	HM	P		REUSE EX. FRAME	NOTE 1
X30	D	REUSE EX. DOORS				G	WD	P		1	HM	P		REUSE EX. FRAME	NOTE 1

DOOR #		DOOR							FRAME					REMARKS	
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC		GLASS
X31	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X32	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X33	A	REUSE EX. DOORS				G	WD	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1, 7
X34	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X35	A	REUSE EX. DOORS				G	WD	P	EX.GWG	1	HM	P	REUSE EX. FRAME		NOTE 1, 7
X36	A	REUSE EX. DOORS				H	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X37	A	REUSE EX. DOORS				H	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X38	A	2x1000	2150		Y	B	HM	P	TG	2	HM	P		TG	NOTE 1, 3, 4, 8
X39	A	REUSE EX. DOORS				B	HM	P	EX.GWG	6 (SIM)	HM	P	REUSE EX. FRAME		NOTE 1, 7
X39	B	915	2150	1HR	Y	H	HM	P		1	HM	P			NOTE 1, 2, 3, 8
X40	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X41	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X42	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X43	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X44	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X45	A	REUSE EX. DOORS				G	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X46	A	REUSE EX. DOORS				H	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X47	A	REUSE EX. DOORS				B	HM	P	EX.GWG	9	HM	P	REUSE EX. FRAME		NOTE 1, 7
X47	B	REUSE EX. DOORS				B	HM	P	EX.GWG	9	HM	P	REUSE EX. FRAME		NOTE 1, 7
X48	A	REUSE EX. DOORS				H	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X49	A	REUSE EX. DOORS				H	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X50	A	REUSE EX. DOORS				H	WD	P		1	HM	P	REUSE EX. FRAME		NOTE 1
X100	A	REUSE EX. DOORS				H	HM	P		6	HM	P	REUSE EX. FRAME		NOTE 1,8
X100	B	REUSE EX. DOORS					WD		EX.GWG		WD		REUSE EX. FRAME		NOTE 1, 7

DOOR #		DOOR							FRAME					REMARKS		
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC		GLASS	
X100	C	REUSE EX. DOORS					WD		EX.GWG		WD		REUSE EX. FRAME		NOTE 1, 7	
X104	A	2x915	2150		Y	H	HM	P		11	HM	P			NOTE 2,3,8	
X105	A	REUSE EX. DOORS				A	HM	P		1	HM	P	REUSE EX. FRAME		NOTE 1	
X111	A	REUSE EX. DOORS						WD		TG		WD		REUSE EX. FRAME		NOTE 1, 7
X112	A	3x1000	2150		Y	B	ALUM	ANNO	TG	3	ALUM	ANNO		TG	NOTE 2,3,8	
X112	B	REUSE EX. DOORS					C	HM	P	EX.GWG	3	HM	P	REUSE EX. FRAME		NOTE 1, 5, 6, 7
X113	A	REUSE EX. DOORS					E	HM	P	EX.GWG	5	HM	P	REUSE EX. FRAME		NOTE 1, 5, 6, 7
X114	A	REUSE EX. DOORS						WD		EX.GWG		WD		REUSE EX. FRAME		NOTE 1, 7
X115	A	REUSE EX. DOORS						WD		EX.GWG		WD		REUSE EX. FRAME		NOTE 1, 7
X115	B	REUSE EX. DOORS						WD		EX.GWG		WD		REUSE EX. FRAME		NOTE 1, 7
X115	C	REUSE EX. DOORS						WD		EX.GWG		WD		REUSE EX. FRAME		NOTE 1, 7
X116	A	REUSE EX. DOORS					E	HM	P	EX.GWG	2	HM	P	REUSE EX. FRAME		NOTE 1, 5, 6, 7
X120	A	900	2150			F	HM	P	TG	8	HM	P	REUSE EX. FRAME		NOTE 3	
X121	A	900	2150			F	HM	P	TG	8	HM	P	REUSE EX. FRAME		NOTE 3	

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 08 80 50 Glazing.
- .4 Section 08 71 10 Finish Hardware – General
- .5 Section 08 71 15 Finish Hardware Schedule

1.2 REFERENCES

- .1 American Architectural Manufacturers Association (AAMA):
 - .1 AAMA 2605-05, Voluntary Specification for High Performance Coatings on Architectural Extrusions and Panels.
 - .2 AAMA CW-10-04, Care and Handling of Architectural Aluminum from Shop to Site.
- .2 American National Standards Institute (ANSI):
 - .1 ANSI, H35.1M-2009, Alloy and Temper Designation Systems for Aluminum (Metric).
- .3 American Society for Testing and Materials (ASTM):
 - .1 ASTM A167-99(2009), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM B221M-08, Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
 - .3 ASTM F738M-02(2008), Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .4 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint.
- .5 Canadian Standards Association (CSA):
 - .1 CSA W59-M-03(R2008), Welded Steel Construction (Metal Arc Welding).

1.3 DESIGN REQUIREMENTS

- .1 Design aluminum doors in accordance with following Climatic Design Data for Oakville contained in the Ontario Building Code:
 - .1 Design temperature: January 1%, July 2 1/2% .
 - .2 Hourly wind pressures: 1 in 50 year occurrence.
- .2 Design aluminum doors to accommodate following without producing detrimental effect:
 - .1 Cyclic 40 degrees C daily thermal swing of components.
 - .2 Cyclic, dynamic loading and release of loads such as wind loads.
 - .3 13 mm vertical deflection in supporting structure and movement of supporting structure due to live, dead load, and creep or deflections, seismic load, sway displacement and similar items.

- .3 Prevent deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical deflection to less than $L/175$ (under uniformly distributed positive design wind load), and 10 mm maximum regardless of span.

1.4 SUBMITTALS

- .1 Shop drawings:
 - .1 Submit shop drawings in accordance with the Section 01 33 00 indicating:
 - .1 Plans, sections, details, type of extrusions, profiles, anchorage, glazing details, and finishes.
 - .2 Section and hardware reinforcement.
- .2 Samples:
 - .1 Submit sampled in accordance with the Section 01 33 00 of the following:
 - .1 One complete corner detail of door frame, glazing, and finish for each door type.
 - .2 Each door hardware item for the Consultant's approval.
- .3 Reports:
 - .1 Submit substantiating engineering data, and independent test results of pre-tested, existing doors to substantiate compliance with the design criteria.
 - .2 Submit documentation to substantiate ten years of experience in aluminum door manufacture and installation.

1.5 DELIVERY, STORAGE, AND HANDLING

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

Part 2 Products

2.1 ACCEPTABLE MANUFACTURER(S) AND SYSTEM(S)

- .1 Aluminum doors:
 - .1 Exterior:
 - .1 '400A Insuldoor' by Alumicor Limited.
 - .2 '360 Insulclad Doors' by Kawneer Company Canada Limited.
 - .3 Or approved alternative.

2.2 MATERIALS

- .1 General:
 - .1 All materials under Work of this Section, including but not limited to, sealants and coatings are to have low VOC content limits.
 - .2 Wherever possible, metals used in work of this Section are to contain recycled content.
- .2 Aluminum extrusions and channels: ASTM B211 and ANSI H35.1 AA6063 alloy, T6 temper.

- .3 Reinforcements and anchors: ASTM A167, Type 304 to AISI No. 2B finish. Size as shown.
- .4 Glass and glazing materials: As specified in Section 08 80 50.
- .5 Frame sealant: Type as recommended by the aluminum work manufacturer.
- .6 Screws, bolts and other fasteners: ASTM F738M; Stainless Steel Type 304.
- .7 Isolation coating: CAN/CGSB-1.108-M; Bitumastic coating, acid and alkali resistant material.
- .8 Foam insulation: One component polyurethane foam for installation within closures and fillers; Enerfoam by Dow Chemical Canada Inc.
- .9 Weatherstripping: Durable, non-absorbing material resistant to deterioration by aging and weathering.
- .10 Door hardware: Supplied by Section 08 71 00, preparation and installation by this Section.

2.3 FABRICATION

- .1 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.
- .2 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints. Apply frame sealant at joints for weatherproof seams.
- .3 Conceal anchors, reinforcement and attachments from view. Fabricate reinforcement in accordance with design requirements.
- .4 Do not expose manufacturer's identification labels on aluminum assemblies.
- .5 Fabricate doors and frames complete with internal reinforcements, cut-outs, and recesses to accommodate finish hardware. Reinforce cut-outs to assure adequate strength.
- .6 Double weatherstrip doors. Install weatherstripping in specially extruded ports and secure to prevent shrinkage or movement.
- .7 Fabricate doors of welded construction.
- .8 Glazing stop: Square, snap-on type, designed for neoprene glazing system.

2.4 FINISH

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

Part 3 Execution

3.1 INSTALLATION

- .1 Install aluminum doors in accordance with reviewed shop drawings, and manufacturer's written instructions.
- .2 Install Work of this Section securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist.
- .3 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.
- .4 Fill voids between aluminum framing and adjacent construction with foam insulation.
- .5 Install aluminum door manufacturer's standard weatherstripping at door frame perimeter. Install weatherstripping throughout entire length and width of doors at jambs and heads.
- .6 Install doors and hardware to manufacturers' written instructions. Clean and adjust hardware for correct performance.
- .7 Adjust operable parts for correct function.
- .8 Remove damaged or unacceptable Products and assemblies from Site and replace to Consultant's acceptance.
- .9 Install glass presence markers, in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.

3.2 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 08 80 50 – Glazing.
- .4 Section 07 92 10 – Joint Sealing: caulking of joints between frames and other building components.

1.2 REFERENCES

- .1 Aluminum Association (AA), Designation System for Aluminum Finishes (2000)
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-[97], Anticorrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-79.1-[M91], Insect Screens.
- .3 Canadian Standards Association (CSA) International
 - .1 CSA-A440-[00]/A440.1-[00], A440-[00], Windows / Special Publication A440.1-[00], User Selection Guide to CSA Standard A440-[00], Windows.
 - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-Z91-[M90(R2000)], Safety Code for Window Cleaning Operations.

1.3 DESIGN REQUIREMENTS AND PREQUALIFIED WINDOW SUPPLIERS

- .1 Base performance standard: Products to be supplied from the list of acceptable manufacturers listed below shall meet or exceed the following performance standard product upon which this specification is largely based: 518 Isoport windows, rain screen system, with Isoport frameless vents as manufactured by Kawneer Company Canada Limited.
- .2 Design framing and glazing to withstand design loads as per Ontario Building Code with a maximum reflection of 1/200th of clear span.
- .3 Work of this Section must be designed by a Professional Engineer licensed to design structures in the Province of Ontario.

1.4 DESIGN REQUIREMENTS AND PREQUALIFIED WINDOW SUPPLIERS

- .1 Base performance standard: Products to be supplied from the list of acceptable manufacturers listed below shall meet or exceed the following performance standard product upon which this specification is largely based on windows manufactured by Alwind Industries.

- .2 Acceptable Manufacturers/Suppliers: Aluminum Windows meeting this specification for this project shall be supplied by one of the following pre-approved suppliers:
 - .1 Alwind Industries– Concord, ON, Tel. 1 905-738-4266
 - .2 Windspec Inc. – Concord, ON, Tel. 1 905-738-8311
 - .4 Kawneer – Scarborough, ON, Tel. 416-755-7751
 - .5 Fulton Windows – Mississauga, ON Tel. 905-890-6970
 - .6 Alumnicor Ltd.- Toronto, ON Tel. 416-745-4222
 - .4 Other manufacturers approved in writing during the tender period.
- .3 Design framing and glazing to withstand design loads as per Ontario Building Code with a maximum reflection of 1/200th of clear span.
- .4 Work of this Section must be designed by a Professional Engineer licensed to design structures in the Province of Ontario.

1.4 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the window manufacturer or similar manufacturer). Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or owner.
- .3 Window supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed similar windows for a minimum of five (5) years in the Province of Ontario.

1.5 SHOP DRAWINGS

- .1 **Should the units be pre-ordered without building dimensions being available coordinate with the Construction manager to provide guaranteed opening sizes. Identify all required opening sizes and depths on shop drawings.**
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Clearly indicate on shop drawings all materials and large scale details for head, jamb and sill as they will be installed in contact with building components for this project, profiles of components, elevations of unit, anchorage details, location of isolation coating, location of insulation to jambs head and sill, drainage locations, description of related components and exposed finishes and fasteners.
- .4 Show paths of interior drainage and venting.

1.6 CERTIFICATES

- .1 Submit manufacturer's certificate, and test performance data certifying compliance with specification requirements, for:
 - .1 windows
 - .2 finishes.
 - .3 removable self framed insect screens.
 - .4 infiltration/exfiltration rates.
 - .5 thermal transfer resistance of frames.
 - .6 locking hardware
 - .7 vandal resistance

1.7 PERFORMANCE

- .1 The overall thermal transmittance of fenestration assemblies shall be less than 0.81 Btu. Thermal transmittance for the fenestration shall be determined using ASHRAE 90.1 calculation procedures and shall include the effect of sash, frame, edge effect and spacer for multiple-glazed units.
- .2 Fenestration shall meet CAN/CSA – A440 windows:
 - .1 Air Leakage: A3
 - .2 Water Leakage: B7
 - .3 Wind Load Resistance: C5
 - .4 Condensation Resistance: fixed frame: 71 minimum
 - .5 glass: 67 minimum
- .3 Window shall also meet the requirements for blocked operation, ease of operation, sash strength, stiffness and resistance to forced entry.
- .4 Submit manufacturer's certificate, certifying compliance with the above-noted requirements at time of shop drawing submission.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill to recycling facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

1.9 WARRANTY

- .1 Contractor shall provide a warranty for materials and labour warranting windows and frames against leakage, defects and malfunction in accordance with the Contract, but for five (5) years. Warranty shall include all materials and labour, tools and equipment to repair and/or replace material defects with no pro-rating for the warranty period.
- .2 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the window system for a period of five (5) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of 5 years.
- .3 The supplier shall also submit a warrantee, in accordance with Section 088050-Glazing, for 10 years warranting the sealed units against defects.

1.10 MAINTENANCE DOCUMENTS AND MATERIALS

- .1 Provide 2 copies of data for maintenance and routine cleaning.
- .2 Provide 2 copies of final record reviewed shop drawings for owner's records.
- .3 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

Part 2 Products

2.1 MATERIALS

- .1 Extrusions shall be AA6063 T54 alloy and temper for framing.
- .2 Formed aluminum sheet and plate components shall be AA1100-H14 alloy and temper suitable for their purpose and finish.
- .3 Exposed anodized sheet and plate to AA5005-H14 alloy and temper or AA1100-H14 alloy and temper (anodizing quality, 1.6 mm thickness).
- .4 Non-exposed sheet and plate to AA3003-H14 alloy and temper, mill finish.
- .5 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .6 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.

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- .7 Glazing tapes shall be preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd.
- .8 Exterior Sills: extruded aluminum, minimum 3 mm thick, complete with joint covers, complete with jamb drip deflectors on both sides of each sill (refer also to drawings for type), chairs, anchors, anchoring devices. All corners shall be ground or rounded to eliminate burrs and sharp edges. **Coordinate final wall design and depth with the Construction Manager prior to fabrication.** Submit details with shop drawings.
- .9 Operable and Fixed lite Aluminum windows sections: acceptable products shall be the following units or equivalent performing units by Kawneer or Fulton or acceptable alternates if approved by consultant in advance of the bid close:
- .1 ALWIND INDUSTRIES
- .1 Fixed Frame FG400
- .2 Vented Units VO400, CO400
- .3 Curtain Wall Series CW400
- .2 WINDSPEC INC.
- .1 Fixed Frame Series 970
- .2 Vented Units Series 515
- .3 Curtain Wall Series 5500
- .3 ALUMICOR
- .1 Fixed Frame Series 970
- .2 Vented Units Series 1350
- .3 Curtain Wall Series 2500
- .10 Work of this Section must be designed by a Professional Engineer licensed to design structures in the Province of Ontario.
- .11 Operable awning windows to include limiting devices to not allow windows to open beyond the exterior sill face on all Ground Floor Windows.
- .12 Sealants: shall be in accordance with Section 07 92 10. Colours to Consultant's selection to either match building materials or window frame.
- .13 Foam Backer Rod: extruded, closed cell foam, round polyethylene rope, minimum 25% wider than width of joint cavity to be caulked. To be compatible with primers and sealants.
- .14 Void filler foam: one part expanding polyurethane closed cell foam by BASF, Hilti or approved alternate specifically designed for window applications. To be compatible with primers and sealers
- .15 Bedding Compound: to CGSB 19-GP-14M.
- .16 Isolation Coating: alkali resistant bituminous paint.

2.2 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Fabricate framing from extrusions of size and shape shown on shop drawings. Interior and exterior extruded aluminum framing sections shall be integrated with a glass reinforced nylon thermal break to form a rigid composite assembly without the use of fasteners or other thermal bridging elements.
- .3 Composite frame assembly shall have a minimum of 1100 lbf/4 in. (4815N/ 100 mm) resistance to shear between the aluminum and the thermal break materials.
- .4 Dry shrinkage of the thermal break shall not exceed 0.1% of the framing member length.
- .5 Fixed framing shall be designed for screw spline corner construction. All frameless vent operating sash extrusions shall be tubular with mitred, clip, adhesive , stake joint construction.
- .6 All framing joints shall be accurately machined, assembled, and sealed to provide neat weather tight connections. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion. Glass stops shall be lock-in screwless type.
- .7 All glazing pockets shall be vented, pressure equalized and drained to the exterior.
- .8 Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners wit silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

2.3 ALUMINUM FINISHES

- .1 Exposed aluminum sections and infill panels or interior column covers, if any, shown on drawings be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31. and CAN/CSA-A440 clear anodized Class II, 10µm (.0004 inch.) (Kawneer #17 Clear).
- .2 For exterior spandrel panels –if required on the project, to be a clear anodized infill panel to match windows finish complete with solid support substrate and insulation layer, clear anodized aluminum smooth or textured finish to Consultant selection.
- .3 Final approval of finish and colour to be made by Consultant.

2.4 HARDWARE

- .1 Hinging hardware shall be 4 bar concealed hinge 301 Series Heavy Duty Steel 4 bar hinges by Anderberg with positive stop and adjustable friction shoe. Following review window operator location conditions on site, install metal bar restrictors to each hinge at jamb to allow maximum 225 mm opening, only following Consultant direction.
- .2 Cam handles and keepers shall be solid cast white satin bronze. Do not cut cam handles to fit sash profiles. Where possible secure cam handles with fastenings concealed from

view at underside of frame for top hinged units. Provide a minimum of two (2) solid bronze or stainless steel cam handles per awning unit.

- .3 Where cam handles lock against frames, provide stainless steel strike plate wrapping sash on both sides.
- .4 Provide stops on all ground floor windows to restrict windows to not open past line of exterior brick face.
- .5 Provide telescopic operator and manual crank operating system for all windows where cams are required to be higher than 1800 above finished floor. Refer to drawings for locations.

2.5 INSECT SCREENS

- .1 Provide aluminum insect screens at all operable windows.
- .2 Insect Screens: to CGSB 79-GP-1M, Type 2, aluminum insect screening coated with aluminum pigmented, extruded aluminum frame finished same as window, spring loaded plunger retainers, 4 per frame

2.6 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze or small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.7 GLAZING

- .1 Prepare windows to receive 25 mm thick double glazed insulating glass specified under Section 08 80 50 – Glazing. Glaze windows in accordance with CSA-A440/A440.1.

2.8 THRU-WALL FLASHING

- .1 Sub-sill flashings to be Blueskin SA by Bakor in locations shown on drawings. Adhere to substrate using primer approved by manufacturer. Ensure clean-up of excess primer and no visible edges of flashing upon completion of the work.

2.9 EXTRUDED SILLS

- .1 Sills are to be a minimum of 7 degree (7°) downward slope and integral drip which extends a minimum of 25 mm from the face of the wall cladding.
- .2 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Break form shapes are not permitted.

2.10 ALUMINUM PANNING

- .1 Panning to be extruded aluminum minimum 1.6 mm thick with pre-coated finish to be identical process and match to aluminum frames and sills. Break form shapes are not permitted.
- .2 Submit samples of panning along with samples of other extrusions and materials.
- .3 Metal panning to be designed to lock into new window frames and have true flat planes with no twists, buckles dents, "oil canning" or other similar visual defects caused by manufacturing or handling.

Part 3 Execution

3.1 PREPARATION

- .1 Protect adjacent surfaces from damage resulting from work under this specification.

3.2 WINDOW INSTALLATION

- .1 Install in accordance with CSA-A440/A440.1.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Install the windows in accordance with the manufacturer's instructions. Install the windows plumb, level and true relative to building structure. Do not exceed 3mm in 3050 mm (1/8" in 10'0") variation from plumb and level. Foam insulate between the frame members and the window opening using a single component polyurethane foam, insulating sealant.

3.3 SILL INSTALLATION

- .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Ensure integral end caps are secured with no burrs or exposed sharp edges and do not require excessive caulking due to profiles at jamb. Break form shapes are not permitted.

3.4 CAULKING

- .1 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside.
- .2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip reflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .3 Apply sealant in accordance with Section 07 92 10 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Consultant.

3.5 CLEAN UP

- .1 Clean glass at the factory. For final cleaning of glass to remove job site soiling refer to Section 08 80 50 - Glazing. Leave all surfaces clean, free from sealants, caulking or other foreign material. Remove all surplus materials and debris resulting from the work of this Trade.
- .2 Refer to other sections for requirements to make good all finishes.

3.6 PROTECTION

- .1 Aluminum shall be isolated from concrete, mortar, plaster or dissimilar metals with bituminous paint or epoxy solution. Framing shall be protected from other building materials during and after installation until acceptance.

END OF SECTION

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1.1 RELATED SECTIONS

- .1 Division 1
- .2 Section 06 40 00 – Architectural Woodwork.
- .3 Section 08 11 14 – Metal Steel Doors and Frames.
- .4 Section 16 – Electrical wiring for magnetic strikes, hold open devices, electric releases and electric locks.

1.2 SECTION INCLUDES

- .1 For continuity and ready reference, this section includes hardware Installation and Inspection which in total will involve more than one contractor, as described following. The General Contractor will ensure in submitting his tender that specific roles and scope delineations are clear.
- .2 Hardware Supply: It is the intention of this Section that **Supply is by a specialist hardware supplier as part of the project's Cash Allowance:**
- .3 Hardware Installation: It is the intention of this section that Installation is by the General Contractor if so qualified or qualified personnel appointed by the General Contractor for all systems and methods described herein. **Installation of all hardware is to be included in the base bid price.**
 - .1 Scope: Installation of door hardware for all interior and exterior steel doors, locksets to teachers closets and coordination of installation of automatic operators with Division 26.
- .4 Hardware Inspection: It is the intention of this section that Installation is by the General Contractor for all systems and methods described herein.
 - .1 Scope: inspection of installation of door hardware.

1.3 REFERENCES

- .1 CAN/CGSB-69.17-M86 – Bored and Pre-assembled Locks and Latches
- .2 CAN/CGSB-69.18-M90/ANSI/BHMA-A156.1-1981 – Butts & Hinges
- .3 CAN/CGSB-69.19-M93/ANSI/BHMA-A156-3-1989 – Exit Devices
- .4 CAN/CGSB-69.20-M90/ANSI/BHMA-A156-4-1986 – Door Controls (Closers)
- .5 CAN/CGSB-69.29-93/ANSI/BHMA-A156-13-1930 – Mortise Locks & Latches
- .6 CAN/CGSB-69.34-93/ANSI/BHMA-A156.18-1987 – Materials & Finishes
- .7 Canadian Steel Door & Frame Manufacturers Association (CSDFMA),
- .8 Canadian Metric Guide for Steel Doors & Frames (Modular Construction)

- .9 NFPA 80-1995 – Fire Doors and Fire Windows

1.4 REQUIREMENTS FOR REGULATORY AGENCIES

- .1 Hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by the Standards Council of Canada.

1.5 SUBMITTALS

- .1 Samples:
- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Butt hinges
 - .2 Continuous hinges
 - .3 Door closers
 - .4 Exit devices
 - .5 Overhead stops
 - .6 Storeroom set with lever trim
 - .2 Identify each sample by a label indicating location for installation, applicable specification paragraph number, brand name and number, finish, and hardware package number.
 - .3 Samples will be retained by the Consultant during the initial review period, but not exceeding one month. Samples will be returned at that time and, if acceptable, they may be incorporated into the Work.
 - .4 Substitute new samples for those rejected by the Consultant.
 - .5 Do not supply door hardware to the site until all samples are approved by the Consultant.
- .2 Hardware List:
- .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit six copies of a detailed final door hardware list prepared by a qualified Architectural Hardware Consultant.
 - .3 List all items to be furnished and delivered under this section.
 - .4 Indicate door hardware proposed, identifying each item by manufacturer name, manufacturer's catalogue model number, material, function, finish, location, and other pertinent information.
 - .5 The list shall be in the same format as the door hardware list bound in this project manual.
 - .6 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.
- .3 Template:
- .1 Within ten working days of being requested by the Consultant or the Contractor, submit templates for door and frame preparations and mounting of door hardware items.

- .2 Identify each template by label indicating applicable specification paragraph number, brand name and number, door number, and hardware package number.
- .3 Submit manufacturer's specifications, catalogue cuts, and other data required to identify individual components listed and to demonstrate compliance with specified requirements for items contained in the final door hardware list. Submission of manufacturer's full line brochures is not acceptable.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection:
 - .1 Store finishing hardware in locked, clean and dry area.

1.7 WASTE DISPOSAL AND MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of recyclable packaging material in appropriate on-site bin for recycling.

1.8 MAINTENANCE DATA

- .1 Provide parts list, manufacturers' instructions, and operation and maintenance data for each type of door hardware for incorporation into maintenance manual specified in Section 017800 – Closeout Submittals.
- .2 Brief the Owner's maintenance staff regarding proper care, cleaning, and general maintenance of door hardware.

1.9 MAINTENANCE MATERIALS

- .1 Supply four sets of wrenches for door closers, locksets, latchsets, and exit devices.
- .2 Supply four sets of other special parts or tools required for proper maintenance and adjustment of door hardware (excluding tools required for keying.)

1.10 WARRANTY

- .1 Submit a warranty for door hardware on a form approved by the Owner and in accordance with the General Conditions, but for a period of three (3) years unless specified otherwise. Where a manufacturer's standard warranty period exceeds three years it shall prevail.
- .2 The warranty for both fire exit devices and power door operators shall be for a period of five (5) years.
- .3 The warranty for door closers shall be for a period of ten (10) years.
- .4 Provide a lifetime warranty for all mortise hinges.

- .5 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.

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Not applicable. Supply of hardware part of the project's Cash Allowance.

Part 3 Execution

3.1 MANUFACTURER'S 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 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

- .1 ALL DOORS, FRAMES, AND FINISHING HARDWARE SHALL BE INSTALLED BASED ON DHI INSTALLATION GUIDE FOR DOORS AND HARDWARE (ANSI/DHI A115.1G-1994 – Approved 8/19/94)
- .2 Power door operators, complete with hook-up to power rough-in, low voltage control wiring, and exit device release, shall be installed by the manufacturers' recommended installer.
- .3 Power door operators to be installed by hardware supplier. Low voltage control wiring to push button locations, exit device release, and 4" x 4" back boxes to be completed by Division 26 (Electrical Contractor.)
- .4 ARCHITECTURAL HARDWARE CONSULTANT:
 - .1 The hardware supplier shall have in its employ an Architectural Hardware Consultant who is a current member of the American Society of Hardware Consultants, 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 must 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 contact will be considered as fair value for supervision and inspection with regard to progress certificates.

- .5 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:

HARDWARE MOUNTING HEIGHTS	
HARDWARE ITEM	DIMENSION ABOVE FINISHED FLOOR
LOCKSET or LATCHSET	950 mm to Centreline of Strike
DEADLOCK	1200 mm to Centreline of Strike
EXIT DEVICE	950 mm to Centreline of Strike
PUSH PLATE/DOOR PULLS	900 mm to Centreline of Strike

.5 HARDWARE MOUNTING HEIGHTS

- .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 Refer to AD drawings for mounting heights. Center latch/levers in center of stiles, and off set panic bars on opposite side of door if required to achieve centered latches.
- .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 on all double doors with panic hardware.
- .7 Supply locksets to Section 064000 – Architectural Woodwork for 35mm and 45mm thick doors where such doors are a part of millwork units. Keying shall be in accordance with the building keying system for

3.3 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Ensure doors with closers close firmly and against wind and building air pressure, and can be opened readily as suitable for installation.
- .3 Inspection:
 - .1 The Hardware Supplier shall have in his employ an Architectural Hardware Consultant who is a current member of the American Society of Hardware Consultants, and who shall be made available for consultation during the course of construction at no additional cost to the Board.
 - .2 In addition to this available consultant, a Hardware Inspector shall be engaged upon recommendation to the Board by the Consultants and costs for inspection paid for from Cash Allowances.

- .3 The Consultant shall advise the Contractor that Hardware Inspector shall be assigned to supervise the hardware installation, provide assistance to the Hardware Installer, and carry out inspection and provide written certification of the finished door hardware installation. Costs for this inspection shall be paid from the Cash Allowance. The Contractor shall notify the Hardware Inspector at least 72 hours prior to commencing the installation and cooperate with the advice of the inspector.
- .4 Upon completion of door hardware installation, the Architectural Hardware Inspector shall conduct an inspection of all door hardware as installed, accompanied by the Consultant, the Owner's representative, and the Contractor.
- .5 If requested by the Consultant, the manufacturer's technical representative for each make of the hardware used in the Work shall be in attendance during the hardware inspection.
- .6 During the inspection, the Architectural Hardware Inspector shall note all unsatisfactory installations and products and re-inspect these items after re-adjustment or replacement to ensure all hardware is in optimum working condition and specified function.
- .4 Upon completion of door hardware installation, the Hardware Supplier shall submit a written certificate that all hardware has been correctly supplied and installed in accordance with the drawings, specifications, schedules, and approved final door hardware list, for type, function, and location, and that door hardware has been checked and adjusted.
- .5 Clean hardware after installation following the hardware supplier's recommendations.
- .6 At project completion all items of door hardware shall be clean and free from disfigurement. The Contractor shall repair or replace hardware found to be defective.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

FINISHING HARDWARE PRODUCT SUMMARY LIST

Aluminum Door Hardware

3 sets of 4 – Heavy Weight Hinges
3 – Mortise Cylinders
1 – RIM Cylinder
1 – RIM exit device
1 – Key removable mullion
3 – Concealed overhead stops
2 – Door closers
3 – Pull handles
3 – Sweeps
3 – Thresholds
1 – Surface Electric Strikes
4 – 4.5 x 4.5 push buttons (operator existing)
4 – ABS back box

Hollow Metal Door Hardware

11 sets of 4 – Heavy Weight Hinges
2 sets of 3 – Heavy Weight Hinges
11 sets of 3 – Standard Weight Hinges
11 – Cylindrical Locks
11 – Surface Exit Devices
3 – Removable Mullions
14 – Mortise Cylinders
4 – Rim Cylinders
13 – Door closers
11 – Concealed Overhead Stops
11 – Pull Handles
2 – Pull handle push plate kits
13 – Wall/Floor Stops
24 – Kick Plates (tape mounted)
8 – Thresholds
11 – Weather Stripping/Sweep sets

Teachers Cabinet Hardware

15 – Cabinet Locks

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 01 78 00 - Closeout Submittals
- .4 Section 08 11 14 – Metal Doors and Frames.
- .5 Section 08 50 50 – Aluminum Windows.
- .6 Section 07 92 10 - Joint Sealing: caulking of joints between frames and other building components.
- .7 Section 10 28 10 – Toilet, Bath and Laundry Accessories.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330-[02], Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C542-[94(1999)], Specification for Lock-Strip Gaskets.
 - .2 ASTM D790-[02], Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .3 ASTM D1003-[00], Test Method for Haze and Luminous Transmittance of Plastics.
 - .4 ASTM D1929-[96(R2001)e1], Test Method for Determining Ignition Temperature of Plastics.
 - .5 ASTM D2240-[02b], Test Method for Rubber Property - Durometer Hardness.
 - .6 ASTM E84-[01], Test Method for Surface Burning Characteristics of Building Materials.
 - .7 ASTM F1233-[98], Test Method for Security Glazing Materials and Systems.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.1-[M90], Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.2-[M91], Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-[M91], Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-[M91], Heat Absorbing Glass.
 - .5 CAN/CGSB-12.5-[M86], Mirrors, Silvered.
 - .6 CAN/CGSB-12.6-[M91], Transparent (One-Way) Mirrors.
 - .7 CAN/CGSB-12.8-[97], Insulating Glass Units.
 - .8 CAN/CGSB-12.9-[M91], Spandrel Glass.
 - .9 CAN/CGSB-12.10-[M76], Glass, Light and Heat Reflecting.
 - .10 CAN/CGSB-12.11-[M90], Wired Safety Glass.
 - .11 CAN/CGSB-12.12-[M90], Plastic Safety Glazing.
 - .12 CAN/CGSB-12.13-[M91], Patterned Glass.
 - .13 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass

- .14 CAN/CGSB-12.3-M76 Glass, Polished Plate or Float, Flat, Clear
- .4 Canadian Standards Association (CSA International).
 - .1 CSA A440.2-[98], Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors [2000].
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045-[95], Sealants and Caulking.
- .6 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual - [1997].
- .7 Laminators Safety Glass Association (LSGA).
 - .1 LSGA Laminated Glass Design Guide [2000].

1.3 SAMPLES

- .1 Submit a 300 x 300 sample of all glass products in accordance with Section 01 33 00 - Submittal Procedures.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 013300 – Submittal Procedures. Coordinate location with Consultant.

1.5 WARRANTY

- .1 Contractor hereby warrants glass against defects and failure, including leakage, under normal conditions of use, in accordance with the Contract, but for ten (10) years total, as follows:
- .2 Supplier shall submit a written warranty from the insulated glass manufacturer to replace or repair any defects in materials or sealed units for a period of ten (10) years from the date of Substantial Completion.
- .3 Mirrors:
 - .1 Submit a warranty for mirrors, covering the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.
 - .2 Warranty shall apply against defects in workmanship and materials and, against silver deterioration and loosening of fastenings.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site] for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

- .4 Divert unused or damaged wood materials from landfill to [recycling] [reuse] [composting] facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturers:
 - .1 AFG Glass Inc
 - .2 Libby-Owens Ford
 - .3 PPG Industries
- .2 EXTERIOR Laminated Safety Glass EXTERIOR DOORS and LITES: Replace all wired glazing in exterior doors and frames that are not a fire separation with laminated safety glass.
 - .1 Where door stop dimensions permit, use 25mm sealed doubled-glazed, insulated units with the inner pane and outer lites to be laminated safety glass
 - .2 Where door stop dimensions do not permit 25 mm double glazed units, use 6mm laminated safety glass.
- .3 EXTERIOR Tempered Safety Glass-WINDOWS: All exterior Vision Glass to new exterior windows to be sealed insulating units conforming to CAN/CGSB-12.8. Exterior lite 6 mm tempered clear glass, Solarban 67 Low Emissivity Coating on inner pane (2nd surface), 13mm argon filled air space, inner lite 6 mm clear tempered glass.
 - .1 All tempered glass for exterior sealed units to conform to CAN2-12.1 M-90 Type 2 tempered glass, Class B plate Double glazed units to have an integral non-metallic spacer creating a 13 mm hermetically sealed Argon filled air space. Spacers shall be continuous with butt joints (if any) at corners only. Pieces are not permitted. Butyl based spacers are not permitted.
- .4 INTERIOR Tempered Safety Glass: All interior Vision Glass to non-fire rated interior doors and screens to be tempered 6 mm tempered clear glass complete with etched tempered glass designation visible.
 - .1 Polished Plate or Float Glass: To CAN/CGSB-12.3 clear.
- .5 Wired Glass (GW): to CAN2-12.11-M76, Georgian-wired, polished, 6 mm, wires running parallel to frames. Locations: as required on drawings to fire rated doors and screens. All wired glass is to include a factory applied, fire retardant, impact resistant safety film as listed below.

- .6 Safety & Security Window Film:
 - .1 Product name: "Safety S70 (SH7CLARL) by 3M".
 - .2 Film is to be applied on all existing (or new) wired glazing in doors and screens throughout the school below 2200 mm including glazing less than 150 mm in width.
 - .3 Film to be applied on one side only (typically the corridor side – direction of egress).
 - .4 For classroom doors, the film will be installed on the corridor side
 - .5 Acceptable Alternates: Safety films from other manufacturers will be accepted provided they meet or exceed the Film Properties, Solar Performance Properties, Flammability, Abrasion Resistance, and Impact Resistance Properties of 3M Safety S70
- .7 Mirrors:
 - .1 Refer to Toilet Accessories 10 28 10 for information.
- .8 Setting blocks: neoprene, 80 durometer hardness, 102 mm x 6 mm width to suit glass to extend from the fixed stop to the opposite face of the glazing unit.
- .9 Spacer Blocks: neoprene, thickness to provide a minimum glass to face clearance of 3mm.
- .10 Glazing tape: preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd. or approved alternate.
- .11 Gasket: black neoprene "U" cavity type with lock strip.
- .12 Sealant: one component silicone, Spectrem 2 by Tremco Ltd. Refer to Section 07900.
- .13 Display cases: shelves to be 13mm tempered glass with polished rounded edges. Doors to be tempered 8mm tempered glass. Coordinate sizes and provide to Section 06 40 00 for installation.

2.2 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Make field measurements before cutting and assembling materials.
- .3 Maintain minimum bite or lap of glass as recommended by the glazing unit manufacturer.
- .4 Each glass lite shall be labeled with the name of the product, weight and quality and year manufactured.
- .5 If requested, provide owner or consultant access to the plant or shop to review fabrication. Consultant or owner to provide 24 hour advance notice of visit.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION:

- .1 As indicated on drawings, replace all wired glazing in exterior doors and frames that are not a fire separation with 25mm sealed, double-glazed laminated glass where existing door stops permit, or 6mm laminated safety glass where existing stops will not permit 25mm sealed units as specified above.
- .2 Inspect all glazing channels prior to application. All openings in joints and channels to be sealed shall be clean, dry and free of dust, oil, grease, loose mortar or any foreign material.
- .3 All surfaces to receive glazing tape shall be wiped dry with a clean rag dampened in Xylol, followed by a dry wipe.
- .4 Examine all sashes prior to glazing to determine if the openings are square and plumb. Any butt and miter joints which are open shall be sealed prior to glazing. Adjust all operating sashes and glaze in the closed position.
- .5 Compression Glazing:
 - .1 When butt joint is in a vertical direction, the glazier shall first run the tape on the head and sill members while going over the joint. If joints at the sash run horizontally, the tape must be applied first to the jambs so that it crosses over the joint.
 - .2 When an offset condition exists at each corner where a horizontal member passes behind vertical mullions, two different sized tapes shall be used to equalize the pressure seal. The thinner tape is to applied first on the glazing leg closest to the interior. The thicker tape shall be cut to the length between the two tapes and applied.

- .3 Each section of tape shall butt the adjoining tape and be united with a tool to eliminate any openings. Lapping of the adjoining tapes at the corners is not permitted.
- .4 Remove paper backing just prior to setting glass and apply a toe bead of sealant 150 mm long in each of the corners.
- .5 Position one setting block at the quarter point of each corner on the sill members or as recommended by IGMA guidelines.
- .6 Set the glass on the setting blocks and press firmly in place. Snap in the interior glazing stops.
- .7 Set the spacer blocks to prevent any “walking” of the lite.
- .6 Mirrors:
 - .1 Install mirrors by means of concealed vandalproof clips. If clips are used, install cushioning tape completing around perimeter of mirror back, set in concealed location within 25 mm of edge. Install fixed mirrors in washrooms at two different heights as indicated on drawings.
 - .2 Follow manufacturer’s installation recommendations.
- .7 Install any wired glass with the wire parallel to the opening.
- .8 Replace any loose glazing stops and tighten all screws.
- .9 Contractor shall include for needle point (cap beads) at all lower horizontal rail joints of all sash/glazing units at the discretion of and as may be requested by the Consultant or owner.

3.5 **CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Immediately upon job completion and when sealants have cured, remove any temporary protection and clean all exposed interior and exterior surfaces. Use proper cleaning materials only which will not harm the window components or any adjacent surfaces.
- .6 Ensure all temporary labels have been removed and fully cleaned.
- .7 Mirrors:
 - .1 Clean mirrors using non-abrasive soap or detergent and rinse with clean water. Leave in clean, polished condition for Owner occupancy.

3.6 **INSPECTION**

- .1 Where inspection is called for elsewhere in the specification, perform Window air and water leakage test to ensure installation meets performance requirements stated herein. Should test fail, take remedial measures and re-test a different location at not additional cost to the owner until the test passes.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 04 21 13 – Masonry
- .3 Section 05 41 00 - Cold Formed Wind Bearing Metal Stud Framing
- .4 Section 09 22 16 – Non-structural Metal Framing.
- .5 Supply of access doors for mechanical and electrical devices in mechanical and electrical sections.

1.2 REFERENCES

- .1 Aluminum Association
 - .1 Designation for Aluminum Finishes-[1997].
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C36/C36M-[01], Specification for Gypsum Wallboard.
 - .2 ASTM C79/C79M-[01], Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.
 - .3 ASTM C442/C442M-[01], Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
 - .4 ASTM C475-[01], Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .5 ASTM C514-[01], Specification for Nails for the Application of Gypsum Board.
 - .6 ASTM C557-[99], Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .7 ASTM C630/C630M-[01], Specification for Water-Resistant Gypsum Backing Board.
 - .8 ASTM C840-[01], Specification for Application and Finishing of Gypsum Board.
 - .9 ASTM C931/C931M-[01], Specification for Exterior Gypsum Soffit Board.
 - .10 ASTM C954-[00], Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .11 ASTM C960/C960M-[01], Specification for Pre-decorated Gypsum Board.
 - .12 ASTM C1002-[01], Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .13 ASTM C1047-[99], Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .14 ASTM C1280-[99], Specification for Application of Gypsum Sheathing Board.

- .15 ASTM C1177-[01], Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .16 ASTM C1178/C1178M-[01], Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .3 Association of the Wall and Ceilings Industries International (AWCI)
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-[M88], Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[1988(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal recyclable material in appropriate on-site for recycling.
- .3 Divert unused gypsum from landfill to gypsum recycling facility for disposal approved by Consultant.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

- .5 Divert unused wood materials from landfill to recycling facility.
- .6 Divert unused paint and caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Note that paper faced gypsum board products are not used on this project.
- .2 Abuse Resistant Fiberglass-Mat Faced Gypsum Board:
 - 1. Thickness: 16 mm (5/8")
 - 2. Width: 1200 mm (4')
 - 3. Length: 2400 mm (8')
 - 4. Weight: 2.8 lb./sq. ft.
 - 5. Edges: Tapered.
 - 6. Surfacing: Abuse resistant coated fiberglass mat on face, back, and long edges.
 - 7. Flexural Strength, Parallel (ASTM C473, ASTM C1658): Not less than 100 lbf.
 - 8. Flexural Strength, Perpendicular (ASTM C473, ASTM C1658): Not less than 140 lbf.
 - 9. R-Value (ASTM C518): 0.67.
 - 10. Nail Pull Resistance (ASTM C473, ASTM C1658): Not less than 90 lbf.
 - 11. Humidified Deflection (ASTM C473, ASTM C1658): Not more than 1/8 inch.
 - 12. Hardness, Core, Edges, and Ends (ASTM C473, ASTM C1396, ASTM C1658): Not less than 15.
 - 13. Water Absorption (ASTM C630, ASTM C1396, ASTM C1658): Less than 5 percent of weight.
 - 14. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
 - 15. Microbial Resistance (ASTM D6329): Will not support microbial growth.
 - 16. Abuse Resistance (ASTM C1629):
 - .1 Surface Abrasion: Level 3.
 - .2 Surface Indentation: Level 1.
 - .3 Soft-Body Impact: Level 1.
 - 17. Acceptable Products:
 - .1 '**DensArmor Plus Abuse-Resistant Interior Panel**', by Georgia-Pacific Gypsum.
 - .2 Alternate products submitted during the tender period for approval that meet or exceed these specifications
- .3 All gypsum board to have Anti-Microbial and Anti Mold properties.
- .4 Skimming Compound: Apply full cover coat of Durex "Monofino" Fibre Reinforced Cement Plaster as a skim coat following taping and sealing of all gypsum board joints, as manufactured by Durabond Products, Tel. (416) 759-4474
- .5 Steel drill screws: Self drilling screws - ensure penetration capabilities to 18 ga. Studs.

- .6 Stud adhesive: to CAN/CGSB-71.25.
- .7 Laminating compound: if applicable, as recommended by manufacturer, asbestos-free.
- .8 Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.
- .9 Tie Wire: #16 ga. galvanized soft annealed steel wire.
- .10 Caulking: Acoustical sealant.
- .11 38 mm thick mineral wool batts ULC labeled, if indicated on drawings.
- .12 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness commercial sheet steel with G90 zinc finish, perforated flanges, and one piece length per location.
- .13 Sealants: in accordance with Section 07 92 10 - Joint Sealing.
- .14 Insulating strip: rubberized, moisture resistant, 3 mm thick cork strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .15 Joint compound: to ASTM C475, asbestos-free.
- .16 Abuse resistant gypsum board specified above is for use in all interior partitions and bulkheads unless specifically noted otherwise.

Part 3 Execution

3.1 ERECTION

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Install work level to tolerance of 1:1200.

3.2 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.
- .2 Ensure use of screw suitable for 20 ga. wind load bearing studs for application to interior side of outer cold formed wind load bearing stud framing.

-
- .3 Apply single layer gypsum board to metal furring or framing using screw fasteners and laminating adhesive. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.
 - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
 - .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
 - .4 Apply abuse resistant gypsum board where gypsum board is indicated adjacent sinks. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads.
 - .5 Apply abuse resistant gypsum board to concrete block surfaces, where indicated, using laminating adhesive.
 - .6 Apply fire-rated abuse resistant gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.
 - .7 Install abuse resistant ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
 - .8 Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.
 - .9 Install abuse resistant gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
 - .10 Install abuse resistant gypsum board with face side out.
 - .11 Do not install damaged or damp boards.
 - .12 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
 - .13 Where a floor or roof structural member interferes with an interior partition wall at which a smoke or fire separation is required, a gypsum board enclosure with a fire rating not

less than required for the wall must be provided to continue the required separation to the floor or roof above (typical).”

3.3 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .4 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .5 Provide continuous polyethylene dust barrier behind and across control joints.
- .6 Locate control joints at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.
- .7 Install control joints straight and true.
- .8 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
- .9 Install expansion joint straight and true.
- .10 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .11 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .12 Splice corners and intersections together and secure to each member with 3 screws.
- .13 Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.
- .14 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .15 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .16 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 Custom:

- .1 Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
- .2 Apply complete skim coat with specified Skim Coat products to all finish surfaces prior to painting.
- .17 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .18 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .19 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .20 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .21 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
- .22 Mix joint compound slightly thinner than for joint taping.
- .23 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
- .24 Allow skim coat to dry completely.
- .25 Remove ridges by light sanding or wiping with damp cloth.
- .26 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 21 16 – Gypsum Board Assemblies.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C645-[00], Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C754-[00], Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.40-[97], Primer, Structural Steel, Oil Alkyd Type.
- .3 Environmental Choice Program (ECP).
 - .1 CCD-047a -[98], Paints - Surface Coatings.
 - .2 CCD-048-[98], Surface Coatings - Recycled Water-borne.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material in appropriate on-site bins for recycling.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .4 Divert unused gypsum materials from landfill to recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.59mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum lath and metal lath. Knock-out service holes at 150 mm centres.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.
- .3 Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.
- .4 Metal Accessories: CSA A82.30-1965 (R-1971).

Part 3 Execution

3.1 ERECTION

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .3 Erect metal studding to tolerance of 1:1000.
- .4 Attach studs to bottom track using screws.
- .5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .6 Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 2100 mm high and a minimum of four (4) anchors per jambs for jambs over 2100 mm high.
- .7 Provide two (2) studs at each side of openings wider than stud centre specified.
- .8 Install, cut to length, piece of runner horizontally over door frames and at top and bottom of rough opening in glazed partitions.
- .9 Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.
- .10 Install steel stud or furring channel between studs for attaching electrical and other boxes.
- .11 Extend all partitions to underside of deck above for sound and fire separation.
- .12 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 CEILING FURRING

- .1 Install runners level to tolerance of 3 mm over 3.5 m. Provide runners at interruptions of continuity and change in direction.
- .2 Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.
- .3 Furr for bulkheads within or at termination or ceilings.
- .4 Install furring channels at 400 mm o.c. maximum.

3.3 WALL FURRING

- .1 Install steel furring, as indicated.

.2 Frame opening and around built-in equipment on four (4) sides with channels.

.3 Box-in beads, columns, pipes, and around exposed services.

3.4 FIRE RATED ASSEMBLIES

.1 If required, install Metal Stud System and Furring in accordance with appropriate ULC Design and with supplement to the National Building Code of Canada 1985.

3.5 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 07 92 10 – Joint Sealing.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-[99], Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3-[92], Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4-[92], Specification for Latex Portland Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5-[92], Specification for Chemical Resistant Furan Resin Mortars and Grounds for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6-[92], Specification for Ceramic Tile Grounds (included in ANSI A108.1).
- .2 American Society for Testing and Materials (ASTM International) International
 - .1 ASTM C144-[99], Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C 207-[91(1997)], Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C847-[95(2000)], Specification for Metal Lath.
 - .4 ASTM C979-[99], Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-[78], Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1-[M88], Tile, Ceramic.
 - .4 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-[98], Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .2 CSA A123.3-[98], Asphalt Saturated Organic Roofing Felt.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09300 [2000], Tile Installation Manual.

.2 Tile Maintenance Guide [2000].

1.3 **PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Chemical resistant mortar and grout (Epoxy and Furan).
 - .3 Cementitious backer unit.
 - .4 Dry-set Portland cement mortar and grout.
 - .5 Divider strip.
 - .6 Elastomeric membrane and bond coat.
 - .7 Reinforcing tape.
 - .8 Levelling compound.
 - .9 Latex-Portland cement mortar and grout.
 - .10 Commercial Portland cement grout.
 - .11 Organic adhesive.
 - .12 Slip resistant tile.
 - .13 Waterproofing isolation membrane.
 - .14 Fasteners.

1.4 **SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Base tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .3 Floor tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .4 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
- .5 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.
- .6 Prepare a 2 m x 3m Mock up sample on site to ensure demonstration of installation details and quality control.

1.5 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- .2 Store material so as to prevent damage or contamination.
- .3 Store materials in a dry area, protected from freezing, staining and damage.

- .4 Store cementitious materials on a dry surface.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal recyclable packaging material in appropriate on-site for recycling.
- .3 Unused adhesive, sealant and coating materials must be disposed of at an official hazardous material collections site as approved by the Consultant.
- .4 Unused adhesive, sealant and coating materials must not be disposed of into the sewer system, into streams, lakes, onto the ground or in other location where it will pose a health or environmental hazard.
- .5 Broken ceramic materials must be diverted from landfill to a local facility as approved by Consultant.

1.7 ENVIRONMENTAL CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12° C for 48 h before, during, and 48 h after, installation.
- .2 Do not install tiles at temperatures less than 12° C or above 38° C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15° C or above 25° C.

Part 2 Products

2.1 FLOOR TILE

- .1 Porcelain tile (PT): to CAN/CGSB-75.1. Include bullnose base & fitted corners; include all pieces and trims. Designation Por.1: 300 mm x 300 mm porcelain tile.
 - .1 Acceptable materials:
 - .1 “City View” dist. by Daltile Co. Ltd.
 - .2 “Vitra Dotti” distributed by Centura
 - .2 Including (sit-on) bullnose base and fitted corners as approved by Consultant. Size 100 mm x 200 mm, (sit-on) bullnose base trim and inside cove corner and outside cove corner pieces all in matte finish. Standard base with mitered corners is unacceptable.
 - .3 At various infill and repair locations to existing terrazzo flooring.
 - .4 Samples to be provided to Consultant at the outset of the project.
 - .5 Contractor to consider order time for some tiles.
 - .6 Allow for 2 field colours from manufacturer’s full line “stock colours” and 1 accent tile and base colours from manufacturer’s full line. Price Group 2 & 3,
 - .7 Locations: at base of lockers as shown on drawings.

2.2 WALL TILE

- .1 Ceramic tile: to CAN/CGSB-75.1, Type 5, Class MR 4, 106 x 106 x 6 mm size, cushion edges, glazed surface, coved base pattern, allow for two (2) colors as selected, for Thin-set application.
- .2 Acceptable Materials: "Vitra, Color Wall", by Centura or "Maple Leaf Spectrum Type V", by Olympia Tile.
- .3 Locations: in student washrooms behind urinals, three walls of kindergarten washrooms, walls behind drinking fountains (850mm wide x 2120mm high) and other areas indicated on drawings and room finish schedule.

2.3 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Internal and External Corners: Provide trim shapes as follows where indicated.
 - .1 Bullnose shapes for external corners including edges.
 - .2 Coved shapes for internal corners.
 - .3 Special shapes for:
 - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
 - .2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
 - .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.
 - .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.
- .5 Provide cove and bullnose shapes for countertops and where indicated and required to complete tile work.

2.4 MORTAR AND ADHESIVE MATERIALS

- .1 Walls: Mortarcrete Latex Mortar conforming to ANS1A118.4-1973, manufactured by L & M Ceramo Inc.
- .2 Floors:
 - .1 Cement Mortar: Mixture of 1 part Portland cement, 4 parts dry sand and 1/10 hydraulic lime. Materials shall conform to the following:
 - .2 Portland Cement: To CAN3-A, Type 10.

- .3 Hydrated Lime: To ASTM C-206 or 207, Type 5.
- .4 Sand: To CSA A82.56, passing 1.6 mm sieve.
- .5 Water: Potable, containing no contaminants which cause efflorescence.
- .6 Thin Set Mortar: field mixed, blended sand-Portland cement-latex mortar, “Kerabond/Keralastic by Mapei.”
 - .1 Acceptable Alternates: “Laticrete 4237 distributed by Ceratec Inc., or Flextile 52 thin set.
 - .2 Latex Additive: “Cemtex” by Master Builders, Laticrete 2022” distributed by Ceratec Inc.,

2.5 GROUT

- .1 Colouring Pigments:
 - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
 - .2 Grout to be grey in colour.
 - .3 Job coloured grout are not acceptable.
 - .4 Use in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
 - .5 Colour shall be selected by Consultant from Manufacturer’s standard colour range.
- .2 Chemical-Resistant Grout for Walls:
 - .1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
 - .2 Epoxy Grout: “Latapoxy SP-100” Stainless, chemical resistant epoxy grout by Laticrete International. Colour from manufacturer’s full range. Alternate: Kerapoxy by Mapei.
- .3 Floors:
 - .1 Polymer modified grout as manufactured by MAPEI.

2.6 ACCESSORIES

- .1 Floor Porcelain Tile Edge/Fascia Joint: by Schluter Systems
 - .1 Refer to Drawings: for use at top of existing terrazzo cover and to be capped by porcelain tile.
 - .2 Acceptable Products: Rondec-Step in satin nickel finish by Schuler, as distributed by Centura Tile (416 785-5151).
- .2 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.
- .3 Cleavage plane: polyethylene film to CGSB 51-34.
- .4 Metal lath: to ASTM C847 painted finish, 10 mm rib at 2.17 kg/m².
- .5 Transition Strips: purpose made metal extrusion; stainless steel type.

- .6 Reducer Strips: purpose made metal extrusion; stainless steel type; maximum slope of 1:2.
- .7 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .8 Sealant: in accordance with Section 07 92 10 - Joint Sealing.
- .9 Floor sealer and protective coating: to tile and grout manufacturers recommendations.

2.7 MIXES

- .1 Portland Cement:
 - .1 Scratch coat: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, [and latex additive where required]. Adjust water volume depending on water content of sand.
 - .2 Slurry bond coat: portland cement and water mixed to creamy paste. Latex additive may be included.
 - .3 Mortar bed for floors: 1 part portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. [Latex additive may be included].
 - .4 Mortar bed for walls and ceilings: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. [Latex additive may be included].
 - .5 Levelling coat: 1 part portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
 - .6 Bond or setting coat: 1 part portland cement, 1/3 part hydrated lime, 1 part water.
 - .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
- .4 Mix bond and levelling coats, and grout to manufacturer's instructions.
- .5 Adjust water volumes to suit water content of sand.

2.8 PATCHING AND LEVELING COMPOUND

- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
 - .1 Compressive strength - 25 MPa.
 - .2 Tensile strength - 7 MPa.
 - .3 Flexural strength - 7 MPa.

- .4 Density - 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

2.9 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and levelling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2000, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Install floor tiles as per pattern. Layout and install flash cove tile first, before floor tile, ensuring a flush edge on the horizontal surface by feathering to masonry walls as required to produce a straight line on the floor. Install floor tiles to pattern supplied by Consultant at a later date. Contact consultant to review when approximately no more than 10 sq. m has been installed.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Make internal angles square, external angles rounded.
- .10 Make internal angles square, external angles chamfered at 45° with narrow tile strip.
- .11 Construct cove base, as described using all special pieces available for inside and outside corners.

- .12 For Floors: Use bull nose edged tiles at termination of wall tiles, except where tiles abut projecting surface or differing plane.
- .13 Seal grouted joints with sealer.
- .14 Keep building expansion joints free of mortar or grout.
- .15 For Walls: Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .16 Install divider strips at junction of tile flooring and dissimilar materials.
- .17 Allow minimum 24 h after installation of tiles, before grouting.
- .18 Clean installed tile surfaces after installation and grouting cured.

3.2 FLOOR TILE

- .1 Install in accordance with TTMAC to applicable thinset detail.

3.3 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

3.4 CONTROL JOINT

- .1 As required for any large areas, if any: Provide flush control joints by Schluter, model BWS 100G-3/8. Acceptable alternates by Bengard Manufacturing. Allow for control joints every 5 metres along corridors and at each corner of intersecting corridors.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 06 10 10/06101 - Rough Carpentry: Wood strapping.
- .4 Fabrication: to ASTM 365-78 and CAN/GSB-92.1-M77.
- .5 Installation: to ASTM C636-76, except where specified otherwise.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1264-[98], Classification for Acoustical Ceiling Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86], Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
 - .2 CAN/CGSB-92.1-[M89], Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[88(R2000)], Surface Burning Characteristics of Building Materials.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two each 300 x 300 mm samples of each individual tile and grid type in accordance with Section 01340.

1.4 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.5 DESIGN CRITERIA

- .1 Maximum deflection 1/360 of span to ASTM 365-78 deflection test.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15⁰C and humidity of 20 - 40 % before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

Part 2 Products

2.1 MATERIALS

- .1 **For new panels and grid to replace existing:**
- .2 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1 and ASTM E1264.
- .3 Acoustic Ceiling Panels, Designation LAP: Acoustic Ceiling Panels, wet formed mineral fibre panels, by Armstrong World Industries Canada Inc. (Contact: Ruth Shannon; cell: 416-540-5284). Colour: White; Types as noted below:
 - .1 Type 1: LAP: 610 x 1220 mm x 15.9 mm thick; "Fine Fissured No. 1729 Colour: White"; Location: For use in classroom areas and corridors and any additional areas as indicated.
- .4 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
- .5 Type 1 Acoustic Ceiling Panels, Designation LAP: 610 x 1220 mm wet formed mineral fiber panels for use in areas of no air conditioning and humidity up to 90% R.H.
- .6 Acceptable materials: Similar purpose-designed high humidity, anti-sag, mold and mildew resistant ceiling panels by CGC Interiors and BPB Canada Inc.
- .7 Suspension system: 23.8 mm "Prelude XL" exposed tee bar grid, including wall moulding, by Armstrong or similar suspension system by CGC Interiors, Oakville. Colour: white.
- .8 Hangers: 2.6 mm galvanized soft annealed steel wire.
- .9 Accessories: splices, clips, retainers, etc., to complement suspension system components.
- .10 Adhesive: low VOC type recommended by acoustic unit manufacturer.
- .11 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.

- .12 Hold down clips: purpose made clips to secure tile to suspension system, approved for use in fire-rated systems.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Install acoustic units parallel to building lines with edge unit not less than 50% of unit width.
- .3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
- .4 Support suspension system main runners at 1200 oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360 of span.
- .5 Attach cross member to main runner to provide rigid assembly.
- .6 Install suspension assembly to manufacturer's written instructions.
- .7 Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint. Secure to construction. Butt joints neatly, square and true in alignment.
- .8 Set acoustic units in place.
- .9 Set all ceiling levels by the use of transit or laser level.
- .10 Provide for Owner twelve (12) complete, undamaged ceiling tiles, sealed and boxed. Leave in location as directed by Consultant.

3.3 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1303-[99], Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-ISO 14040-[97], Environmental Management - Life Cycle Assessment - Principles and Framework (Adopted ISO 14040:1997, first edition).

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20° for 48 hours before, during and 48 hours after installation.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot approved by Consultant.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Consultant.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.7 QUALITY ASSURANCE

- .1 Supplier shall be an established firm experienced in the field.
- .2 Installer:
 - .1 Flooring contractor experienced in the field and approved by the manufacturer.

- .2 Flooring contractor shall have manual instructions and be trained by the manufacturer and distributor.
- .3 Manufacturer's recommendations for the correct preparation, finishing and testing sub floor surface.

1.8 EXTENDED WARRANTY

- .1 Submit a warranty for all the installation of all resilient sheet flooring, covering materials and labour and the repair or replacement of defective work in accordance with the General Conditions of the Contract, but for seven (7) years total.

Part 2 Products

2.1 MATERIALS

- .1 Resilient Sheet Flooring (SF): Acceptable materials:
 - .1 Acceptable Materials:
 - .1 Gerflor, Taraflex Multi-Use 5.0 (standard embossing not acceptable)
 - .2 Tarkett, Omnisport 5.0
 - .3 Connor Sports Surface Solutions, SportGrain Plus 5.0
 - .2 Locations: Kindergarten Classrooms. Refer to Room Finish Schedule and Drawings
 - .1 Colour: light Maple with wood grain pattern (NOT texture)
 - .2 Embossing must be mottled finish and not wood grain texture type.
 - .3 Surface resistance: Unaffected by surface water and chemicals.
 - .4 Slip resistance tested in accordance with ASTM D2047 Static coefficient of friction: Dry 0.95, Wet 0.93.
 - .5 Meets ULC 102.2 Flame spread 5, Smoke developed 295.
 - .6 Wear Resistance: ASTM C501 Wear index 436.
 - .7 Static Load Limit: 500 PSI.
 - .8 Hygiene: Bacteriostat retards the growth of bacteria.
- .2 Self Levelling Underlayment: "Ultraplan 1" by Mapei fast setting, polymer-modified; for over cured concrete, plywood, ceramic tile, old cutback adhesive, and old vinyl and vinyl composition flooring, feather edge to 1 1/2" (38 mm).for use to prepare floor at locations where existing flooring has been removed and subfloor is not level..
- .3 Filler and Cover Former:
 - .1 As recommended by manufacturer to suit subfloor on which its material is installed and to suit vertical wall/floor junctions.
- .4 Primers and Adhesives: As recommended by manufacturer of material to suit subfloor condition.
- .5 Cleaner: Neutral chemical compound that will not damage sheet or affect its colour.
- .6 Welding Rod: PVC welding rod, colour to match resilient sheet flooring.

- .7 Cap strip: sized to suit application, type recommended by flooring manufacturer, Altro Stainless Steel Cap, mechanically fastened to wall

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
- .2 Concrete and room humidity to be as recommended by flooring manufacturer prior to installation.

3.2 PREPARATION

- .1 Scope includes preparation of floor using self levelling coating and patching compound as required.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .5 As required, seal concrete slab to resilient flooring manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install on a smooth, flat concrete finish, which will be achieved manually or mechanically.
- .2 Ensure concrete sub floor temperature to be maintained at a minimum of 70°F during installation and ensure the moisture content does not exceed 3 Lbs per 1000 Sq Ft per 24 hours or lower.
- .3 Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer's instructions.
- .4 Before proceeding with any work, inspect the sub floor surface and report, in writing, to the project manager and the General Contractor any visible defect on the surface, such as cracks, bumps, rough areas or variations in planarity.
- .5 This installation is to proceed on an existing concrete slab in addition to new concrete work as required for mechanical services. Ensure slab is adequately cured and free of moisture or contaminants. If necessary, as part of the work of this section, scarify existing surfaces to prepare surface for adhesive, or to meet manufacturer's installation requirements. Fill joints, cracks, and holes in these surfaces and level surface irregularities with filler. Remove prime paint and wire brush steel base surfaces.

- .6 Check for any grease, oil, paint, duct or any combination remaining on the concrete sub floor.
- .7 Before proceeding with installation, clean concrete surface to remove any dirt or foreign materials, rinse thoroughly and allow eight (8) hours minimum to dry, if required, sanding is necessary in all installations.
- .8 Fill any areas not meeting $\pm 1/8"$ in 10' for level before installation. This will insure levelness and proper adhesion of material.
- .9 Lay each material in accordance with manufacturer's specifications.
- .10 Weld joints on flooring and internal and external angles of coves using welding rod in matching plain colours, and the standard hot-air-welding technique.
- .11 Install standard rubber base at resilient sheet flooring locations.
- .12 Flash into drain openings; do not cut on surface at edge of drain cover. Coordinate with Division 15 for installation with suitable drain type and cover. Bond flooring to drain flange under clamping ring using epoxy adhesive.
- .13 Extend resilient sheet under all cabinet work and casework to the wall line.

3.4 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.5 PROTECTION

- .1 Protect new floors from time of final set of adhesive, with polyethelene or Kraft paper until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Do not wax.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 02 41 15 – Selective Demolition – for the removal of existing floor tiles and adhesives and where required, grinding of floors where adjacent areas are uneven.
- .3 Section 01 73 03 – Execution Requirements, for general slab patching and preparation.
- .4 Section 03 30 00 – Cast-in-Place Concrete for any new slabs

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1066-[99], Specification for Vinyl Composition Floor Tile.
 - .2 ASTM F1344-[00], Specification for Rubber Tile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
 - .2 CAN/CGSB-25.21-[95], Detergent-Resistant Floor Polish.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate tile in size specified.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Dispose of unused finish and adhesive materials at official hazardous material collections site approved by Consultant.
- .4 Do not dispose of unused finish and adhesive materials into sewer system, into streams, lakes, onto ground or in other locations where it will pose health or environmental hazard.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and for 7 days after installation.

1.6 EXTRA MATERIALS

- .1 Provide minimum of four boxes of the single colour flooring material required for this project for maintenance use.
- .2 Extra materials to be from same production run as installed materials.
- .3 Clearly identify each container of floor tile and each container of adhesive.
- .4 Store where directed by School maintenance staff.

Part 2 Products

2.1 MATERIALS

- .1 Vinyl composition tile (VCT): type A SCA 126.1 M1984: - non asbestos, 3 mm, 300 x 300 mm size.
- .2 Acceptable Products:: Standard Excelon by Armstrong, Essentials and Designer Essentials by Mannington Commercial, & Colours Plus Fortress by Centura.
 - .1 Colours to be selected from full range including two solid accent colours colour, plus colours to match existing as required.
- .3 Resilient base (RR): rubber, top set coved, 3 mm thick, rubber, 100 mm high minimum 1200 mm long, including premoulded end stops and external corners. Acceptable materials: non-shrink Rubber Wall Base with toe as manufactured by Johnsonite or approved alternates. Colours: Two (2) from full Johnsonite "Coloright" colour line.
- .4 Stair Tread/ Riser combination: not applicable to this project.
- .5 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade. Use Johnsonite 990 Solvent Free Environmentally Safe White Acrylic Cove Base Adhesive for rubber base. Use Roberts #2057 clear water resistant low odour adhesive for VCT or acceptable alternate approved during tender period by consultant. Submit data sheets for any alternate products considered.
- .6 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste, as recommended by flooring manufacturer for use with their product.
- .7 Metal edge strips: aluminum extruded, smooth, with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .8 Polyethylene sheet: to CAN2 51.33-M77, Type 2, for protection.
- .9 Nose filler: not applicable.
- .10 Solid vinyl colour strips: not applicable.

Part 3 Execution

3.1 INSPECTION

- .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Inspect for negative alkalinity, carbonization or dusting.
- .2 Commencement of work indicates acceptance of conditions by flooring installer.

3.2 SUB-FLOOR TREATMENT

- .1 Remove sub-floor ridges and bumps. Regardless of previous skim coating or localised patching by other Sections allow in the main bid price for filling all low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

3.3 TILE APPLICATION

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install tiles in corridor as per pattern provided by Consultant. Pattern will be provided at a later date.
- .4 Cut tile and fit neatly around fixed objects.
- .5 Install flooring in pan type floor access covers. Maintain floor pattern.
- .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .7 Install **metal edge strips** at unprotected or exposed edges where flooring terminates.

3.4 STAIR APPLICATION

- .1 Not applicable to this project.

3.5 BASE APPLICATION

- .1 Lay out base to keep number of joints at minimum. Use lengths as long as practicable and not less than minimum 500 mm long.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Miter internal corners. Use premoulded corner pieces at all external corners and ensure full adhesion through to ends of corner pieces. See detail for termination at door frames.
- .8 Install toeless type base before installation of carpet on floors.
- .9 Leave in the building one (1) complete carton of each of two (2) colours of floor tile and twelve (12) tiles of each of the remaining colours. Colours of extra tile to be specified by Consultant.

3.6 INITIAL MAINTANANCE AFTER INSTALLATION

- .1 Broom sweep or vacuum thoroughly.
- .2 Do not wet mop, wash, scrub, or strip the floor. These procedures will be done by the Owner.

3.7 PROTECTION OF FINISHED WORK

- .1 Coordinate sequencing with General Contractor to avoid traffic by other trades. Generally, schedule work until after ceiling/lighting installations have been completed.
- .2 Following broom sweeping, protect new floors with 0.15 mm thick Polyethylene cover and lay planking in all necessary traffic areas to minimize damage by other trades. Maintain until just before final inspection.
- .3 Prohibit traffic on floor for 48 hours after installation.

3.8 PREPARATION FOR INSPECTION

- .1 Only if so notified by Architect, and in the presence of the Owner, scrub the floor using a neutral detergent and a floor machine of 170-250 rpm capability equipped with a scrub brush or a scrubbing pad (3M blue or equal).
- .2 Lightly rinse and allow to dry. Note: Do not flood the floor with rinse water, scrubbing, or stripping solutions. Final re-washing, if required, and waxing will be done by owner.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 07 95 13 - Expansion Joint Cover Assemblies.
- .4 Section 07 92 10 - Joint Sealing

1.2 REFERENCES

- .1 American Standards for Testing and Material (ASTM International)
 - .1 ASTM C241-[90(R1997)e1], Test Method for Abrasion Resistance of Stone Subject to Foot Traffic.
 - .2 ASTM D2370-[98], Test Method for Tensile Properties of Organic Coatings.
- .2 Canadian Construction Material Centre (CCMC)
- .3 Canadian Environmental Protection Act (CEPA)
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB 25.20-[95], Surface Sealer for Floors.
- .5 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-[98], Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .2 CAN/CSA-A23.1/A23.2-[00], Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .3 CSA G30.5-[M1983(R1998)], Welded Steel Wire Fabric for Concrete Reinforcement.
 - .4 CAN/CSA-ISO 14040-[97], Environmental Management-Life Cycle Assessment-Principles and Framework.
 - .5 CSA Z760-[94(R2001)], Life Cycle Assessment.
- .6 International Organization for Standardization (ISO)
 - .1 ISO 9001-[00], Quality Management Systems Requirements.
 - .2 ISO 14001-[96(R2001)], Environmental Management Systems.
- .7 Terrazzo, Tile and Marble Association of Canada (TTMAC)
 - .1 TTMAC Maintenance Guide.

- .2 TTMAC/CSCTEK-AID 09400 Portland Cement Terrazzo Digest.
- .3 TTMAC standard 3001.
- .4 TTMAC/CSC Architectural Specification Study on Terrazzo (Portland Cement).

1.3 SUBMITTALS

- .1 Submit proof of manufacturer's CCMC Listing and listing number to Consultant.
- .2 Submit proof of manufacturer's ISO 9001 registration and compliance to Consultant.
- .3 Submit proof of manufacturer's ISO 14001 registration and compliance to Consultant.
- .4 Manufacturer's instructions: provide to indicate special handling criteria, installation sequence and cleaning procedures.
- .5 Submit four copies of TTMAC Maintenance Guide for inclusion in the operations and maintenance manual prepared. Provide specific warning of any maintenance practice or materials that may damage or disfigure the finished work.
- .6 Submit product data and WHMIS MSDS sheets for floor sealer products.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate layout of divider strips and expansion joints.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit 300 x 300 x 20 mm thick samples of each colour terrazzo.

1.6 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up where directed.

1.7 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data as set out in TTMAC publication for terrazzo work for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 33 00.
- .2 Deliver materials to job site just prior to installation.

- .3 Store materials inside, in dry location, protected from freezing, staining and damage, away from heavy traffic areas.
- .4 Deliver and store materials in manner to prevent damage.
- .5 Ensure materials remain in original wrapping and containers until used.
- .6 Store cementitious materials on a dry surface.

1.9 QUALITY ASSURANCE

- .1 Installer: employ skilled mechanics trained and experienced in tile work, company must be registered as members in good standing with the Terrazzo, Tile and Marble Association of Canada, with a minimum of two years experience. If requested by Consultant, submit a listing of at least three previously completed projects of similar size and scope.
- .2 Supplier: a member in good standing with the Terrazzo, Tile and Marble Association of Canada, providing materials meeting the minimum standards of TTMAC.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials wherever possible.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of unused adhesive, sealant and pigment material at official hazardous material collections site.
- .4 Do not dispose of unused adhesive, sealant and pigment material into sewer system, into streams, lakes, onto ground or in any location where it will pose health or environmental hazard.
- .5 Fold up metal banding, flatten, and place in designated area for recycling.
- .6 Collect wood packing shims and pallets, and place in designated area for recycling and reuse.

1.11 ENVIRONMENTAL REQUIREMENTS

- .1 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.
- .2 Ventilation
 - .1 Provide continuously during and after installation. Run system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of installation.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

- .3 Temperature.
 - .1 Maintain air temperature and structural base temperature at terrazzo installation area above 12 °C for 24 hours prior to, during, and for 24 hours following installation.

Part 2 Products

2.1 MATERIALS

- .1 Cement
 - .1 To CAN/CSA-A3000.
 - .2 Type [10], [grey] for underbed.
 - .3 [White] for topping.
 - .4 6 % air-entrainment.
- .2 Sand, fine and coarse aggregates:
 - .1 To CAN/CSA-A23.1/A23.2
 - .2 Clean, washed, locally available.
 - .3 Oval aggregate.
- .3 Water: potable.
- .4 Marble chips:
 - .1 Graded in accordance with TTMAC standard.
 - .2 Abrasion resistance to ASTM C241.
 - .3 No deleterious or foreign matter.
- .5 Pigments:
 - .1 Compatible with portland cement.
 - .2 Alkali-resistant, colour-stable.
 - .3 Lime-proof mineral.
- .6 Epoxy bonding agent: two components, epoxy resin and epoxy hardener conforming to following performance properties after cure schedule of 28 days at 25°C.
 - .1 Viscosity: mixed viscosity not less than 0.04 Pa.s or more than 0.5 Pa.s.
 - .2 Gel time: not less than half hour at 20°C.
 - .3 Flexibility: Gardiner flexibility test, passes bending over 12 mm mandrel, without cracking.
 - .4 Elongation: ASTM D2370, minimum 10%.
 - .5 Bond strength: 2 MPa, with 100% concrete failure at minimum coverage, test concrete specimen minimum compressive strength 20 MPa.
 - .6 Coverage: 0.3 L/m² minimum, dry film thickness not less than 0.2 mm.
- .7 Provide divider strips as required. Include locations of shop drawings.

- .8 Accessories: base caps and base divider strips, separator strips, purpose made and of same material to match divider strips.
- .9 Reinforcing steel: billet steel, grade 300 plain bars.
- .10 Welded steel wire fabric: to CSA G30.5, 50 x 50 x 1.6 x 1.6 mm wire, galvanized, in flat sheets only.
- .11 Slip sheet: polyethylene sheet to CAN/CGSB-51.34, Type 2, 0.05 mm thick.
- .12 Non-slip aggregate: aluminum oxide of size and colour to match marble chips.
- .13 Curing compound: to manufacturers standard.
- .14 Cleaning compound: to TTMAC standard.
- .15 Sealants:
 - .1 To CAN/CGSB 25.20.
 - .2 Sealants.
 - .3 Water-borne surface coatings.
- .16 Finishing compound: to TTMAC standard 3001.

2.2 MIXES

- .1 Slurry coat: cement and water mixed to creamy paste.
- .2 Underbed: 1 part cement to 4 parts sand by volume.
- .3 Terrazzo topping: to match existing colour in corridors.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do terrazzo work in accordance with TTMAC/CSC Architectural Specification Study on Terrazzo (Portland Cement) except where specified otherwise.

3.2 INSPECTION

- .1 Examine area to receive terrazzo for defects in existing work which may affect proper execution of terrazzo work.
- .2 Ensure tolerances of concrete slab work do not deviate from tolerance set for finished terrazzo floor.
- .3 Terrazzo contractor to start work only when all defects are corrected.

3.3 INSTALLATION

- .1 Install terrazzo at all areas indicated on drawings where cuts to existing floor and base have been made for new openings. **Match existing colours and patterns.** Refer to drawings.
- .2 Install over cured concrete in accordance with TTMAC instructions.
- .3 Install divider strips true and level to detailed pattern.
- .4 Install covers at building expansion joints.
- .5 Install control joints above control joints in subfloor.
- .6 Provide mat recesses with frames made up using divider strips.
- .7 Slope finished terrazzo floors to drains.
- .8 Produce terrazzo finished surfaces to match existing in corridors.
- .9 Floors
 - .1 Monolithic terrazzo: provide 16 mm minimum terrazzo topping bonded to concrete base slab.
 - .2 Bonded terrazzo: to TTMAC detail No. 1.
 - .3 Floating standard terrazzo: to TTMAC detail No. 2.
 - .4 Venetian terrazzo: to TTMAC detail No. 2V.
 - .5 Epoxy bonded terrazzo: provide 16 mm maximum topping and epoxy concrete adhesive under bed bonded to concrete base slab.
- .10 Bases
 - .1 Terrazzo bases: to match existing in style and height.
- .11 Clean, seal and finish terrazzo surfaces to TTMAC recommendations.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 02 41 15 – Selective Demolition and Removals – making good of floor surfaces
- .3 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

- .1 American Association of Textile Chemists and Colorists (AATCC)
 - .1 AATCC 16-[1998], Color Fastness to Light.
 - .2 AATCC 23-[1999], Color Fastness to Burn Gas Fumes.
 - .3 AATCC 118-[1997], Oil Repellency: Hydrocarbon Resistance Test.
 - .4 AATCC 129-[2001], Colour Fastness to Ozone in the Atmosphere Under High Humidities.
 - .5 AATCC 134-[2001], Electrostatic Propensity of Carpet.
 - .6 AATCC 171-[2000], Carpets: Cleaning of; Hot Water Extraction Method.
 - .7 AATCC 174-[1998], Antimicrobial Activity Assessment of Carpets.
 - .8 AATCC 175-[1998], Stain Resistance: Pile Floor Coverings.
 - .9 AATCC 189-[2001], Fluorine Content of Carpet Fibers.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM D1055-[97], Specification for Flexible Cellular Materials - Latex Foam.
 - .2 ASTM D1335-[98], Tuft Bind of Pile Floor Coverings.
 - .3 ASTM D1667-[97], Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
 - .4 ASTM D3936-[00] Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.
 - .5 ASTM D5252-[98a], Standard Practice for the Operation of the Hexapod Drum Tester.
 - .6 ASTM D5417-[99], Standard Practice for Operation of the Vettermann Drum Tester.
 - .7 ASTM E84-[01], Test Method for Surface Burning Characteristics of Building Materials.
 - .8 ASTM E648-[00], Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - .9 ASTM E662-[01], Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No.27.6-[M91], Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.

- .2 CAN/CGSB-4.2 No.77.1-[94]/ISO 4919:1978, Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force.
- .3 CGSB 4-GP-36M-[78], Carpet Underlay, Fiber Type.
- .4 CAN/CGSB-4.129-[93(R1997)], Carpets for Commercial Use.
- .5 CGSB 20-GP-23M-[78], Cushion, Carpet, Flexible Polymeric Material.
- .6 CAN/CGSB-25.20-[95], Surface Sealer Floors.
- .4 Carpet and Rug Institute (CRI)
 - .1 CRI-104-[96], Standard Installation of Commercial Carpet.
 - .2 IAQ Carpet Testing Program.
- .5 National Floor Covering Association (NFCA)
 - .1 Floor Covering Specification Manual [1998].
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[88(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S102.2-[88(R2000)], Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit control submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit verification to demonstrate compliance with CAN/ULCS102 and CAN/ULCS102.2.
- .3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).
- .4 Submit report verifying that tuft bind meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.
- .5 Submit report outlining proposed dust control measures.
- .6 Submit carpet schedule using same room designations indicated on drawings.
- .7 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.
- .8 Submit certification and description of carpet recycling process

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data sheet for each carpet, under cushion, adhesive, carpet protection and subfloor patching compound.

- .3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.
- .4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate locations and lengths of seams for carpeted areas.
- .3 Indicate nap direction, open edges, special patterns, and other details required by Consultant to clarify work.
- .4 Submit drawings showing columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required as well as direction of carpet pile and pattern, location of edge mouldings and edge bindings to Consultant for review prior to installation of carpet.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 225 x 225 mm pieces for each colour selected, 300 mm square pieces of undercushion, 150 mm lengths of carpet gripper and binder bars, base, divider strips.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.
- .3 Schedule of carpet reclamation activities indicating following:
 - .1 Detailed sequence of removal work.
 - .2 Inventory of items to be removed and reclaimed.
 - .3 Proposed packing and transportation measures.
- .4 Certification: Reclamation Agency to verify in writing that used carpet was removed and recycled in accordance with [carpet] [fibre] manufacturers' reclamation program.
 - .1 Record off-site removal of debris and materials and provide following information regarding removed materials.
 - .1 Time and date of removal.
 - .2 Type of material.
 - .3 Weight and quantity of materials.
 - .4 Final destination of materials.

1.8 QUALIFICATIONS

- .1 Installer Qualifications:
 - .1 Flooring contractor requirements.
 - .1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.
 - .2 Certified by carpet manufacturer prior to [tender] [bid] submission.
 - .3 Must not sub-contract labour without written approval of Consultant.
 - .2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

1.9 REGULATORY REQUIREMENTS

- .1 Prequalification: tested to CAN/CGSB-4.2-No.27.6.
- .2 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Label packaged materials. For carpet tile products indicate nominal dimensions of tile and indicate installation direction.
- .2 Packaging, labelling, packing and marking details.
- .3 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.
- .4 Store carpeting and accessories in location as directed by Consultant. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.
- .5 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.
- .6 Store materials in area of installation for minimum period of 48 hours prior to installation.
- .7 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Vacuum used carpet before removal.
- .3 Maintain possession of removed used carpet.
- .4 Carpet undercushion: provide recycling of carpet padding where locally available or as designated by carpet reclamation program.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Consultant
- .2 Temperature: Maintain ambient temperature of not less than 18 °C from 48 hours before installation to at least 48 hours after completion of work.
- .3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.
- .4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .5 Ventilation:
 - .1 Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities. Provide fans with HEPA filters.
 - .3 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of carpet installation.
- .6 Test existing floor levelling compound for presence of asbestos contamination. Notify Consultant for additional instructions where asbestos is discovered.
- .7 Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

1.13 EXTRA MATERIALS

- .1 Provide extra materials of carpet, carpet base, and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 10 m² of each colour, pattern and type of carpet tile. Extra materials to be from same production run as installed materials.
- .3 Identify each package of carpet and each container of adhesive.
- .4 Deliver to Consultant and store where directed by Consultant.

Part 2 Products

2.1 MANUFACTURERS

- .1 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

2.2 CARPET TILE

1. Acceptable Carpet Tile Materials (CPT) – shall be suitable for direct glue-down installation as per CGSB-4-SP-156; pre-glued products are NOT acceptable. Acceptable manufacturers and models:
 1. One (1) colour from full line of the following acceptable patterns and series.
 2. All carpet tile supplied for each installation shall be manufactured from yarn of the same dye lot
 3. Acceptable products as manufactured by Mannington Commercial Modular carpet, Series “Good Form 2” Collection. Contact: Katherine Szeplaki;
Katherine_szeplaki@mannington.com, 519-588-2225
 4. Acceptable alternates as manufactured by Interface. Contact: Mary Leach;
mary.leach@interface.com, 416.577.5810:

2.3 WARRANTY

- .1 All carpet tile supplied for each installation shall be manufactured from yarn of the same dye lot.
- .2 Carpet and installation shall carry a minimum Manufacturer’s ten (10) year warranty

2.4 ADHESIVES

1. Use Manufacturers recommended adhesive.
2. Submit all adhesive products MSDS.
3. Spray adhesives are NOT acceptable.

2.5 ACCESSORIES

- .1 Base:
 - .1 Rubber base: refer to Section 09 65 16- Colour: Black.
- .2 Carpet protection: non-staining heavy duty kraft paper.
- .3 Concrete floor sealer: to CAN/CGSB-25.20, Type 1.
- .4 Subfloor patching compound: Portland cement base filler, mix with latex and water to form a cementitious paste.

Part 3 Execution

3.1 SUB-FLOOR TREATMENT

- .1 Refer to Section 02 41 15 Selective Demolition and coordinate for all required floor cleaning, adhesive removal, scarification, patching and filling to suit.

- .2 Remove sub-floor ridges and bumps. Regardless of previous skim coating or localised patching by other Sections allow in the main bid price for filling all low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Cracks 3 mm wide or protrusions over 0.8 mm will be filled and levelled with appropriate and compatible latex polymer fortified patching compound.
- .4 Do not exceed manufacturer's recommendations for patch thickness.
- .5 Large patch areas are to primed with a compatible primer.
- .6 Concrete substrates shall be cured, clean and dry.
- .7 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.
- .8 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

3.2 PREPARATION

- .1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.
- .2 Pre-condition carpeting following manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install in accordance with manufacturer's printed instructions and in accordance with Carpet and Rug Institute Standard for Installation of Commercial Carpet, CRI 104.
- .2 All carpet to be installed as per Manufactures instructions (latest editions/amendments) and in accordance with good installation practices.
- .3 Carpet shall be rolled during installation using minimum 75 lb. linoleum roller.
- .4 Carpet tiling shall be wall to wall, where carpet meets vinyl tile or other surfaces of less thickness, a carpet to resilient adapter as manufactured by Johnsonite compatible with the decor, shall be installed, using mechanical fasteners, plastic plugs and screws or concrete nails. Do not use power actuated devices. Carpet shall neatly follow line of walls, bulkheads, columns and door framing.
- .5 Finish installation to present smooth wearing surface free from conspicuous seams, burring and other faults.
- .6 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.
- .7 Adhesive seams and cross-joints. Seam edges must be sealed.

- .8 Fit neatly around Architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.
- .9 At openings, seams to occur under door edges
- .10 Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- .11 Install carpet smooth and free of bubbles, puckers, and other defects.

3.4 BASE INSTALLATION

- .1 Install resilient base in accordance with Section 09 65 19.

3.5 PROTECTION OF FINISHED WORK

- .1 Vacuum carpets clean immediately after completion of installation. Protect traffic areas.
- .2 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.
- .3 Install carpet protection to satisfaction of Consultant and Board Project Manager.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 61 00 – Common Product Requirements.
- .3 Section 06 40 00 – Architectural Woodwork.
- .4 Section 05 12 23 – Structural Steel for Buildings.
- .5 Section 05 50 00 – Metal Fabrications.
- .6 Section 06 20 13 – Exterior Finish Carpentry
- .7 Section 08 11 14 – Metal Doors and Frames.
- .8 Section 09 91 27 – Finish and Colour Notes.
- .9 Section 09 91 30 – Door and Room Finish Schedule.

1.2 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- .2 Ontario Painting Contractors Association (OPCA) Architectural Specification Manual - referenced as OPCA Manual, latest Edition. Paint formulations and methods referred to herein refer to this Manual. If contractor is unfamiliar with this reference standard, contact the OPCA at (416) 498-1897.

1.3 WARRANTY

- .1 Furnish an OPCA 2 Year Guarantee or alternately a 100% 2 Year Maintenance Bond on completion of the work. The Guarantee or Maintenance Bond shall warrant that the work has been performed with respect to the standards and requirements incorporated in the OPCA specification manual-latest edition.
- .2 Painting contractor using a Maintenance Bond type guarantee shall supply at the time of tender a copy of the form of Bond to be used together with proof of ability to furnish same at no additional cost to the Owner. In either case, the specification will be as referred to in the OPCA Specification Manual.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Do not apply paint finish in areas where dust is being generated.
- .2 Conform to requirements of OPCA Manual.
- .3 Comply with the requirements of Section 01 35 30 – Health and Safety.

1.5 JOB MOCK-UP

- .1 Complete a mock-up room to be reviewed and approved by Owner, Consultant, and OPCA Inspector for approval on application of block filler and finish paint coats.

1.6 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for any changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.7 DELIVERY, HANDLING AND STORAGE

- .1 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .2 Remove damaged, opened and rejected materials from site.
- .3 Provide and maintain dry, temperature controlled, secure storage.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Store materials and supplies away from heat generating devices.
- .6 Store materials and equipment in a well ventilated area with temperature range 7⁰C to 30⁰C.
- .7 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .8 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .9 Remove paint materials from storage only in quantities required for same day use.
- .10 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .11 Fire Safety Requirements:
 - .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.8 FINISHES AND COLOURS

- .1 Review the requirements outlined in Section 099127, Finish Schedule and Colour Notes. A separate colour schedule will be issued after contract award.
- .2 Allow for 6 colours plus “matching existing” from all formulations for this project.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .5 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .6 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by employees for verifiable re-use or re-manufacturing.
- .7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

Part 2 Products

2.1 MATERIALS

- .1 Paint materials for paint systems shall be products of a single manufacturer.
- .2 Acceptable products: Per Chapter 5 OPCA Manual and as listed.
- .3 Paint materials for each paint system to be products of a single manufacturer.
- .4 Use low-VOC and low-odour paints only.
- .5 Acceptable Manufacturers: Glidden, Para, Benjamin Moore, Sherwin Williams & Sico.

Part 3 Execution

3.1 GENERAL

- .1 Prepare surfaces to receive paint per Chapter 3 OPCA Manual.
- .2 For doors supplied by Relocatable Contractor as indicated in the Door Finish schedule, clean and re-prime all surfaces prior to painting. Refer to AD drawings for Door Finish Schedule.

3.2 APPLICATION

- .1 Sand and dust between each coat to remove defects visible from distance up to 1.5 m.
- .2 Finish closets and alcoves as specified for adjoining rooms.
- .3 Apply each coat at the proper consistency. Each coat of finish should be fully dry and hard before applying the next coat, unless the manufacturer's instructions state otherwise.
- .4 Method of application to be as approved by Consultant. Apply paint by brush, roller, air sprayer or airless sprayer as required. Conform to manufacturer's application instructions unless specified otherwise.
- .5 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.

- .6 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .7 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant.
- .8 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .9 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .10 Sand and dust between coats to remove visible defects.
- .11 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .12 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .13 Finish closets and alcoves as specified for adjoining rooms.
- .14 Finish top, bottom, edges and cut-outs of doors after fitting as specified for door surfaces.

3.3 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Refer also to Finish Notes in Section 099127- Finish and Colour Notes.
- .2 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise. Coordinate with mechanical trades applying banding and labeling after pipes have been painted. Do not paint white PVC covers on exposed mechanical water, drain and other lines
- .3 Paint gas piping standard yellow where visible on roof or in service spaces. Do not paint gas meter or gas equipment in wall niche yellow—colour to later selection by Consultant.
- .4 Paint surfaces inside of ductwork and elsewhere behind grilles where visible using primer and one coat of matte black paint.
- .5 Paint both sides and edges of plywood backboards for equipment before installation.

- .6 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.4 PAINT SYSTEMS

- .1 System references listed are based on Chapters 4A and 4B of OPCA Manual and are OPCA Premium Grade, unless noted otherwise.

3.5 INTERIOR FINISHES

- .1 Wood, where applicable:
 - .1 Doors, miscellaneous trim: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Casework and miscellaneous wood items:
 - .1 Exterior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Interior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
- .2 Gypsum board: INT.4-B, Latex Eggshell Finish, Premium Grade.
- .3 Concrete Block: INT. Acrylic Latex Semi-Gloss Finish, Premium Grade; 3 full coats of block filler, 2 full coats of latex primer and 2 full coats of acrylic latex shall be applied.
- .4 Concrete Block Epoxy Coating (EP) ALTERNATE PRICE: All Corridors, Stairwells and Washrooms and Gymnasium to dado height (approx. 2200 a.f.f.): INT.8-D; Epoxy Premium Grade, Semi-Gloss Finish, 3 full coats of block filler, 2 coats of water based epoxy coating. Colours: 4 colours to consultant selection. Note locations on interior elevations and finish schedule. Confirm extent and by review on site prior to tender.
- .5 Concrete Block: Alkyd Gloss Finish, Premium Grade - shown on Room Finish Schedule as P-GF (Paint - Gloss) finish.
- .6 Concrete Floors; refer to Section 3346- Concrete Floor Hardeners and Sealers for liquid sealer.
- .7 Exposed Cast in Place Concrete ceilings: INT. 8-A, Latex Flat Finish, Premium Grade
- .8 Exposed Precast Concrete ceilings: INT. 8-A, Latex Flat Finish, Custom Grade
- .9 Miscellaneous metal, including all exposed steel on stairs and railings/guardrails:
 - .1 EPOXY finish, exterior grade, two coats on a rust inhibitive primer for all exposed steel (except stainless steel handrails) on all stairs including exposed steel nosing at porcelain tile stair landing, stair stringer, pickets, guardrails and railings.
- .10 Galvanized metal: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade
- .11 Hollow Metal Doors and Frames and Miscellaneous Metal: Interior of all hollow metal frames to be primed. Without exception, all wipe coated Galvanized Hollow Metal Doors, Frames and Screens, interior and exterior shall be field cleaned with solvent, prime paint coated and then finished with INT. 13-A Premium Grade, Alkyd Semi-Gloss

Finish. Base coat primer shall be submitted for review in advance or door/frame painting shall be rejected by Consultant.

.12 Gymnasium Painting:

- .1 Refer to specific notes in Finish Schedule and drawings, as applicable.

3.6 EXTERIOR PAINTING

- .1 General Wood: EXT. 1-A-Gloss, Premium Grade
- .2 Pavement markings: EXT. 7-A, Zone Marking Alkyd Finish, Premium Grade.
- .3 Concrete columns: EXT. 6F, Two component epoxy finish, Premium Grade.
- .4 Miscellaneous metal:
- .1 Primed: EXT. 11-A-Gloss, Premium Grade
- .2 Galvanized: EXT. 12-A-Gloss, Premium Grade
- .5 Galvanized metal: EXT. 12-A-Gloss, Premium Grade.
- .6 Steel - high heat: EXT. 15-A
- .7 Exterior Exposed Steel:
- .1 Gate & brackets for trellis, exterior steel columns, Garbage Enclosure steel
- .2 Note that all exposed steel members are to be shop primed with an inorganic zinc primer over Commercial Blast Cleaning 63-75 micrometres (2-3 mils dry). Field coat of 75-100 micrometres (3-4 mils) high build epoxy. Colour to be selected by Consultant.

3.7 INSPECTIONS

- .1 Provide inspections by representative of the Ontario Painting Contractors Association (OPCA) in compliance with the terms of the Canadian Painting Contractors Association Inspection and Guarantee Program.
- .2 Cooperate at all times with the paint inspection agency in the performance of their duties as required as part of the work of this Section.
- .3 Inspection costs to be paid for directly by painting contractors as part of the painting sub-contractor's fee and not from cash allowances.

END OF SECTION

END OF SECTION

Part 1 General

1.1 GENERAL FINISH NOTES

- .1 The Material and Colour Schedule will be issued by the Consultant after tender. It shall be read in conjunction with the Drawings, Specifications, Room Schedule and Door Schedule. Colour and material references named will be based on one manufacturer, as carried by the Contractor or, in the case that no specific manufacturer is carried, based on the Consultant's choice.
- .2 Approved alternative manufacturers will be acceptable only as indicated in the specifications. However, approved alternate products submitted must match the products named in the Specification to the Consultant's selection. Alternate products other than those named in the specifications will not be allowed unless previously approved by the Consultant.
- .3 Consult Consultant prior to painting any surface not included in the formulae as listed.
- .4 Final colour for exterior painted surfaces and prominent interior areas shall be approved on the job site by the Consultant.
- .5 Paint samples: Contractor to submit paint samples for all areas required to "Match Adjacent Finish".
- .6 All similar paint formulations are to be identical when dry. Variations in tone, texture or sheen shall not be accepted.
- .7 Submit two 300 mm x 300 mm paint samples of each colour required for approval by the Consultant.
- .8 Exact locations of accent paint called for in the Material and Colour Schedule, to be issued after Contract award, not specifically identified on the drawings are to be verified on site with the Consultant.

1.2 EXTERIOR FINISH NOTES

- .1 All exposed metal (doors, frames, lintels, stairs, handrails, mechanical equipment, etc.) to be painted except for prefinished metal louvres, stainless steel, and aluminum. Mechanical equipment is to be painted whether delivered to the site prepainted or not (exhaust fans, goosenecks, exhaust stacks, supports, HVAC units, HRU units, etc.). Colours to match adjacent material-generally either to match brick or tan to match flashing or siding material. Do not paint exposed white PVC pipe covers on interior. Consultant will advise on jobsite which other items mentioned above, if any, do not require painting.
- .2 All unfinished metal work provided by landscaping is to be painted by Section 09 91 22-Painting.

1.3 INTERIOR FINISH NOTES

- .1 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (except stainless steel or anodized aluminum) to be painted to match the surfaces on which they occur unless noted otherwise on the colour schedule, prefinished in suitable colour or directed by the Consultant. If prefinished equipment is damaged, it shall be re-painted. Painting to be by formulations specified in Section 09 91 12- Painting.
- .2 All interior fitments, casework, millwork, etc. to be melamine unless otherwise noted. Refer to Sections for specific requirements regarding materials, construction, finishes and hardware. Note that drawer and cupboard interiors are to be considered as exposed surfaces and will therefore be finished.
- .3 Do not paint over nameplates, identification tags, etc.

END OF SECTION

PART 1 - GENERAL

1.1 General Notes

1. Find the **Room Finish Schedule** on the following pages
2. **This schedule MUST be read in conjunction with a complete set of drawings** to ascertain all details and finished surfaces that may not be listed on the schedule.
3. Refer to interior elevations, plans sections and reflected ceiling plans to coordinate finish notes and extents of materials.
4. Refer to various specifications sections for different types of materials including, but not limited to:
 - .1 flooring materials such as resilient tile
 - .2 ceiling materials such as Lay-In Acoustical panel (LAP)
5. Abbreviations Legend:

<u>Code</u>	<u>Reference</u>
AB	Acoustic Concrete Block
ACP	Acoustic Panels (wall hung)
ASD	Acoustic Steel Deck
CMT	Ceramic Mosaic Tile
CPL	Composite Panels
CPT	Carpet
CB	Concrete Block
CONC	Concrete
CW	Curtain Wall
CWT	Ceramic Wall Tile
EWPM	Exposed Waterproof Membrane (refer to Section 09 97 24)
GWB	Gypsum Board (water resistant)
HAP	Hanging Acoustic Panels
LAP	Lay-in Acoustic Panel
PAP	Perforated Acoustic Panel
P.GF	Paint - Gloss Finish
POR	Porcelain Tile
PT	Paint
RR	Resilient Rubber
RSTR	Rubber Stair Tread & Riser
S.CONC	Sealed Concrete (refer to Section 03 35 05)
SF	Resilient Sheet Flooring
SFCB	Split Face Concrete Block
STL	Steel
VCT	Vinyl Composite Tile
CONC	Concrete

END OF SECTION

General Notes

- 1 Find the **Room Finish Schedule** on the following pages
- 2 **This schedule MUST be read in conjunction with a complete set of drawings** to ascertain all details and finished surfaces that may not be listed on the schedule
- 3 Refer to interior elevations, plans sections and reflected ceiling plans to coordinate finish notes and extents of material:
- 4 Refer to various specifications sections for different types of materials including, but not limited to
 - flooring materials such as resilient tile
- 5 Where ceramic wall tile is identified, G.C. to coordinate tile installation behind all fixtures (do not tile around fixtures)
- 6 Contractor required to ensure floor is level as required to make good existing floor for new finishes
- 7 Refer to A01 Fire Separations and Proposed Reflected Ceiling Plans for required fire resistance rating at ceiling:
- 8 Contractor to remove existing window coverings, hardware, etc. and store free from dirt and damage and re-install after construction is complete.

Abbreviations Legend:

Code Reference

EX.	Existing
ACT	Acoustic Ceiling Tiles
CB	Concrete Block
CFT	Ceramic Floor Tile
CW	Curtain Wall
CWT	Ceramic Wall Tile
GYP	Gypsum Board
P	Paint
POR	Porcelain Tile
RR	Resilient Rubber
TERR	Terrazzo Floor and Cove Base
VCT	Vinyl Composite Tile

ROOM NO.	ROOM NAME	FLOOR FIN.	BASE	WALL		CEILING			REMARKS
				MAT'L	FIN.	MAT'L	FIN.	HEIGHT	
X00	EX. STORAGE	EX. VCT/ VCT	EX.RR/ RR	EX. BLK	PAINT	EX. CONC.			PATCH VCT FLOORING AND RUBBER BASE TO MATCH EXISTING (APPROX. 2.0 SQ.M.) PAINT (2) TWO EXISTING EXTERIOR WALLS TO MATCH EXISTING.
X01	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X02	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X03	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X04	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X05	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X06	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES IN EX. CONCRETE BLOCK WALLS, AND HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING PRIOR TO PAINT. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, COLUMNS, ETC. (SEE INTERIOR ELEVATIONS).
X07	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X07A	EX. STORAGE	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X07B	EX. STORAGE	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X08	EX. MUSIC CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X09	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X10	EX. CON. ED. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X12	EX. VESTIBULE	EX. TERR/ TERR	EX. TERR/ TERR	EX. BLK	PAINT	EX.ACT			PATCH TERRAZZO FLOORING AND TERRAZZO COVE BASE TO MATCH EXISTING. PAINT ENTIRE VESTIBULE.

ROOM NO.	ROOM NAME	FLOOR	BASE	WALL		CEILING			REMARKS
		FIN.		MAT'L	FIN.	MAT'L	FIN.	HEIGHT	
X13	EX. CORRIDOR	EX. TERR	EX. TERR	EX.BLK	PAINT	EX.ACT			PAINT ENTIRE CORRIDOR (SOUTH WALL ONLY).
X14	EX. VESTIBULE	EX. TERR	EX. TERR	EX. BRICK	-	EX.ACT			EXISTING TERRAZZO FLOOR TO BE REPAIRED/ (UNDER DEMOLISHED LOCKERS) AND ENTIRE CAREA CLEANED AND POLISHED. SEE SPEC.
X100	EX GYMNASIUM	EX. VCT	WD.	EX. BLK.	PAINT	EX. CONC.			PAINT EXTERIOR WALL (EXTERIOR WALL AT PANEL REPLACEMENT) FIELD COLOUR ONLY.
X104	EX. BOILER RM.	EX. CONC.		EX.BLK/ GYP.		EX. CONC.			
X105	EX. OFFICE	EX.VCT	EX.RR	EX.BLK/ GYP.		EX.ACT			
X106	EX. W.R.	EX. TERR	EX. TERR	EX.BLK/ GYP.		EX.ACT			
X107	EX. W.R.	EX. TERR	EX. TERR	EX.BLK		EX.ACT			
X108	EX. STAFF ROOM	EX.VCT	EX.RR	EX.BLK		EX. CONC.			
X109	EX. CUSTODIAL RM. A	EX. EPOXY/EPOXY		EX. BLK		EX. CONC.			RE-EPOXY ENTIRE FLOOR TO MATCH EXIISTING. PRIME & PAINT ENTIRE WALL & DELETED FIXTURE.
X110	EX. STORAGE	EX.VCT	EX.RR	EX.BLK		EX. CONC.			
X111	EX. V.P. OFFICE	EX.VCT	EX.RR	EX.BLK		EX.ACT			
X112	EX. MAIN VESTIBULE	EX. TERR	EX. TERR	EX.BLK	PAINT	EX.ACT			PAINT ENTIRE VESTIBULE
X113	EX. CORRIDOR	EX. TERR	EX. TERR	EX.BLK		EX.ACT/GYP	P	SEE RCP PLAN	PAINT ENTIRE CORRIDOR (WOOD DOOR TO REMAIN).
X114	EX. GEN. OFFICE	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. ACT			
X115	EX. PR. OFFICE	EX.VCT	EX.RR	EX.BLK/ GYP.		EX.ACT/GYP	P	SEE RCP PLAN	

ROOM NO.	ROOM NAME	FLOOR	BASE	WALL		CEILING			REMARKS
		FIN.		MAT'L	FIN.	MAT'L	FIN.	HEIGHT	
X116	EX. CORRIDOR	EX. TERR	EX. TERR	EX.BLK/ GYP.		EX.ACT			PAINT ENTIRE CORRIDOR (WOOD DOOR TO REMAIN).
X117	EX. BOYS W.R.	EX. TERR	EX. TERR	EX.BLK/ GYP.	PAINT	EX.ACT			PAINT EX. WALL w/ NEW BRADLEY FIXTURE TO MATCH EXISTING
X118	E. GIRLS W.R.	EX. TERR	EX. TERR	EX.BLK/ GYP.	PAINT	EX.ACT			PAINT EX. WALL w/ NEW BRADLEY FIXTURE TO MATCH EXISTING
X120	EX. OFFICE	VCT	RR	EX.BLK/ GYP.		EX. CONC.			
X121	EX. OFFICE	EX. VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X17	EX. GIRLS W.R.	EX. TERR	EX. TERR	EX.BLK/ GYP.	PAINT	EX.ACT			PAINT EX. WALL w/ NEW BRADLEY FIXTURE TO MATCH EXISTING
X18	EX. BOYS W.R.	EX. TERR	EX. TERR	EX.BLK/ GYP.	PAINT	EX.ACT			PAINT EX. WALL w/ NEW BRADLEY FIXTURE TO MATCH EXISTING
X19	EX. CUST. RM.	EX. TERR/TERR	EX. TERR/TERR	EX.BLK		EX. CONC.			PATCH TERRAZZO FLOOR AND RUBBER BASE TO MATCH EXISTING.
X20A	EX. LIBRARY	CPT/VCT	RR	EX.BLK/ GYP.	PAINT	EX. CONC.	PAINT		PATCH ALL HOLES IN EX. CONCRETE BLOCK WALLS, AND HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING PRIOR TO PAINT. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, COLUMNS, ETC. (SEE INTERIOR ELEVATIONS).
X21	EX. KINDERGARTEN	EX. VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X22	EX. LIBRARY	CPT/VCT	RR	EX.BLK/ GYP.	PAINT	EX. CONC.	PAINT		PATCH ALL HOLES IN EX. CONCRETE BLOCK WALLS, AND HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING PRIOR TO PAINT. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, COLUMNS, ETC. (SEE INTERIOR ELEVATIONS).
X23	STAFF ROOM	EX.VCT/VCT	EX.RR/RR	EX.BLK/ GYP.	PAINT	EX. CONC.			PATCH VCT FLOORING AND RUBBER BASE TO MATCH EXISTING.
X24	EX. CLASSROOM	EX.VCT/VCT	EX.RR/RR	EX.BLK/ GYP.		EX. CONC.			PATCH VCT FLOORING AND RUBBER BASE TO MATCH EXISTING.
X25	EX. CLASSROOM	EX.VCT/VCT	EX.RR/RR	EX.BLK/ GYP.		EX. CONC.			PATCH VCT FLOORING AND RUBBER BASE TO MATCH EXISTING.
X26	EX. CLASSROOM	EX.VCT	EX.RR	EX.BLK/ GYP.		EX. CONC.			
X27	EX. CORRIDOR	EX. TERR/TERR	EX. TERR/TERR	EX.BLK	PAINT	EX.ACT			PATCH TERRAZZO FLOORING AND TERRAZZO COVE BASE TO MATCH EXISTING., PAINT ENTIRE CORRIDOR.
X27A	VESTIBULE	EX. TERR	EX. TERR	EX.BLK		EX.ACT			
X28	EX. CUST. RM.	EX. TERR/TERR	EX. TERR/TERR	EX.BLK		EX. CONC.			PATCH VCT FLOORING AND RUBBER BASE TO MATCH EXISTING.
X29	EX. CORRIDOR	EX. TERR	EX. TERR	EX.BLK		EX.ACT			

ROOM NO.	ROOM NAME	FLOOR	BASE	WALL		CEILING			REMARKS
		FIN.		MAT'L	FIN.	MAT'L	FIN.	HEIGHT	
X30	EX. KINDERGARTEN	SHEET	RR	EX.BLK	PAINT	EX. CONC.	PAINT		
X31	EX. CLASSROOM	VCT	RR	EX.BLK.	PAINT	EX. CONC.	PAINT		
X32	EX. CLASSROOM	VCT	RR	EX.BLK.	PAINT	EX. CONC.	PAINT		
X33	EX. CLASSROOM	VCT	RR	EX.BLK.	PAINT	EX. CONC.	PAINT		
X34	EX. CLASSROOM	VCT	RR	EX.BLK.	PAINT	EX. CONC.	PAINT		
X35	EX. CLASSROOM	VCT	RR	EX.BLK.	PAINT	EX. CONC.	PAINT		
X36	EX. BOYS W.R.	EX. TERR	EX. TERR	EX.BLK.	PAINT	EX.ACT			PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, AND EXPOSED DUCTWORK.
X37	EX. GIRLS W.R.	EX. TERR	EX. TERR	EX.BLK.	PAINT	EX.ACT			PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, AND EXPOSED DUCTWORK.
X38	EX. STAIR	EX. TERR	EX. TERR	EX.BLK.	PAINT	EX.ACT			
X39	EX. STAIR	EX. TERR	EX. TERR	EX.BLK.	PAINT	EX.ACT			
X40	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, EXISTING MILLWORK CABINETS, AND MILLWORK SHELVING (SEE INTERIOR ELEVATIONS). CONTRACTOR TO REMOVE AND REINSTALL MILLWORK HARDWARE, COAT HOOKS, AND SUPPORTS AS REQUIRED FOR PAINTING. SEE SPEC.
X41	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, EXISTING MILLWORK CABINETS, AND MILLWORK SHELVING (SEE INTERIOR ELEVATIONS). CONTRACTOR TO REMOVE AND REINSTALL MILLWORK HARDWARE, COAT HOOKS, AND SUPPORTS AS REQUIRED FOR PAINTING. SEE SPEC.
X42	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, EXISTING MILLWORK CABINETS, AND MILLWORK SHELVING (SEE INTERIOR ELEVATIONS). CONTRACTOR TO REMOVE AND REINSTALL MILLWORK HARDWARE, COAT HOOKS, AND SUPPORTS AS REQUIRED FOR PAINTING. SEE SPEC.
X43	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, EXISTING MILLWORK CABINETS, AND MILLWORK SHELVING (SEE INTERIOR ELEVATIONS). CONTRACTOR TO REMOVE AND REINSTALL MILLWORK HARDWARE, COAT HOOKS, AND SUPPORTS AS REQUIRED FOR PAINTING. SEE SPEC.
X44	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, EXISTING MILLWORK CABINETS, AND MILLWORK SHELVING (SEE INTERIOR ELEVATIONS). CONTRACTOR TO REMOVE AND REINSTALL MILLWORK HARDWARE, COAT HOOKS, AND SUPPORTS AS REQUIRED FOR PAINTING. SEE SPEC.
X45	EX. CLASSROOM	VCT	RR	EX. BLK	PAINT	EX. CONC.	PAINT	3200	PATCH ALL HOLES AND CRACKS (6mm) IN CONCRETE ROOF SLAB AS REQUIRED TO MATCH EXISTING. CONTRACTOR TO PAINT ENTIRE ROOM INCLUDING, CEILING, EXPOSED DUCTWORK, EXISTING MILLWORK CABINETS, AND MILLWORK SHELVING (SEE INTERIOR ELEVATIONS). CONTRACTOR TO REMOVE AND REINSTALL MILLWORK HARDWARE, COAT HOOKS, AND SUPPORTS AS REQUIRED FOR PAINTING. SEE SPEC.
X46	EX. CUST. RM.	EX. TERR/TERR	EX. TERR/TERR	EX. BLK	PAINT	EX. CONC.			PATCH VCT FLOORING AND RUBBER BASE TO MATCH EXISTING.
X47	EX. CORRIDOR	EX. TERR	EX. TERR	EX.BLK.		EX.ACT			

1 General

1. SUMMARY

- .1 Section Includes:
 - .1 Compliance with requirements of the sections of Division 1 of the specifications.
 - .2 Requirements for providing the concrete floor sealer parts of the Work.

2. SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's technical data, installation instructions, maintenance instructions and general recommendations for concrete floor sealer.
- .2 Samples:
 - .1 Provide samples as specified in section 01 33 00 Samples, supplemented as follows:
 - .1 Submit 300 mm x 300 mm square sample of concrete floor sealer applied to a smooth trowel finish concrete paver.
 - .2 Submit each type of sample in triplicate.
 - .3 Modify and resubmit samples as many times as may be necessary to obtain Consultant's approval.
- .3 Closeout Documents:
 - .1 Provide manuals that contain the floor sealer manufacturer's maintenance and repair manual. The maintenance and repair manuals shall give specific warning of maintenance practices, Products and materials which may cause damage and disfigurement.

3. QUALITY ASSURANCE

- .1 Single Source Responsibility:
 - .1 Obtain concrete floor sealer Products from the same manufacturer with not less than ten (10) years of successful experience in manufacturing and installing principal materials described in this section. Contractor must have completed at least five projects of similar size and complexity. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.
- .2 Pre-installation Meeting:
 - .1 Hold a pre-installation meeting at the Place of the Work.
- .3 Mock-up:
 - .1 At site, under manufacturer's supervision, apply for approval 9 m2 of each type of complete floor finish in area designated, to match submitted samples. When approved, site applied sample to be standard for appearance, texture, workmanship, etc. All Work to conform to this sample.

4. DELIVERY, STORAGE AND HANDLING

- .1 Deliver Products to the Place of the Work. Check material for completeness and shipping damage prior to job start.

- .2 All materials must be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.
- .3 Store Products in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 16° and 32°C.

5. **PROJECT CONDITIONS**

- .1 Environmental Requirements:
 - .1 Concrete substrate must be properly cured for a minimum of 30 days.
- .2 Temperature:
 - .1 Maintain ambient temperature of not less than 18 deg.C/65 deg.F and a floor temperature of not less than 16 deg.C/60 deg.F from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .3 Moisture:
 - .1 Ensure substrate is within moisture limits prescribed by concrete floor sealer manufacturer.
- .4 Protection:
 - .1 Areas to accept concrete floor sealer shall be free of other trades during, and for a period of 24 hours, after floor installation.
- .5 Manufacturer's Representative:
 - .1 Manufacturer's representative must be on job site at start of installation.

6. **WASTE MANAGEMENT AND DISPOSAL**

- .1 Collect and separate packaging material for recycling in accordance with the Waste Management Plan.
- .2 Remove from the Place of the Work and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of unused finish and adhesive materials at official hazardous material collections site.

7. **WARRANTY**

- .1 Furnish a single, written warranty covering both material and workmanship for a period of three (3) full years from date of Substantial Performance of the Work. The Warranty shall cover defects such as cracking, delamination under impact and under heavy loaded carts and under thermal shock, and excessive wear.

2 **Products**

1. **MATERIALS**

.1 Manufacturers:

- .1 The specifications are based on Products manufactured by Sika Canada Inc. Products by Duochem Inc, division of Corrosion Services, CPD Construction Products, Niagara Protective Coatings, Selby/Ucrete,. Stonhard Ltd. Euclid or other approved manufacture may be approved on condition of being able to furnish evidence of equivalency or better to the specified Products.

.2 Concrete Floor Sealer System (EWPM)

.1 General:

- .1 Two-component, clear, water based mat epoxy coating, Sika MRW roller applied two coat system on a sealed/primed substrate.

.2 Characteristics

- .1 Seamless and very easy to clean.
- .2 Abrasion and chemical resistant.
- .3 No odour typical of solvent based coatings

.3 Minimum Technical requirements

- .1 Solids content: 100% by weight, 100% by volume.
- .2 Pot life 90 mins.
- .3 Application method: Brush, or roller.
- .4 Number of coats: Two.
- .5 Dry film thickness per coat: as per manufacturer's instructions
- .6 Cleaning solvent: Warm water.
- .7 Cure time: Touch dry: 4-5 hours.
 - .1 Hard dry: 16-18 hours.
 - .2 Complete cure: 7 days.
- .8 Recoat time: 16 hours.

.4 Minimum Physical properties

- .1 Abrasion resistance: 175 mg loss per ASTM D 4060 CS-17 wheels 1000 revolutions 1000 gr/wheel.
- .2 Tensile strength 2.1 MPa per ASTM D 2370 (2.8 mils D.F.T.)
- .5 Primer: as recommended by manufacturer.

3 **Execution**

1. **WORKMANSHIP**

.1 General

- .1 Handle, mix and apply Products as per the Product manufacturer's printed surface preparation and application specifications, and as specified in this specification section 09 97 24.
- .2 Application tools and equipment shall be as per the Product manufacturer's printed requirements.

2. **PREPARATION**

- .1 Prepare concrete by sanding smooth and for removal of bond inhibiting substances.

- .2 Apply as per manufacturer's instructions.

3. **APPLICATION**

- .1 Apply concrete sealer as indicated.
- .2 Rolling direction of each coat shall be the same.

4. **FIELD QUALITY CONTROL**

- .1 The Owner reserves the right to invoke the following material testing procedure at any time, and any number of times during period of flooring application.
- .2 The Owner may engage service of an independent testing laboratory to sample materials being used on the jobsite. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.
- .3 Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.
- .4 If test results show materials being used do not comply with specified requirements, the Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

5. **CURING, PROTECTION AND CLEANING**

- .1 Cure concrete floor sealing materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.
- .2 Protect concrete floor sealing from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. Contractor is responsible for protection and cleaning of surfaces after final coats.
- .3 Cleaning: Remove temporary covering and clean flooring just prior to final inspection. Use cleaning materials and procedures recommended by the concrete floor sealer manufacturer.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site packaging materials at appropriate recycling facilities.
- .2 Dispose of recyclable packaging material in appropriate on-site bin for recycling.

Part 2 Products

2.1 MATERIALS

- .1 Coat Racks and Shelves (student):
 - .1 Model STL 1001 as manufactured by Architectural School Products, Mississauga or “Steel Line” Model SL-300 U by Vogel Peterson or equal as selected by Consultant.
 - .2 Standard arrangement of 2 ABS hooks per 1’-0’ arranged on alternate bars of shelf units.
 - .3 Colours: single colour frame with contrasting coloured hooks to later selection by Consultant.
 - .4 Acceptable alternates: Global School Products or Martack Specialties Limited.
 - .5 Locations: Throughout school in corridors.
- .2 Lockers: as noted on drawings .
 - .1 457 wide x 380 deep x 457 high Nova 50 Cubbie Locker series by SPSS, Lincora Canada Inc. 1-888-856-9795. Fabricate from cold rolled steel, min. 16 ga. framing unless noted.

- .1 Double-walled honeycomb type doors with 16 ga. outer panel and 20 ga. inner panel
 - .2 Body and back not less than 24 gauge.
 - .3 Frame vertical members not less than 16 gauge. Bottom and cross members not less than 18 gauge steel.
 - .4 Continuous piano hinge, recessed extruded aluminum lock pocket, metal hasp with no moving part for padlock, individual number plate.
 - .5 Include jamb trims, min. 20 ga. gables and sloped tops.
 - .6 Colours: Allow for 2 standard colours: single colour frame with contrasting doors in two colours to later selection by Architect.
 - .7 Acceptable alternates: to meet this specification by Hadrian Manufacturing Inc., Burlington, GSW, Shanahan's Ltd., Calgary as supplied by W.G. Wood Sales, ASI/Watrous or General Storage System.
 - .8 Lockers to be installed above coat racks on Second Floor as indicated on drawings.
- .3 Safety Release Coat Hook:
- .1 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .2 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .3 Colours: 2 standard colours from manufacturer's complete range.
 - .4 Locations:
 - .1 Barrier-free washrooms (1 per washroom)
 - .5 Acceptable Materials: "HenkelHook" as manufactured/distributed by Henkel Diversified Inc, London ON, Tel. (519) 641-5872 or similar hook by Frost, distributed by Architectural School Products.
- .4 Roof Ladder and Guard and Roof Hatch:
- .1 Refer to 05 55 00 Metal Fabrications and Architectural drawings for roof ladder
 - .2 Refer to roofing specifications sections to specified new Roof Hatch.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install where indicated on drawings and as per manufacturer's instructions.

3.3 DEMONSTRATION AND TRAINING

- .1 Provide demonstration of operation to the Owner and his representatives.

- .2 Provide training for operation, maintenance and repairs.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 05 50 00 - Metal Fabrications.
- .3 Section 10 28 10 - Toilet And Bath Accessories.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A167-[99], Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-[02], Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A480/A480M-[03], Specification for General Requirements for Flat-Rolled Stainless and Heat Resisting Steel Plate, Sheet, and Strip.
 - .4 ASTM A653/A653M-[02a], Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.81-[M90], Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-[92], Gloss Alkyd Enamel Air Drying and Baking.
 - .3 CAN/CGSB-1.104M-[91], Semigloss Alkyd, Air Drying and Baking Enamel.
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-B651-[95(R2001)], Barrier-Free Design.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures].
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate fabrication details, plans, elevations, hardware, and installation details.
- .3 Samples:

- .1 Submit samples of finish hardware and phenolic plastic in selected colour and finish in accordance with Section 01 33 00 - Submittal Procedures, for approval of Consultant.
- .2 Submit duplicate representative samples of hardware items, including brackets, fastenings and trim.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, corrugated cardboard packaging material in appropriate on-site bins for recycling.

Part 2 Products

2.1 MATERIALS

- .1 Metal toilet partitions.
- .2 Metal Partitions: Metal, floor anchored and head rail braced. Two (2) colours will be chosen by the Consultant from manufacturers' full range of baked enamel. Locations: Student Washrooms.

2.2 MATERIAL DESCRIPTION

- .1 Metal Partitions: floor mounted and head rail braced. Fabricated with:
 - .1 25 mm thick doors and partitions of 20 ga. cold rolled steel cemented on 22 mm sound deadening fibre core, and complete with hardware and fittings.
 - .2 Pilasters to be min, 32 mm thick.
 - .3 pilasters to have 32 mm core and integral leveling device concealed by 100 mm high stainless steel shoe.
 - .4 all hardware to be chrome plated over non-ferrous metal.
 - .5 hinges to be heavy duty continuous hinges in brushed stainless steel.
 - .6 pulls on outside of handicapped doors
 - .7 all doors to have rubber tipped bumper and slide bar latch, combination door stop and keeper, all attached with chrome plated brass sleeve bolts with theft proof heads.
 - .8 rubber tipped die cast chrome plated coat hooks to be provided on inside of doors.
 - .9 provide stops on top and bottom of all doors
 - .10 Finish coating to be durable **anti-graffiti** powder coated finish. **Two colours** to be selected from the standard anti-graffiti colours available.

- .11 Acceptable Materials: meeting these specifications as manufactured by Hadrian Manufacturing Inc., Burlington of Canada Ltd.
- .12 Acceptable alternates: meeting or exceeding these exact specifications if reviewed and approved by the Consultant. Partitions must have anti-graffiti finish.
- .2 Safety Release Coat Hooks:
 - .1 Refer to Manufactured Specialties section 10 11 25 for information.

2.3 FABRICATION

- .1 Fabricate pilasters and stiles minimum 25 mm thick, and panels and doors minimum 25 mm thick, of materials as specified.
- .2 Supply steel floor inserts and locations to Contractor for placing prior pouring of floor slab.
- .3 Provide pilasters with 2.9 mm, stainless steel leveling bar, rod and anchor concealed by one-piece 102 mm high stainless steel.
- .4 Include panel brackets, hinges, door stops, latches, safety release coat hooks for metal partitions, fastening devices, bumpers, and pull on the outside of doors to handicapped accessible compartments.
- .5 Coat hooks to be mounted in ALL barrier free washrooms and shall be safety release style and mounted on the side wall.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install compartments in accordance with reviewed shop drawings and in a neat, rigid manner free of defects.
- .2 Provide anchors, inserts and fixings necessary for attachment of supports. Supply steel floor inserts and locations to Contractor for placing prior pouring of floor slab. Elsewhere, drill supports as required to receive attachment of compartments.
- .3 Install units secure, accurately positioned, plumb, level, square and free from sag and distortion. Provide 3 brackets per partition.
- .4 Perform drilling of steel, masonry and concrete necessary to install this work.

- .5 Ensure spaces between panels and pilasters, between panels and walls and between pilasters and walls are of uniform consistent width and sized to ensure it is not possible to see persons using the compartments.
- .6 Coordinate installation with the work of trades providing ceilings, wall and floor finishes, shower accessories and other adjacent components and construction.
- .7 Use stainless steel anchors and fasteners; ferrous metals are not acceptable.
- .8 Provide for adjustment of ceiling variations with screw jack through steel saddles made integral with pilaster. Conceal fixings with stainless steel shoes.
- .9 Do work in accordance with CAN/CSA-B651.

3.3 ADJUSTMENT

- .1 Upon completion of the work or when directed, remove all traces of protective coating or paper.
- .2 Clean exposed surfaces and fittings.
- .3 Test safety release Coat Hooks, hinges, locks and latches and where necessary, adjust and lubricate. Set hinges so that doors stand open maximum 30 degrees when compartment is not in use. Ensure that partitions are in working order.
- .4 Lubricate hardware and other moving parts.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Clean and polish hardware and stainless components.
- .5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 10 21 14 – Metal Toilet Compartments.
- .3 Section 08 80 50 – Glazing: Mirrors.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A167-[99], Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B456-[95], Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A653/A653M-[99], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A924/A924M-[99], Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-[M90], Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-[92], Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CAN/CGSB-12.5-[M86], Mirrors, Silvered.
 - .4 CGSB 31-GP-107Ma-[90], Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651-[95], Barrier-Free Design.
 - .2 CAN/CSA-G164-[M92], Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures
- .2 Shop drawings of units for use by the handicapped shall be distinctly marked and cross-referenced to the corresponding article in the specifications.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Ferrous Steel: Sheet, cold-rolled furniture steel, double annealed, mill stretched and leveled, and fully pickled. Otherwise, steel shall be hot-rolled or cold-rolled of alloy to suit needs of fabrication, use, and appearance.
- .2 Galvanized Steel: For sheet, Z275 zinc coating designation in accordance with ASTM Specification A525. For irregular sections, hot dip galvanized to comply with CSA G164.
- .3 Stainless steel sheet metal: to ASTM A167, Type 304, with No. 4 finish.
- .4 Anchors and Fastenings: Where exposed, use stainless steel and otherwise to match metal anchored. Where non-exposed, use the same as that specified for exposed, or use galvanized steel. Anchors and fastenings shall be of the type appropriate for the substrate to which accessory unit is secured.
- .5 Acceptable alternates to the items in 2.2. below as manufactured by Bobrick, Frost & ASI/Watrous.

2.2 COMPONENTS

- .1 Hand Dryers – Semi-recessed (HD): refer to Electrical specifications.
- .2 Handicapped Grab Bars (GB): Model W1401-F and FP, and W1401-F96 by Watrous
 - .1 Two (2) bars per water closet: 600 mm long bar behind water closet and one 750 mm x 750 mm L shaped grab bar beside water closet mounted as per O.B.C. requirements
 - .2 all bars to have concealed mounting hardware
 - .3 Quantity: **refer to drawings.**
 - .4 all bars to withstand horizontal and vertical pull of 2.2 kN
- .3 Convenience Shelves (CS): Model B295x16 by Bobrick
 - .1 Location: **Refer to Drawings** :Staff Washrooms and Barrier Free Washrooms
- .4 Mirrors:
 - .1 Fixed Mirrors (designation Type ML):
 - .1 Best quality, 6 mm thick float glass, with concealed tamperproof clip fasteners.
 - .2 24 ga., Type 302 or 304 No 4 finish stainless steel frames on all edges and galvanized iron backing with concealed mounts.
 - .3 Sizes: each unit 24" x 60"
 - .4 Locations: as shown on Drawings.
 - .5 Acceptable Materials: Frost 'Stock series' model 941TG Tempered Glass Vandal resistant mirror.
 - .6 Acceptable alternate: by Twin Cee; or "Tamperproof" model by Pilkington Ford
 - .2 Handicapped Mirrors (designation Type TM):

- .1 Fixed tilt mirror
- .2 Acceptable Materials: Frost 'Stock series' model 941-1836FT Tempered Glass; 18" x 36" each.
- .3 Locations: as shown on drawings.
- .3 Frames: Type 302 or 304 No. 4 finish stainless steel.
- .4 Mirror Cushioning: PVC pressure-sensitive foamed tape, 6 mm thick with adhesive on one side.
- .5 The supply of the following items will be the School Board. Contractor to include in tender the installation of the following items as noted on the drawings:
 - .1 Paper towel dispenser
 - .2 Soap dispenser
 - .3 Sanitary Napkin Dispenser/Vendor
 - .4 Sanitary Napkin Disposal
 - .5 Toilet Paper Dispenser

2.3 FABRICATION

- .1 Construction: Fabricate with materials, component sizes, metal gauges, reinforcing, anchors and fasteners of adequate strength to withstand intended use.
- .2 Where specified as frameless, provide stainless steel accessories with one-piece fronts having 90 degree formed returns at their edges and openings.
- .3 Where accessory fronts are framed, frame edges, both inside and outside, with 90 degree formed returns continuously welded and ground smooth at the corners. Doors shall also have 90 degree formed returns as specified.
- .4 Unless otherwise specified, hinges shall be semi-concealed stainless steel piano hinges extending full-length of hinged element. Provide hinged elements with concealed, mechanically-retained rubber bumpers for silent closing, and shall close flush with faces of fronts or frames.
- .5 Ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.
- .6 No exposed fixings permitted. Cut edges and openings square and smooth. Chamfer corners of edges and cut-outs 1.6 mm.
- .7 Assembly: Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .8 Fasten work with concealed methods, unless otherwise indicated on Drawings.
- .9 Weld all connections where possible, bolt where not possible and cut off bolts flush with nuts. Countersunk bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastening.
- .10 Welded joints shall be tight, flush, and in true planes with base metals. Make welds continuous at joints where entry of water into voids of members or assemblies is possible.

- .11 Provide for differential movements within assemblies and at junctions of assemblies with surrounding work.
- .12 Welds in exposed locations shall be ground and polished smooth.
- .13 Finish Work: Provide holes and connections for related work installed under other Sections of this specification, if applicable.
- .14 Cleanly and smoothly finish exposed edges of materials, including holes.

Part 3 Execution

3.1 INSPECTION OF SECTION

- .1 Take site measurements to ensure that work is fabricated to fit surrounding construction around obstructions and projects in place, or as shown on drawings, and to suit service locations.

3.2 INSTALLATION

- .1 Install all accessories in accordance with manufacturers' instructions at their recommended mounting heights unless noted otherwise on drawings.
- .2 Securely fasten accessories plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work. Install in locations shown and specified herein. Mounting heights as shown or in accordance with the OBC in the case of barrier-free accessories.
- .3 Work shall include anchor bolts, bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeve brackets, clips, and other items necessary for secure installation, as required by loading and by Jurisdictional Authorities.
- .4 Attach work at wood by screws through countersunk holes in metal.
- .5 Attach work to masonry with lead plugs and non-corrosive fastenings, to support load with a safety factor of 3. Perform all drilling necessary to install the work.
- .6 Insulate between dissimilar metals or between metals and masonry or concrete with bituminous paint, to prevent electrolysis.
- .7 Coordinate installation with the work of other trades adjacent to accessories to achieve the reveals or other edge conditions shown, where their front faces are flush with the finished wall surfaces.
- .8 Owner to supply and install remainder of washroom accessories not specified here (toilet paper dispensers, etc.). Cooperate with Owner as required.

3.3 CLEANING UP AND ADJUSTMENT

- .1 Upon completion of the work, or when directed, remove all traces of protective coatings or paper.

- .2 Test mechanisms, hinges, locks and latches, and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

END OF SECTION

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Part 1 General

1.1 SECTION INCLUDE

- .1 Materials and installation for chain link fences and gates.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 - Cast-in-Place Concrete.

1.3 SCOPE OF WORK

- .1 The work specified under this Section includes all labour, materials and equipment necessary for the complete repair and supply, installation and erection of the following:
 - .1 Baseball Backstops;
- .2 Fencing shall be prepared and installed in accordance with the manufacturer's instructions and according to the details and in the locations shown on the Drawings.

1.4 QUALIFICATIONS

- .1 Welding shall be undertaken by Fabricators fully approved by the Canadian Welding Bureau to qualification requirements of CSA W 47.1-1973.

1.5 MEASUREMENT PROCEDURES

- .1 Measure supply and erection of chain link baseball backstops to meet or exceed dimensions of existing units to be removed.

1.6 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A53/A53M-[02], Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A90/A90M-[01], Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
 - .3 ASTM A121-[99], Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
 - .4 A653/A653M-[03], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM C618-[03], Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-138.1-96, Fabric for Chain Link Fence.
 - .2 CAN/CGSB-138.2-96, Steel Framework for Chain Link Fence.

- .3 CAN/CGSB-138.3-96, Installation of Chain Link Fence.
- .4 CAN/CGSB-138.4-96, Gates for Chain Link Fence.
- .5 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-A23.1/A23.2-00(August 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-A3000-98(R2002), Cementitious Materials Compendium. Includes:
 - .1 CAN/CSA-A23.5-98, Supplementary Cementing Materials
- .4 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .6 The Master Painters Institute (MPI) - Architectural Painting Specification Manual - [March 1998].
 - .1 MPI # 18, Organic Zinc Rich Primer.
- .7 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.7 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Provide adequate and suitable facilities for storage and protection of fencing and be responsible for any loss of, or damage to, when handling and delivering.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
- .5 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Consultant.
- .6 Divert unused concrete materials from landfill to local facility as approved by Consultant.

- .7 Unused paint or coating material must be disposed of at official hazardous material collections site as approved by Consultant.
- .8 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .9 Fold up metal banding, flatten and place in designated area for recycling.

1.10 SHOP DRAWINGS

- .1 Submit Shop Drawings and/or Catalogue Illustrations in accordance with Section 01 33 00 – Shop Drawing, Product Data and Samples.

Part 2 Products

2.1 MATERIALS

- .1 Fencing: chain-link fencing fabric, posts, hardware, etc. to be supplied from one manufacturer as a complete, co-ordinated system.
 - .1 As supplied by Town & Country Fencing, Guelph, Tel.: (519) 822-8929.
- .2 Concrete mixes and materials:
 - .1 To CAN3-A23.1-M77.
 - .2 Compressive Strength: 20 Mpa minimum at 28 days.
 - .3 Footings: 400 mm minimum diameter -, 1500 mm minimum depth at terminal or gate posts.
- .3 Chain-link fence fabric: to CGSB/CAN2-138.1-M80.
 - .1 Woven steel wire fabric for Baseball backstops as follows:
 - .1 Mesh Size: 50 mm x 50 mm
 - .2 Wire Gauge: **6 gauge for back panel** and 9 gauge for sides and top sections
 - .3 Top and Bottom Selvage: “Twisted and Knuckled” (TK)
 - .4 Height of Fabric: to meet school Board standards and match existing to be removed and replaced.
 - .2 Wire to be treated and finished as follows:
 - .1 Hot dipped galvanized.
- .4 Posts and rails: to CGSB/CAN2-138.2-M80+Amdt-June-82, galvanized steel pipe to ASTM A120 Schedule 40. Pipe sizes as follows:
 - .1 Terminal End and Corner and Gate Posts: 100 mm (4” in) diameter.
 - .2 Top Rail, Gate Frames, Brace Rails, Bottom Rail: 43 mm (1-11/16 in) diameter.
 - .3 Posts and rails to be hot dipped galvanized. Prior to application of finish, treat with Parker Bondertie and chlorothenesolvent applied in a thickness of 4-5 mils by electrostatic coat and oven cured for smooth and even surface.

- .5 Tie wire fasteners: single strand, galvanized steel wire conforming to requirements of fence fabric, 9 gauge.
- .6 Tension bar: 5 x 20 mm minimum size galvanized steel.
- .7 Tension bar bands: 3 x 20 mm minimum size galvanized steel or 5 x 20 mm minimum size aluminum.
- .8 Fittings and hardware: cast aluminum alloy, galvanized steel or malleable or ductile cast iron. Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail (line posts). Turnbuckles to be drop forged.

2.2 FINISHES

- .1 Galvanizing:
 - .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2.
 - .2 For pipe: 550 g/m² minimum to ASTM A90.
 - .3 For other fittings: to CAN/CSA-G164.
- .2 Locations: all locations noted on Drawings SP01 & LP1.

2.3 FABRICATION

- .1 Wire fabric shall be woven into 38 mm mesh with top of fabric barbed and bottom knuckled. Fabric shall be hot-dip galvanized after weaving.
- .2 All posts to be complete with necessary fittings and hardware.
- .3 Gate frames and braces shall be electrically welded at all joints and hot-dip galvanized after welding, and complete with malleable iron hinges, latch and latch catch.
- .4 Gate latches are to be designed such that padlock can be attached and operated from either side of gate.
- .5 Double gates are to have centre rest with drop bolt for closed position and chain hook to hold gates open.

Part 3 Execution

3.1 ERECTION

- .1 Ensure new foundations for basketball backstops as minimum shall be 400 mm x 400 mm concrete, 1,500 mm deep below the lowest adjoining grade. **Terminate concrete posts minimum of 150 mm below grade for safety.**
- .2 All posts shall be placed in a vertical plumb position and set accurately to line shown on Drawings.

- .3 Ensure grade is adjusted to allow bottom rail flush with grade with no gaps more than 25 mm.

3.2 TOUCH UP

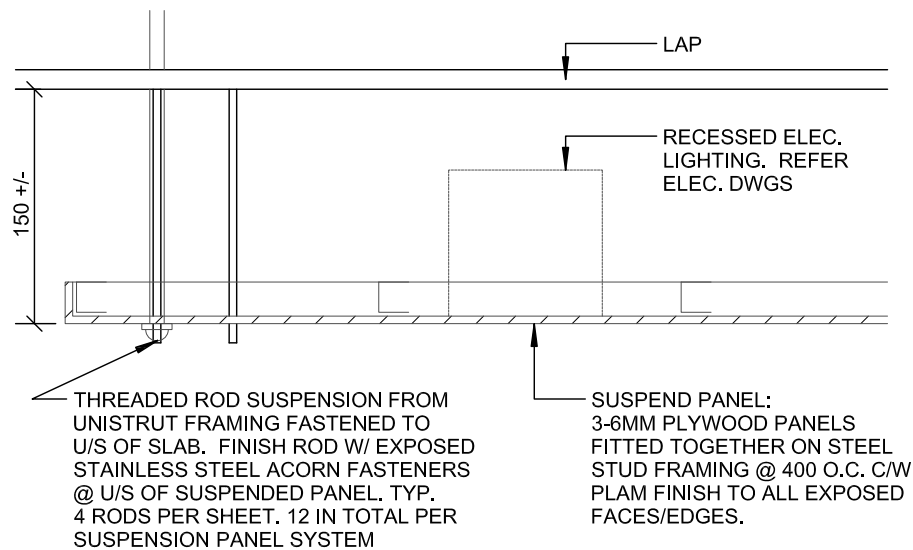
- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas as indicated. in accordance with Section 09 91 13 - Exterior Painting.
 - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

3.3 CLEANING

- .1 Clean and trim areas disturbed by operations.
 - .1 Dispose of surplus material, fittings, excess hardware tec., and replace damaged turf with sod. Rake surface pea gravel and remove and replace any surface pea gravel contaminated by soil or broken concrete.

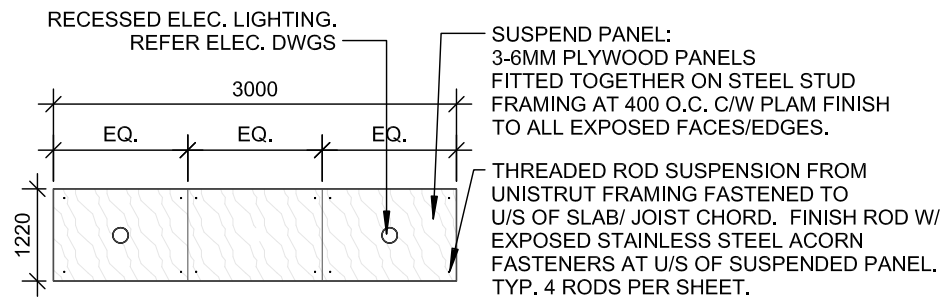
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SECTION

SCALE 1 : 50



PLAN

SCALE 1 : 100

CEILING PANEL DETAILS

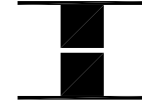
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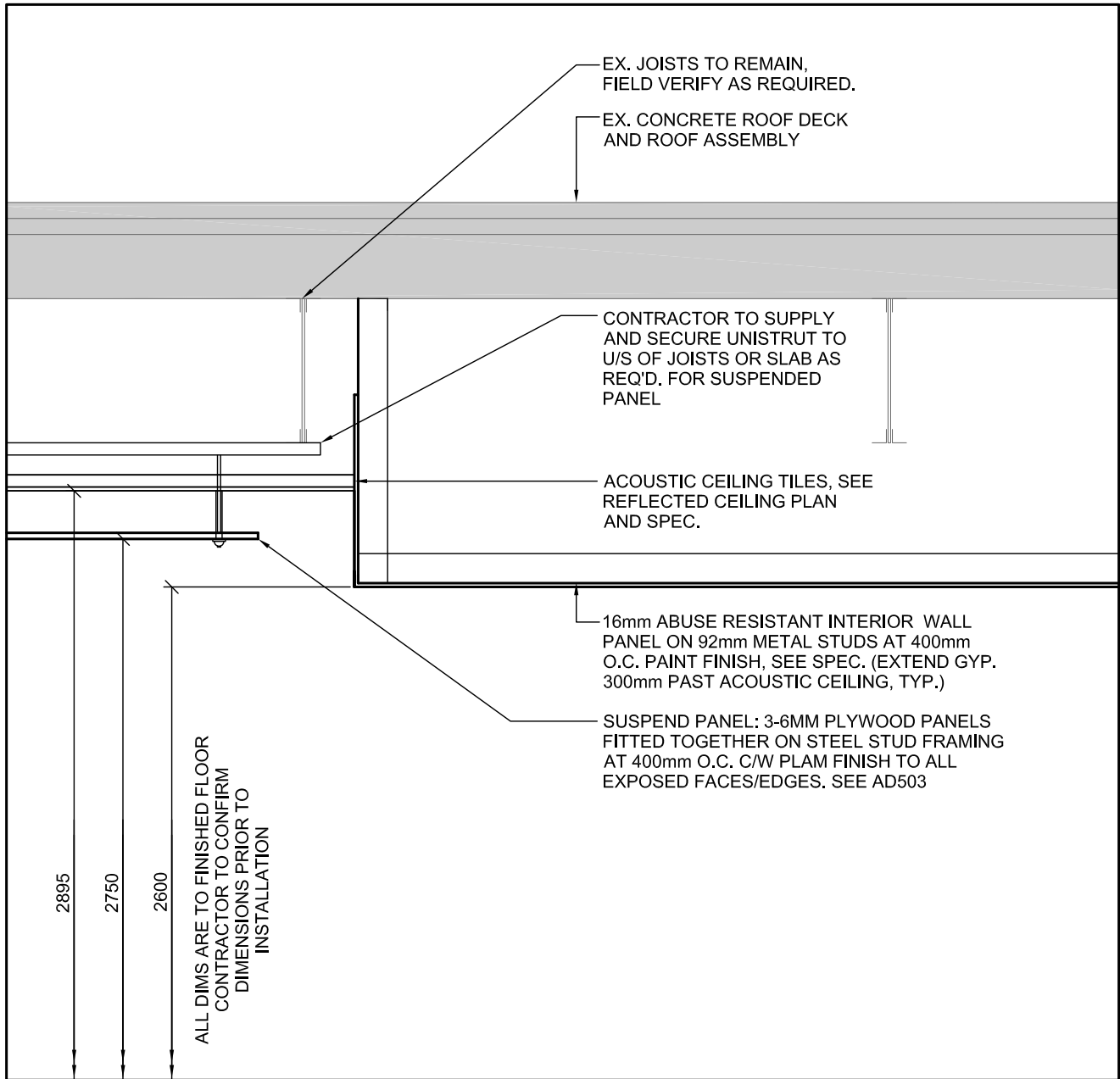
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& ASSOCIATES**
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CEILING DETAILS

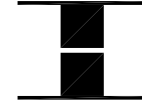
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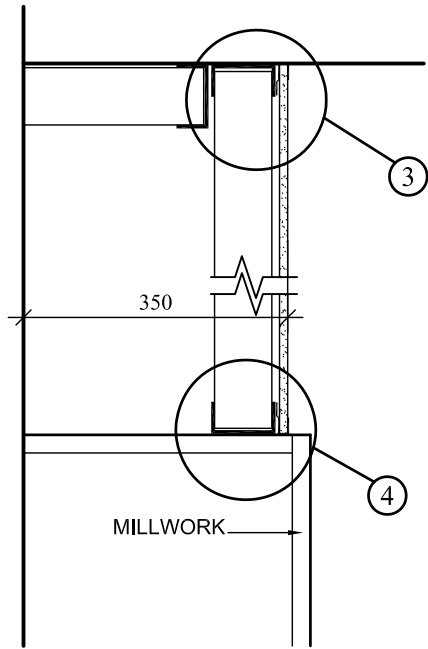
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& ASSOCIATES**
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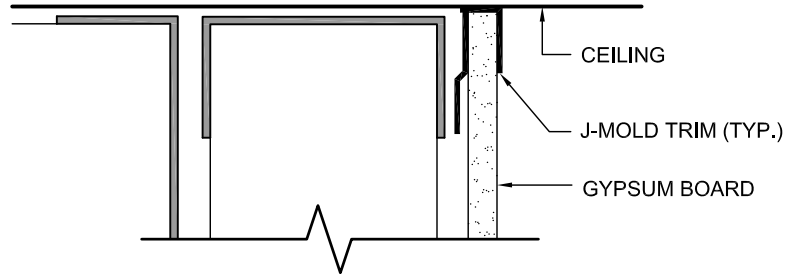
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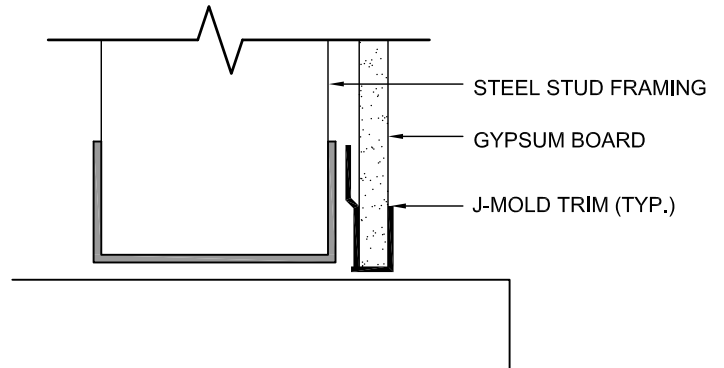
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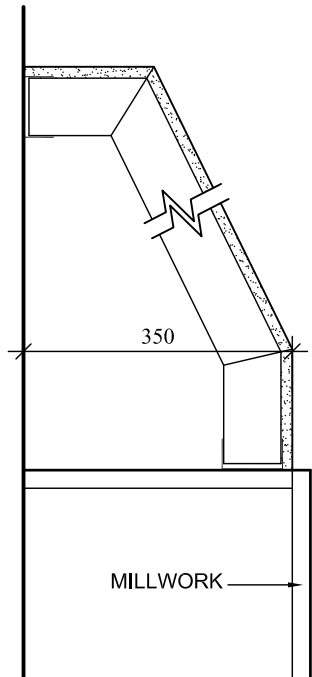
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3



SECTION DETAIL

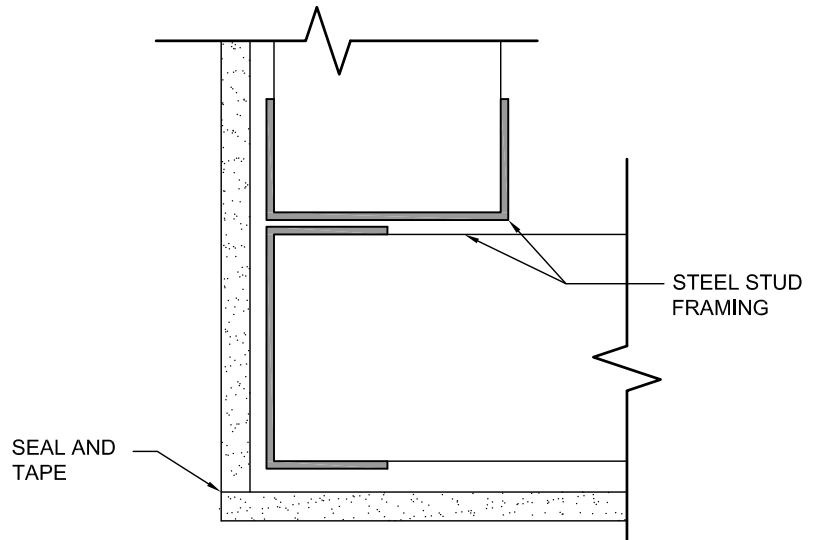
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SECTION

2

NOTE: PROVIDE WHEN MILLWORK
IS INSTALLED IN SPACE GREATER
THAN 1 STOREY



PLAN DETAIL

5

GYPSUM BOARD BULKHEAD DETAIL AT UPPER
MILLWORK, SEE INTERIOR ELEVATIONS

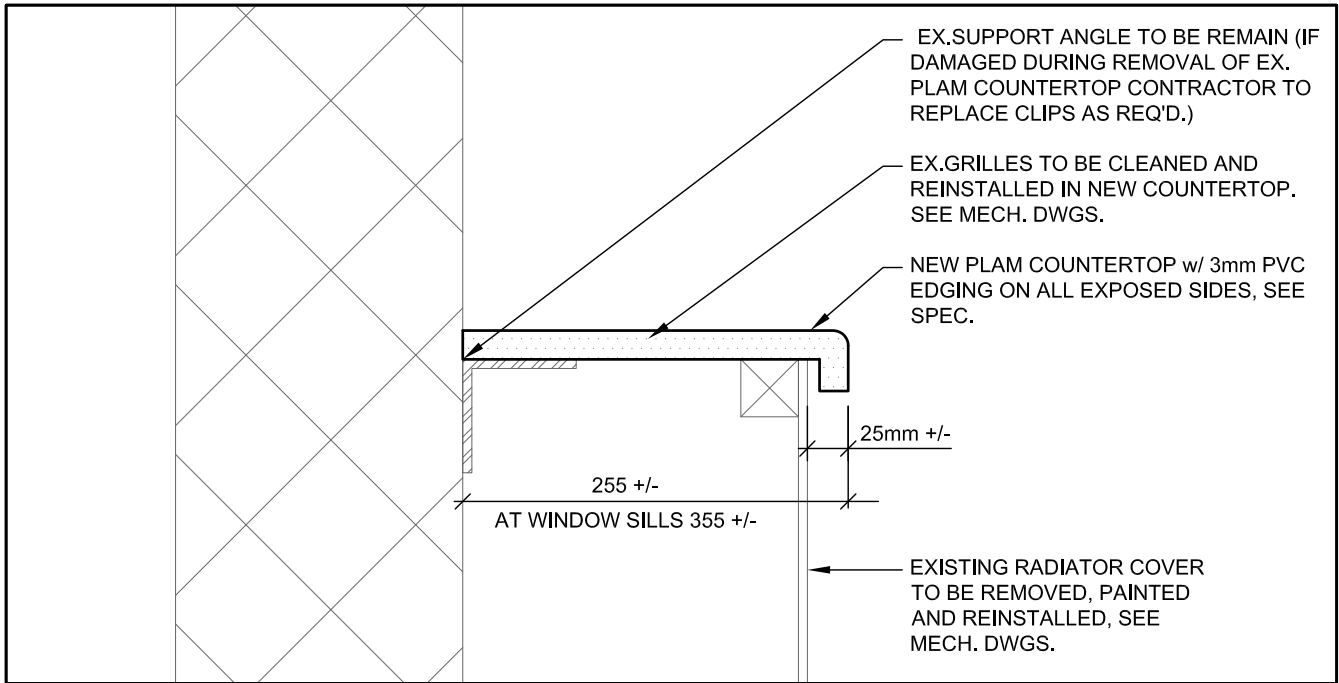
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& ASSOCIATES
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PLASTIC LAMINATE SILL
(FIRST AND SECOND FLOOR)

PROJ: 16127

SCALE: NOTED

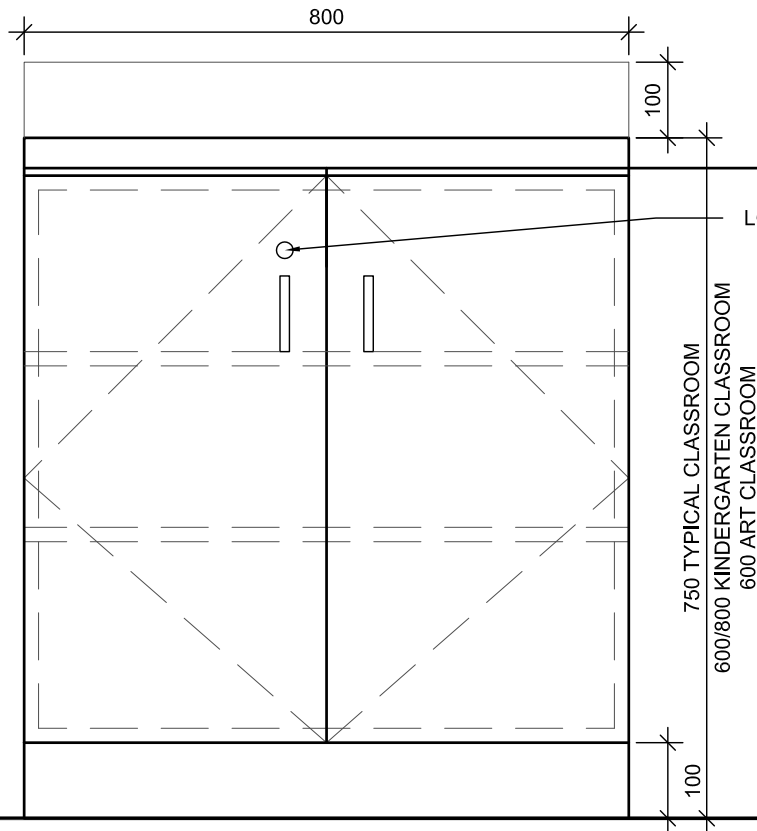
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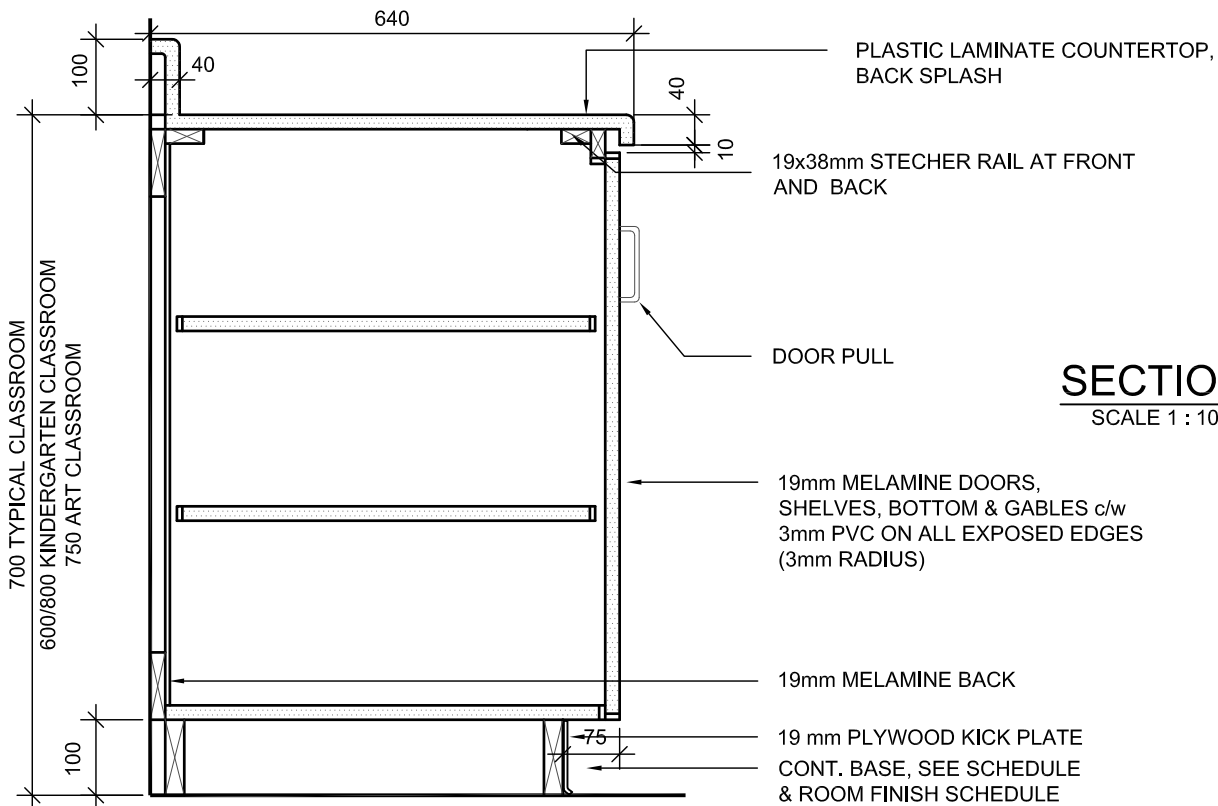
LOCK. SEE SPEC, TYP.

ELEVATION

SCALE 1 : 10

NOTE:

1. REFER TO SPECIFICATION FOR MILLWORK CONSTRUCTION AND HARDWARE.
2. WIDTH VARIES ,REFER TO INTERIOR ELEVATIONS.



SECTION

SCALE 1 : 10

CABINET TYPE B1

PROJ: 16127

SCALE: NOTED

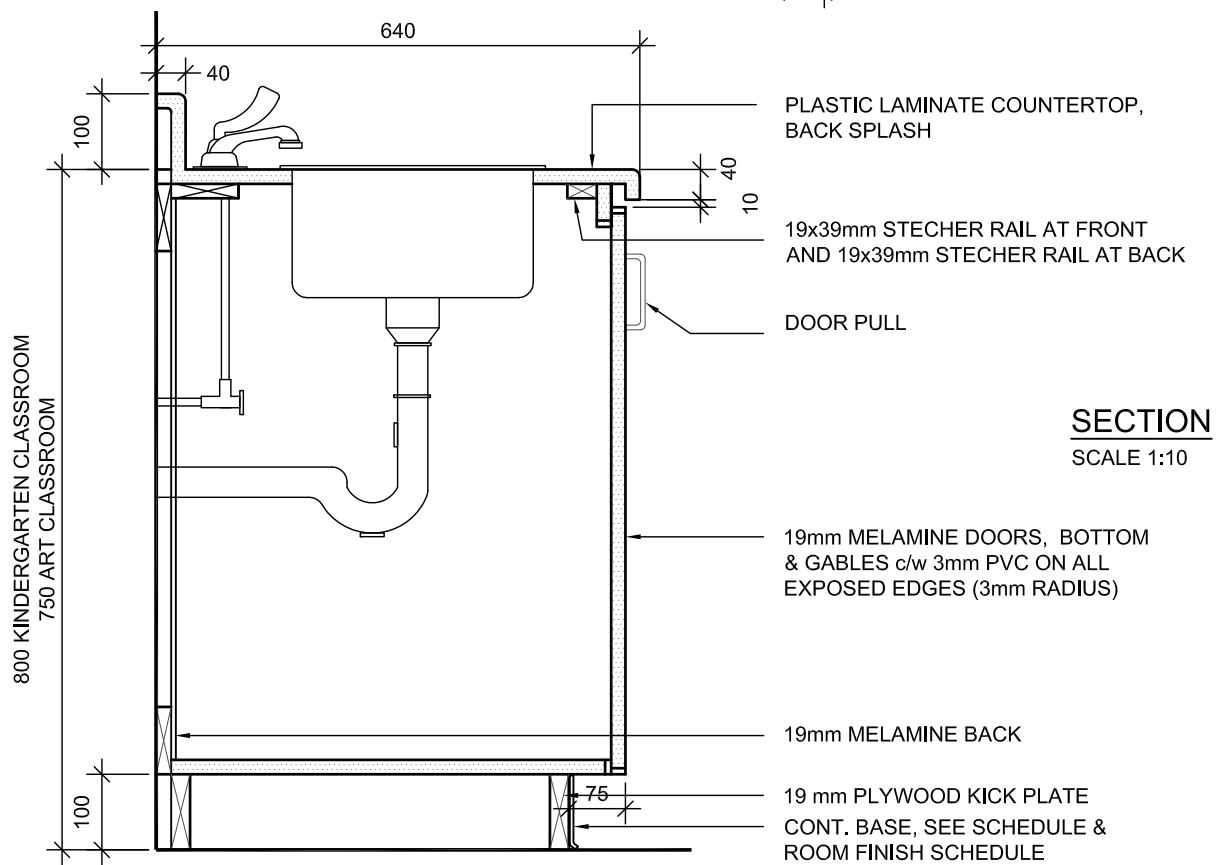
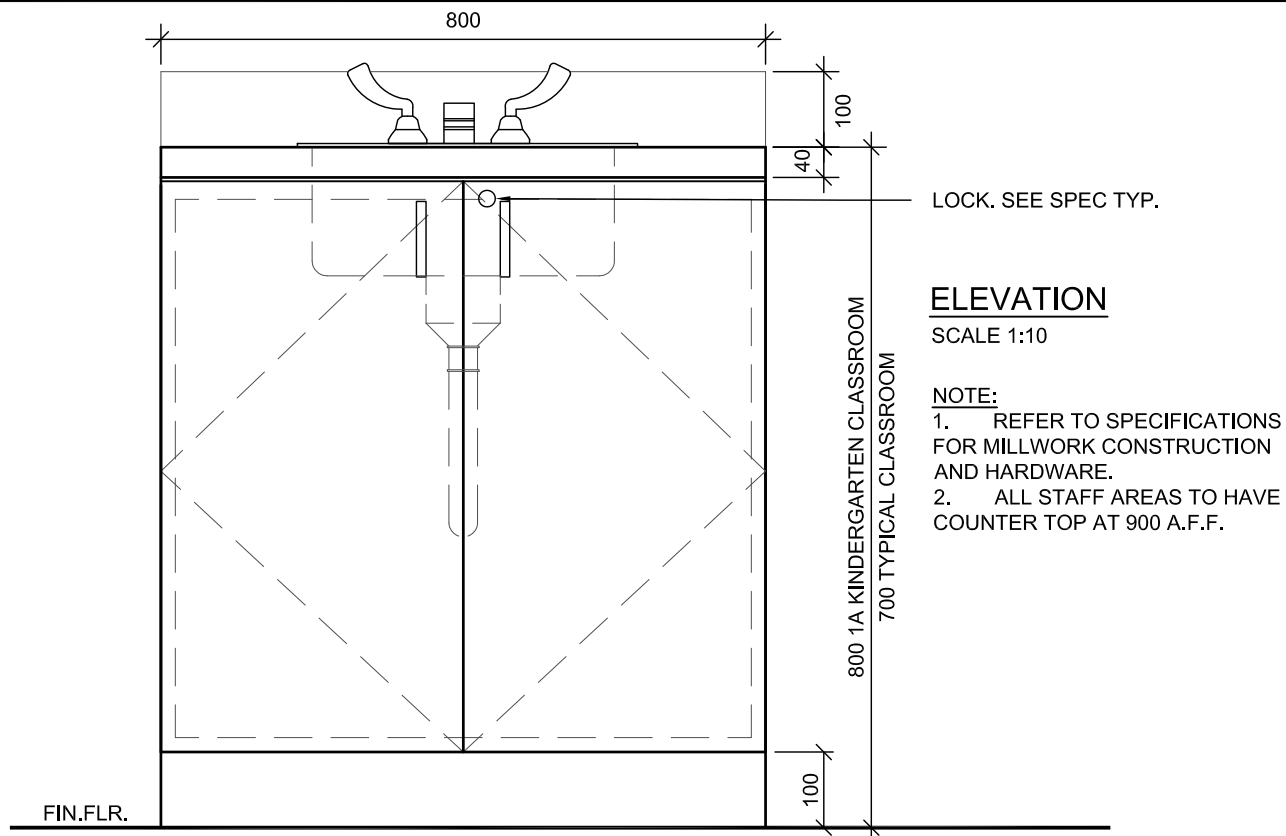
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CABINET TYPE B2

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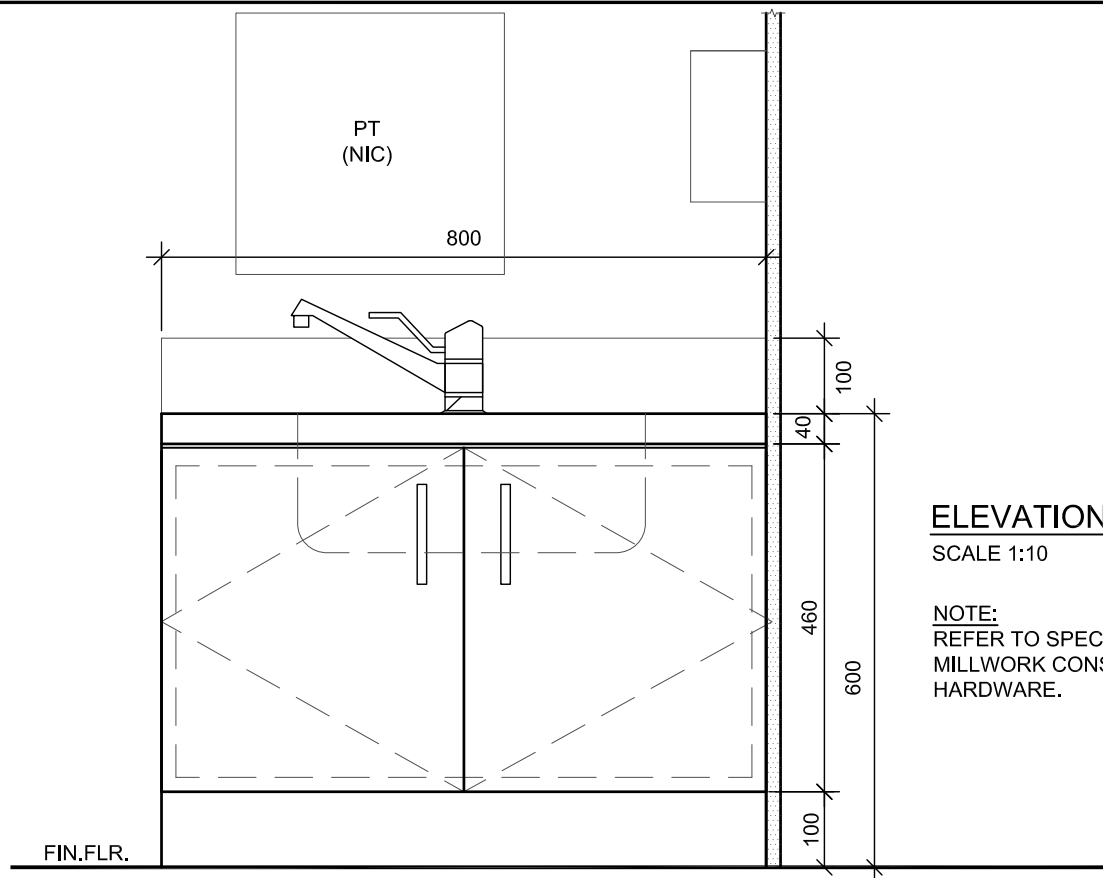
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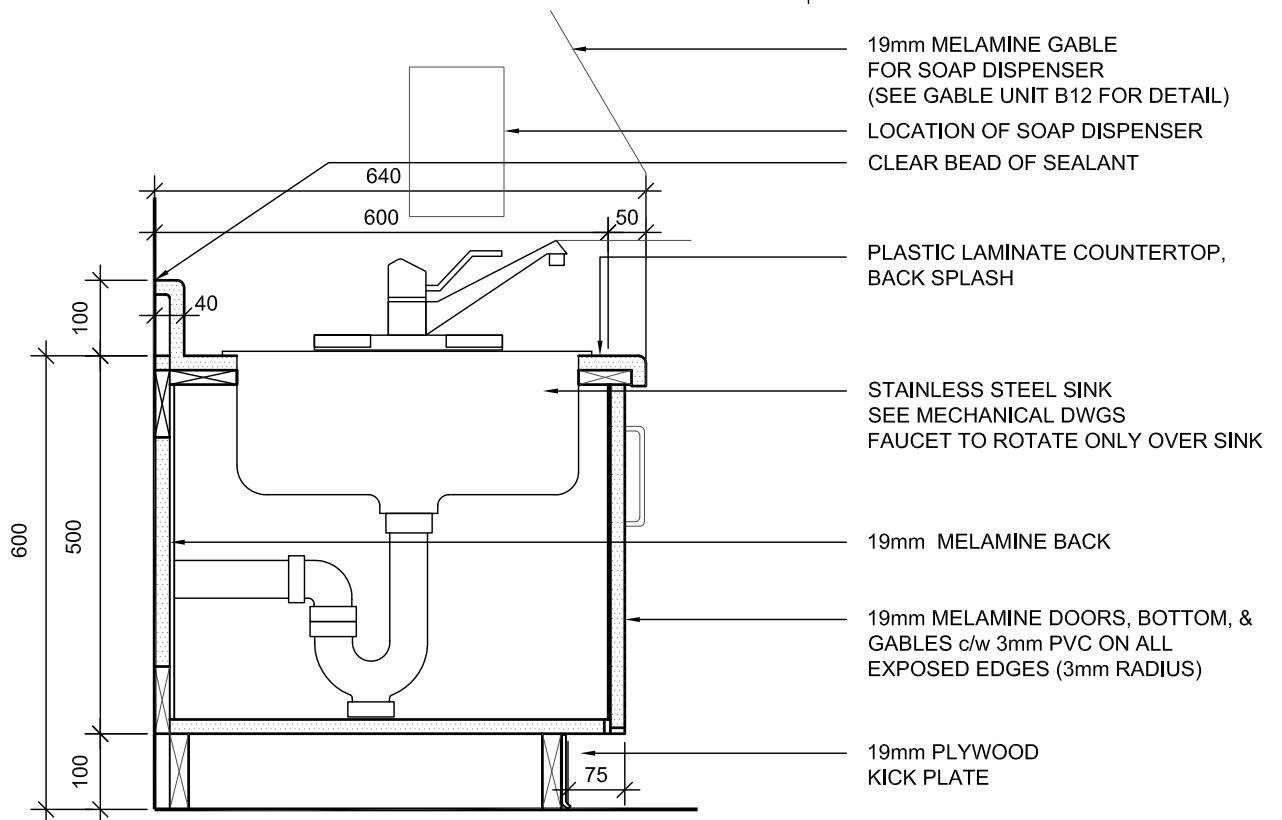
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602



ELEVATION

SCALE 1:10

NOTE:
REFER TO SPECIFICATIONS FOR
MILLWORK CONSTRUCTION AND
HARDWARE.



CABINET TYPE B3
KINDERGARTEN

PROJ: 16127

SCALE: 1:10

DRAWN: CC

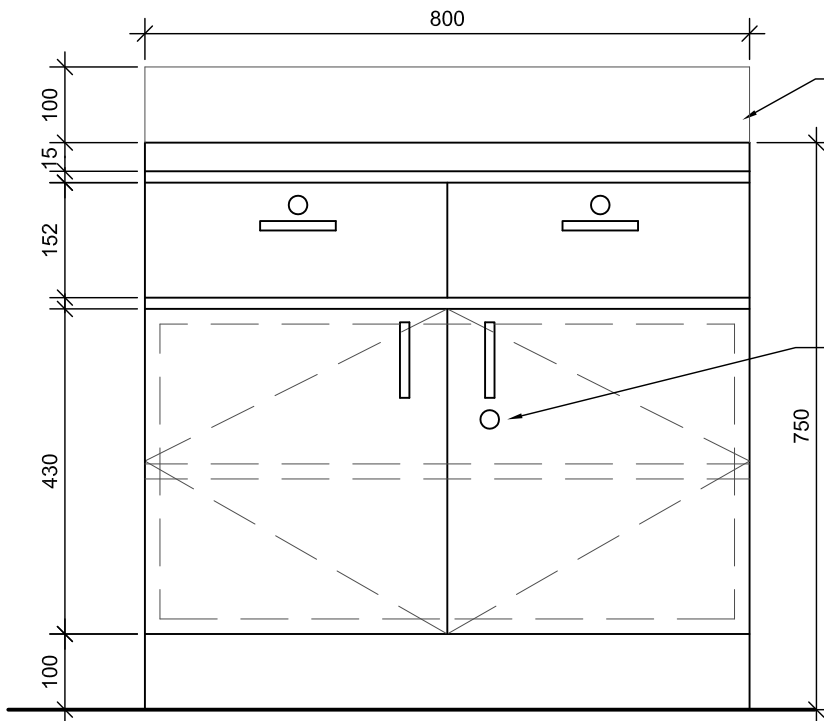
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& ASSOCIATES
ARCHITECTS**



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CONTINUOUS COUNTER
TOP AND BACKSPLASH.
POST FORMED

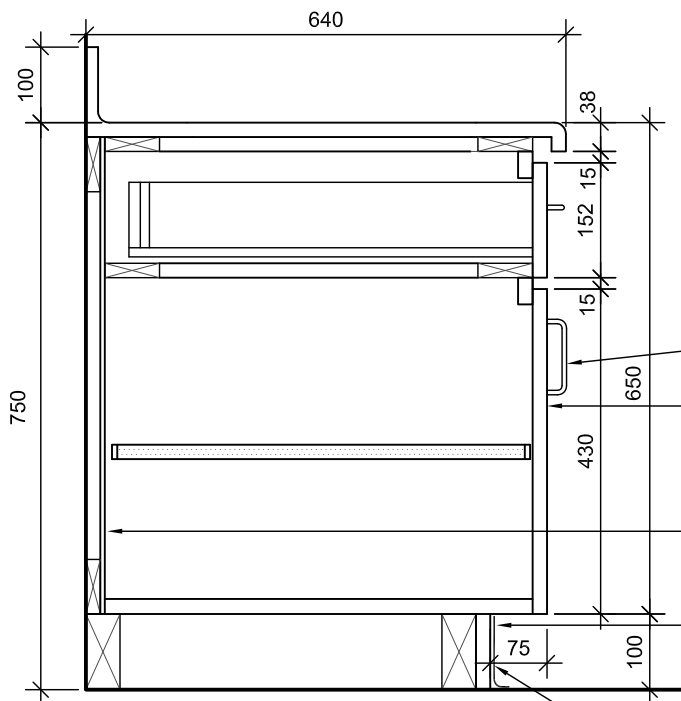
LOCK (TYP.)

ELEVATION

SCALE 1 : 10

NOTE:

1. REFER TO SPECIFICATION FOR MILLWORK CONSTRUCTION AND HARDWARE.
2. WIDTH VARIES ,REFER TO INTERIOR ELEVATIONS.



NOTE:

ALL MILLWORK DOORS AND
DRAWERS TO BE EQUIPT WITH
LOCKS UNLESS OTHERWISE NOTED.

SECTION

SCALE 1 : 10

DOOR PULL

19mm MELAMINE DOORS,
SHELVES, BOTTOM & GABLES c/w
3mm PVC ON ALL EXPOSED EDGES
(3mm RADIUS)

19mm MELAMINE BACK

19 mm PLYWOOD KICK PLATE
CONT. BASE, SEE SCHEDULE
& ROOM FINISH SCHEDULE

RUBBER BASE TYP.

CABINET TYPE B4

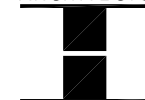
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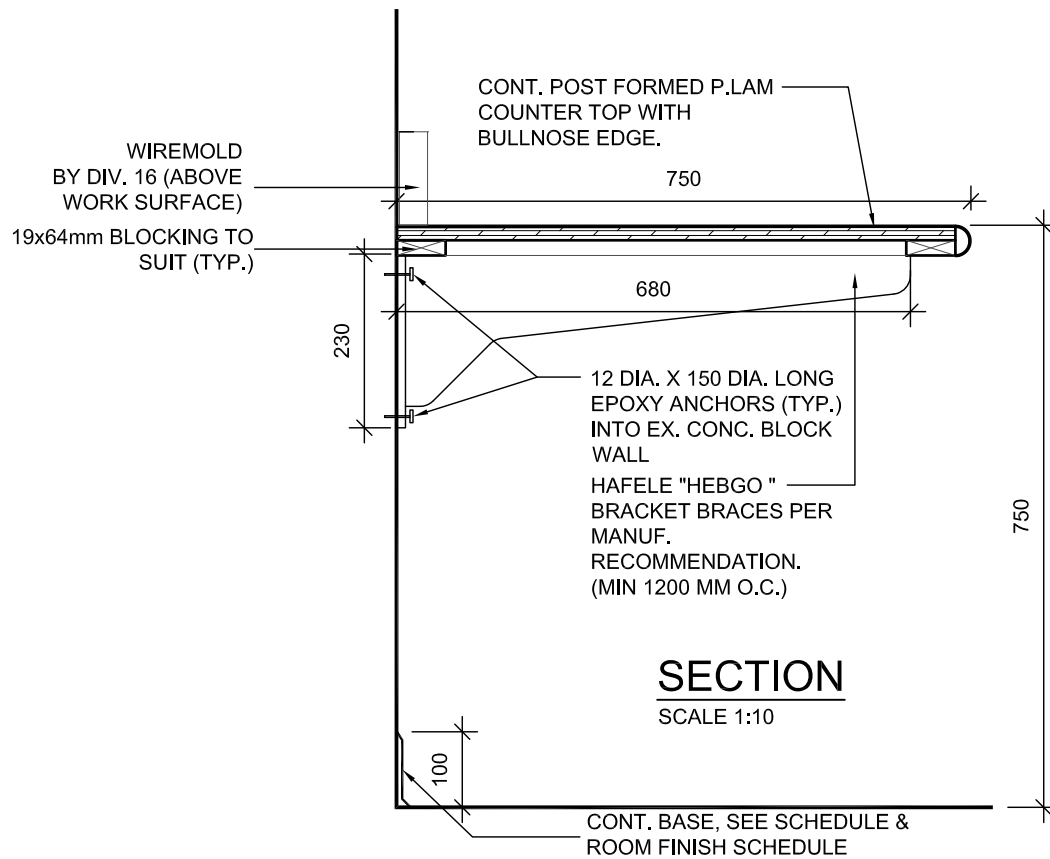
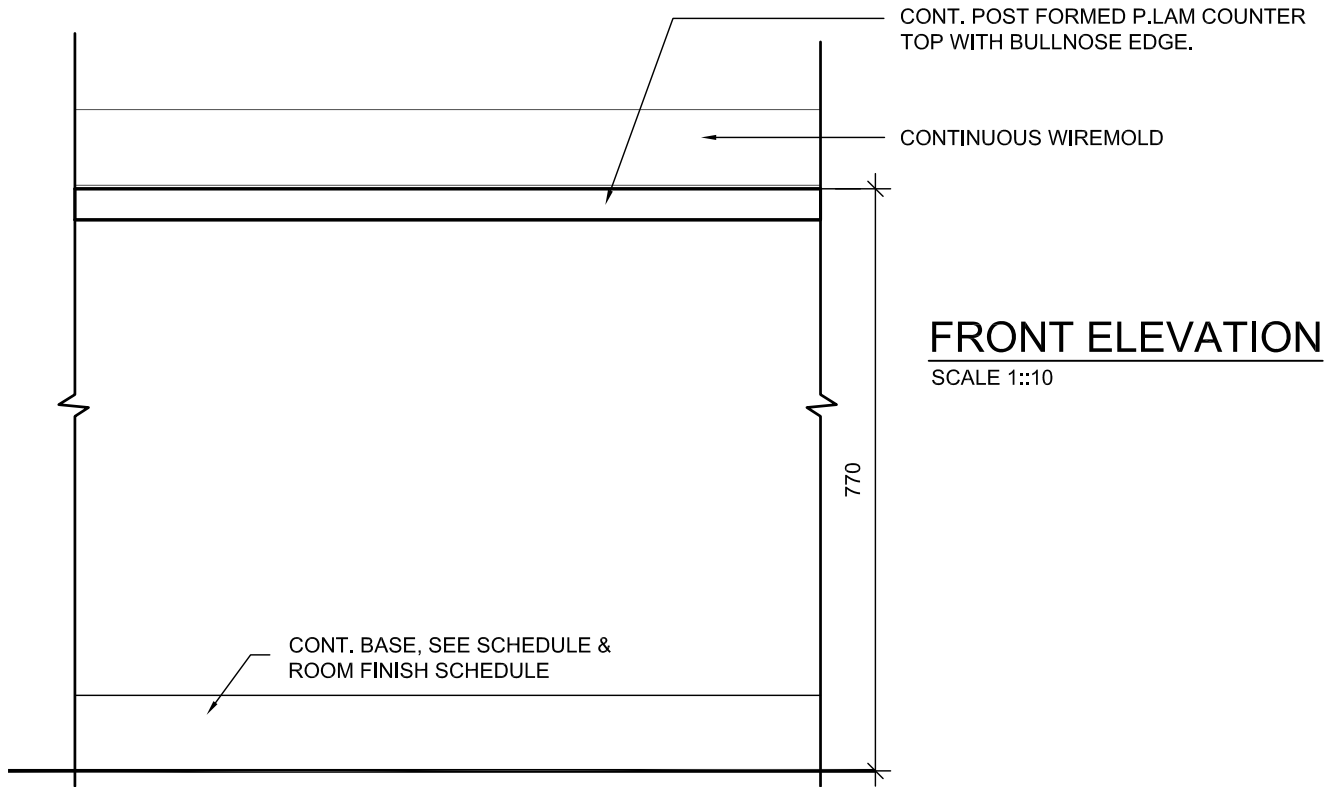
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& ASSOCIATES
ARCHITECTS**



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CABINET TYPE B6
ACTIVITY ROOM COUNTER

PROJ: 16127

SCALE: NOTED

DRAWN: CC

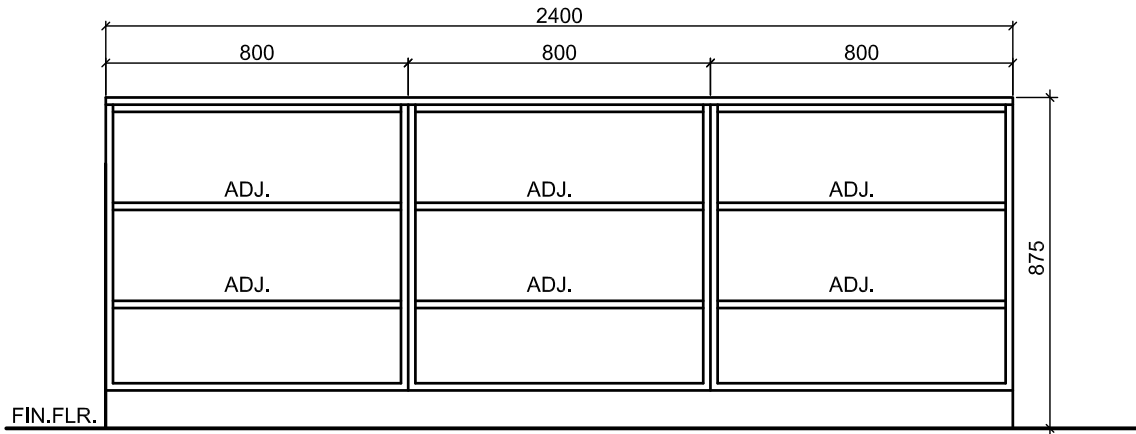
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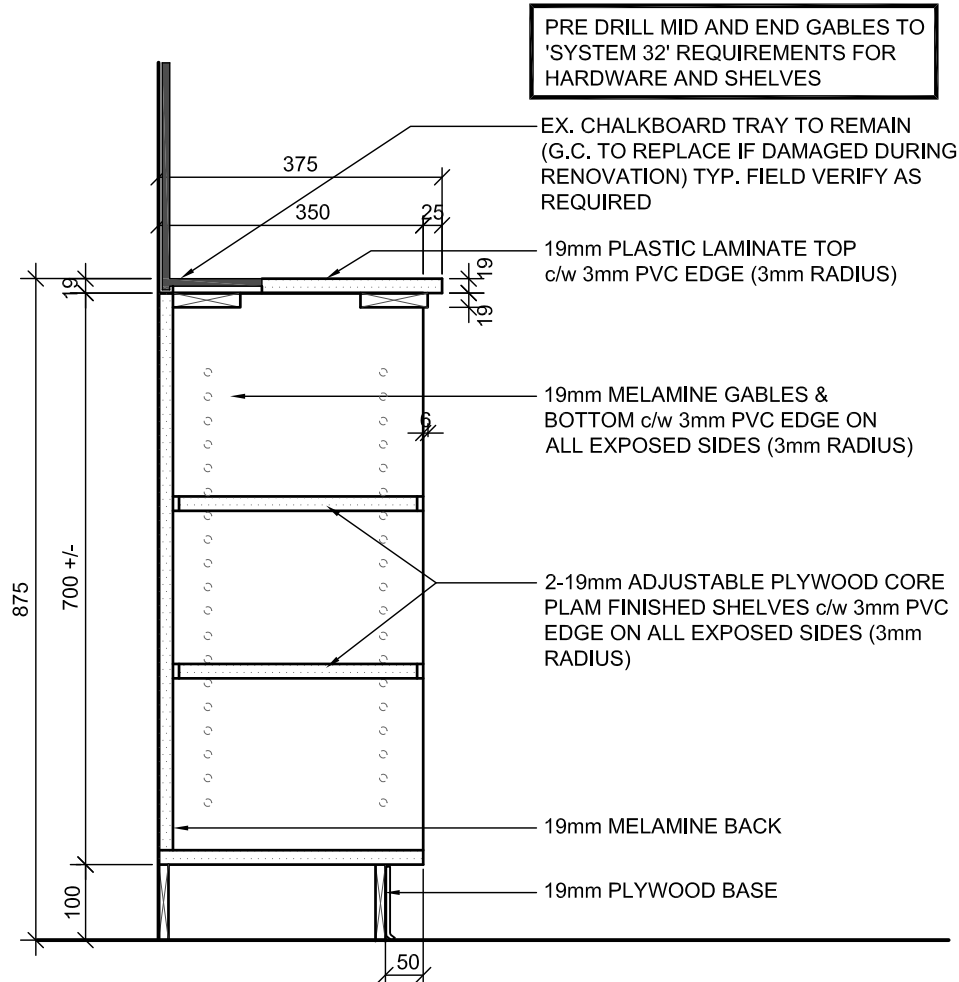


ELEVATION

SCALE 1:20

NOTE:

REFER TO SPECIFICATION FOR MILLWORK
CONSTRUCTION AND HARDWARE.



SECTION

SCALE 1:10

CABINET TYPE B7
KINDERGARTEN OPEN SHELVING

PROJ: 16127

SCALE: NOTED

DRAWN: AH

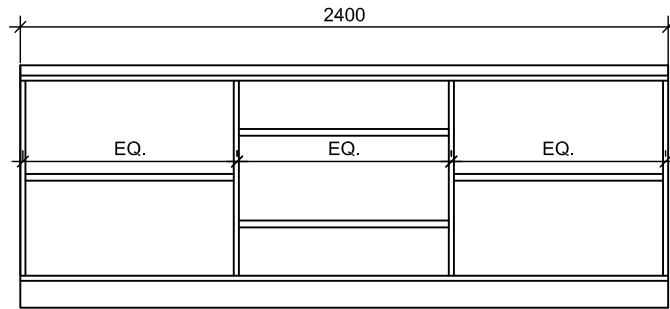
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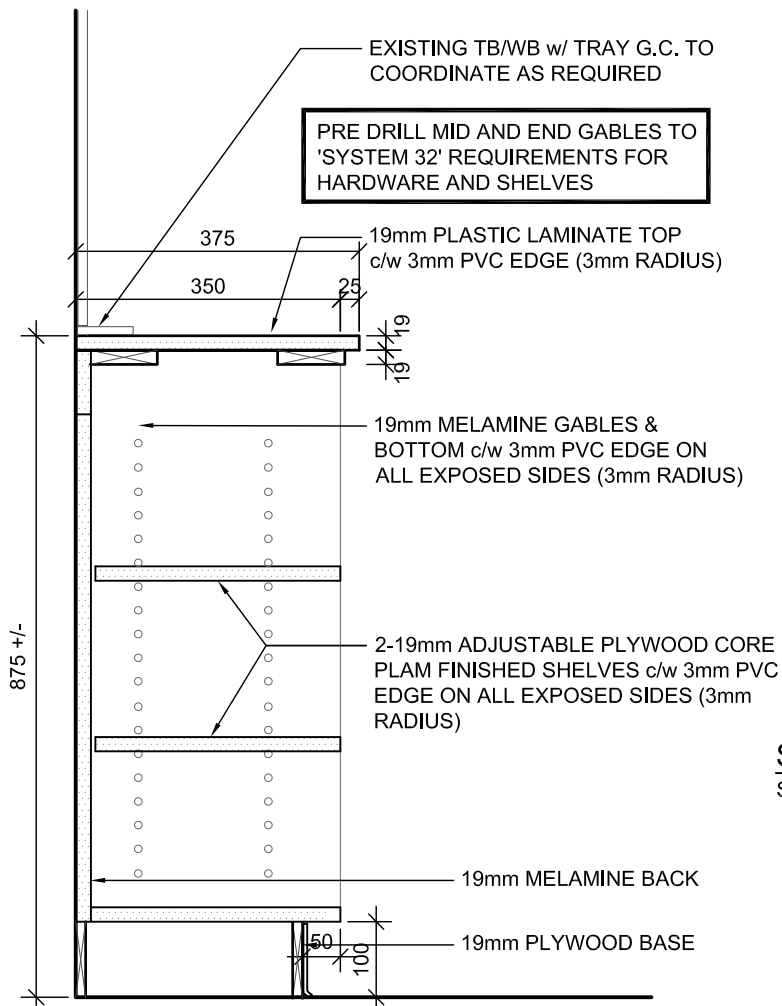


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ELEVATION
SCALE NTS



SECTION
SCALE 1:10

GABLE B9
(LOWER CABINET IN CLASSROOMS)

PROJ: 16127

SCALE: NOTED

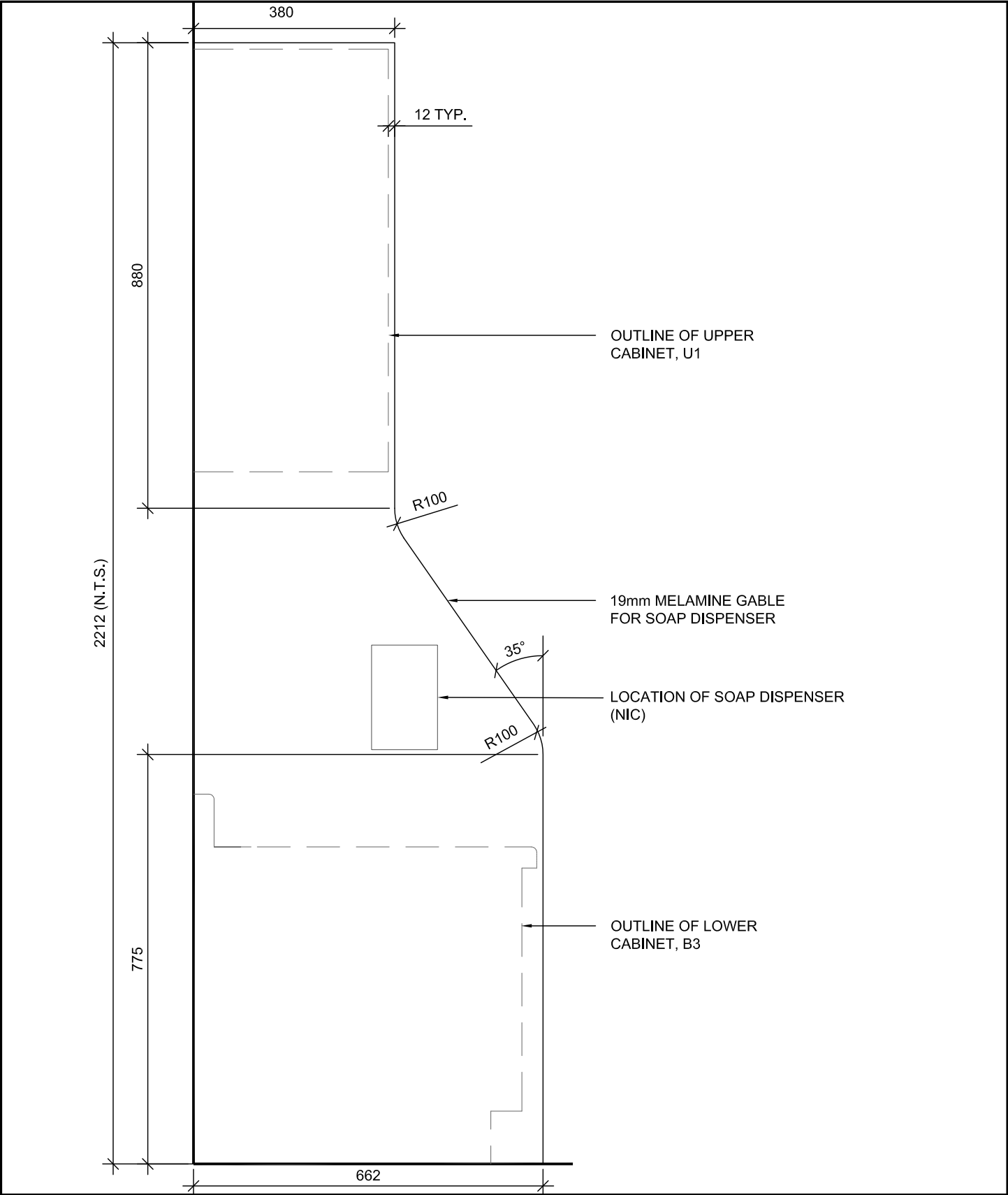
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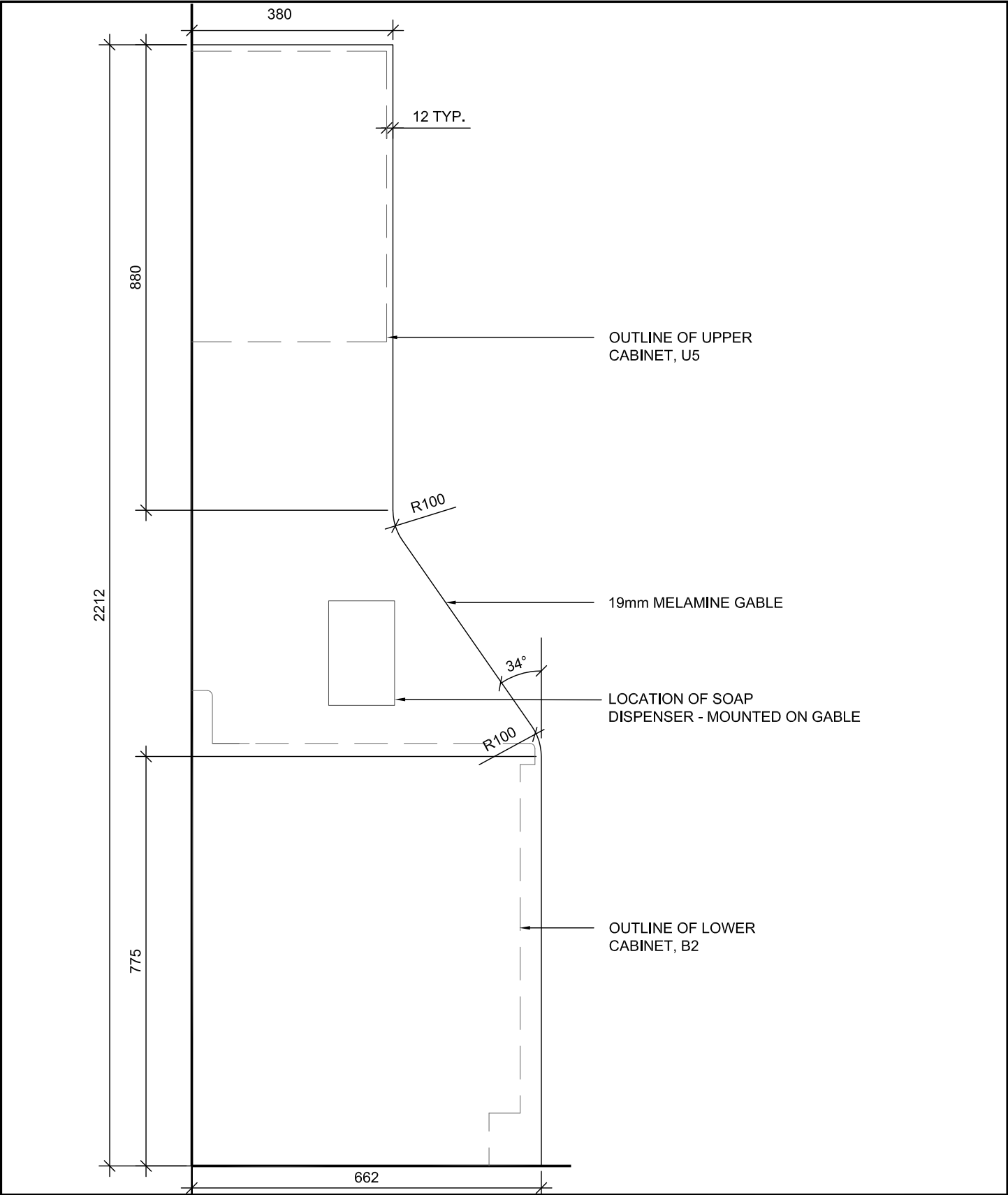
CABINET B12 TYPE B3
KINDERGARTEN

PROJ: 16127
SCALE: NOTED
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GABLE B12 AT CABINET B2

PROJ: 16127

SCALE: NOTED

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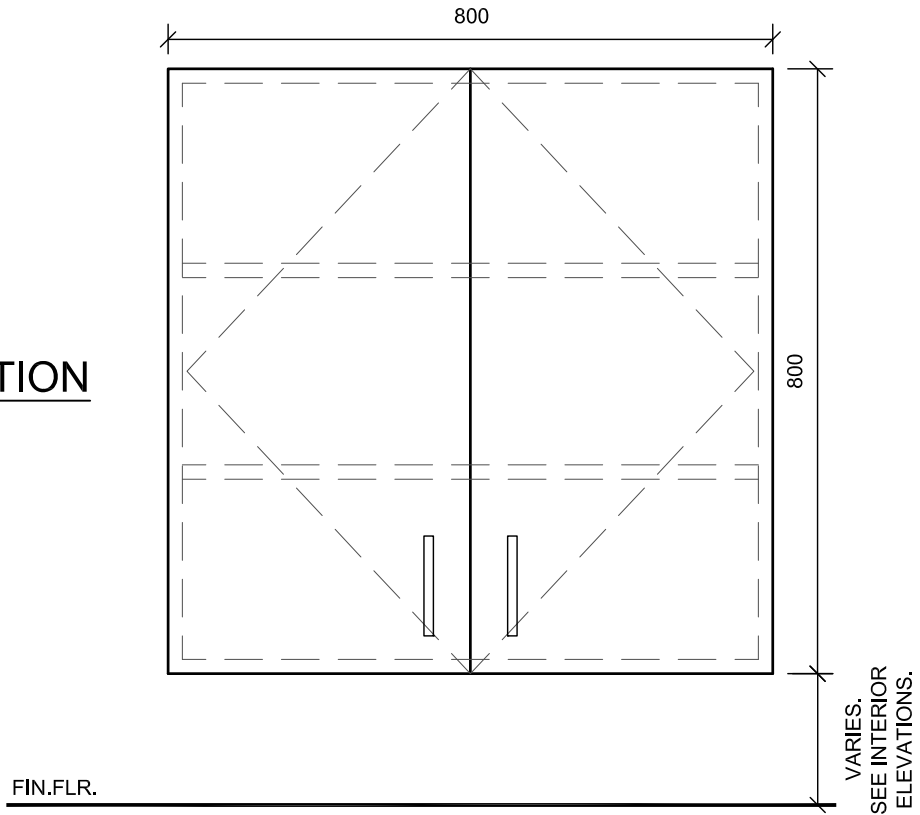
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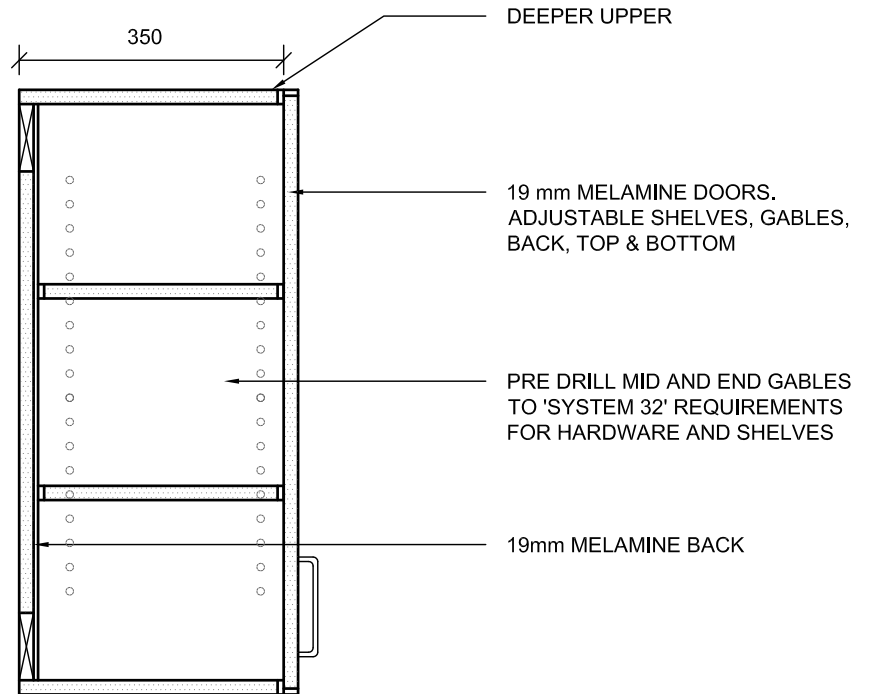
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FRONT ELEVATION



SECTION



NOTE:

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CABINET TYPE U1

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DRAWN: CC

DATE: 17 01 23

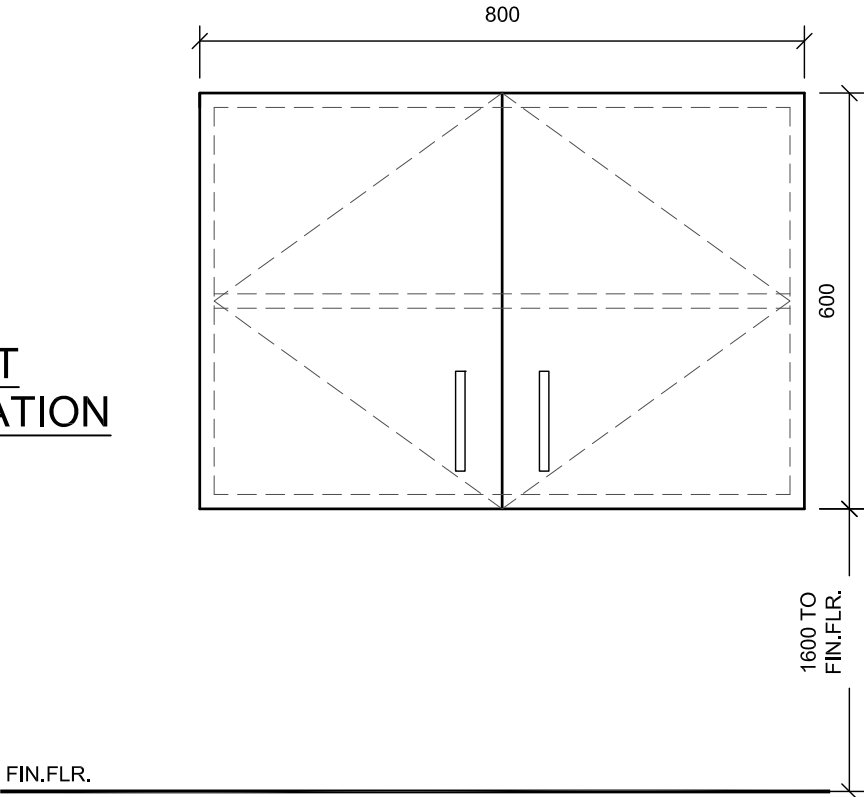
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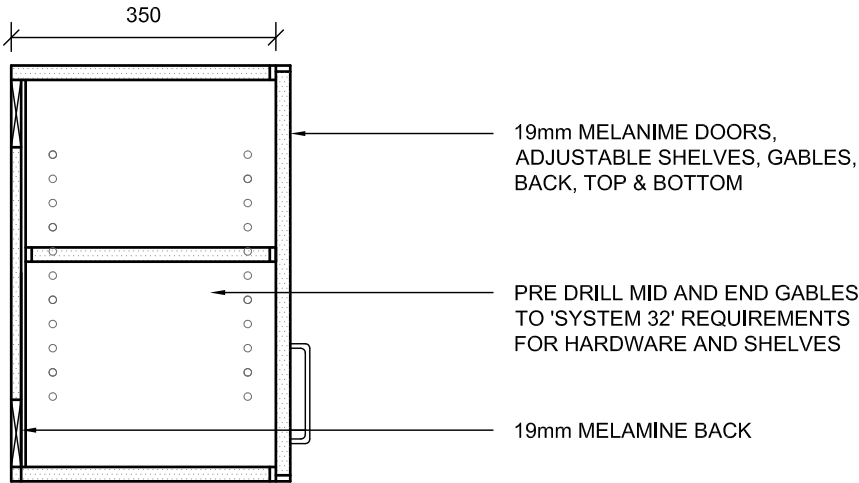
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FRONT ELEVATION



SECTION



NOTE:
REFER TO SPECIFICATION FOR MILLWORK
CONSTRUCTION AND HARDWARE.

CABINET TYPE U5

PROJ: 16127

SCALE: 1:10

DRAWN: BM

DATE: 17 01 23

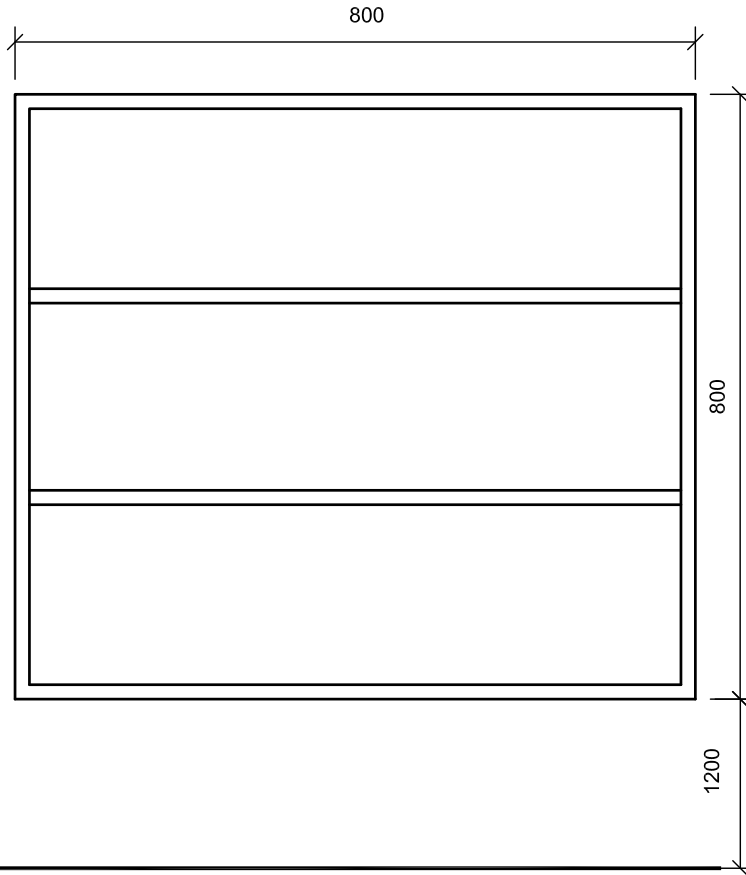


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FRONT ELEVATION

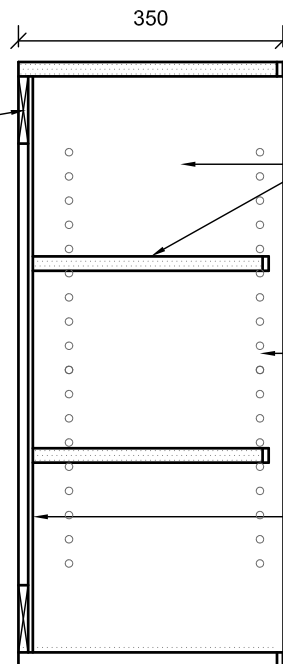
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CONTINUOUS 13x89mm
NAILER STRIPS - TYP. AT
TOP AND BOTTOM

SECTION

SCALE 1:10



19 mm MELAMINE ADJUSTABLE
SHELVES, GABLES, BACK, TOP &
BOTTOM

PRE DRILL MID AND END GABLES
TO 'SYSTEM 32' REQUIREMENTS
FOR HARDWARE AND SHELVES

19mm MELAMINE BACK

NOTE:

REFER TO SPECIFICATION FOR MILLWORK
CONSTRUCTION AND HARDWARE.

CABINET TYPE U7

PROJ: 16127

SCALE: NOTED

DRAWN: DT

DATE: 17 01 23

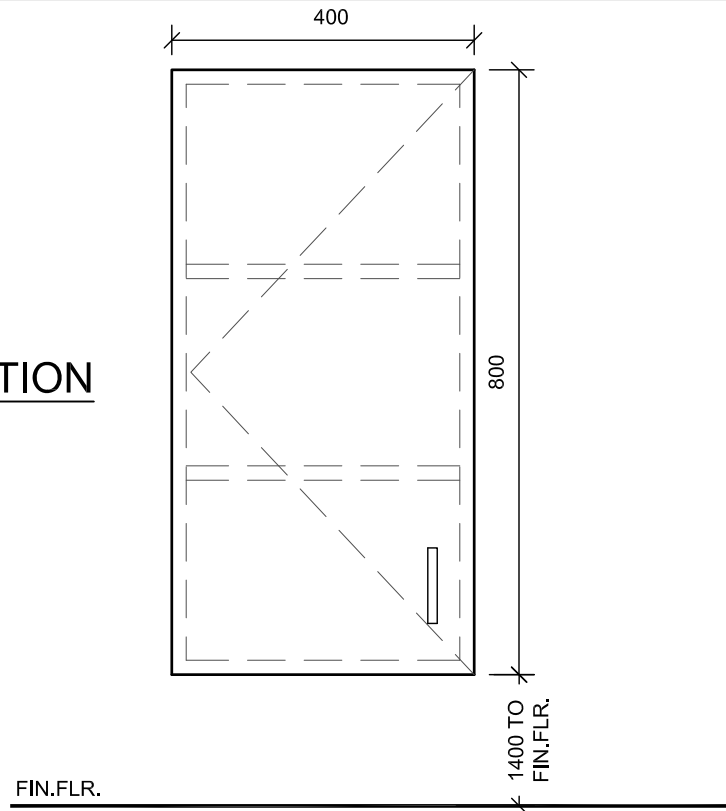


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FRONT ELEVATION

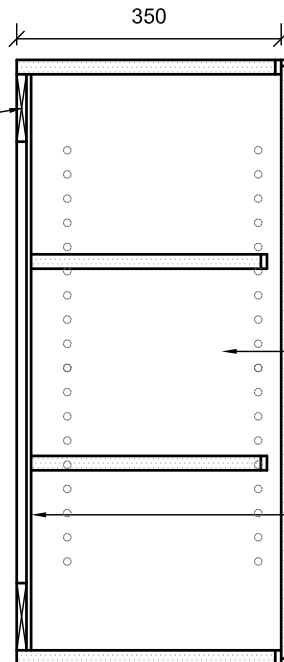
SCALE 1:10



CONTINUOUS 13x89mm
NAILER STRIPS - TYP. AT
TOP AND BOTTOM

SECTION

SCALE 1:10



19 mm MELAMINE DOORS.
ADJUSTABLE SHELVES, GABLES,
BACK, TOP & BOTTOM

PRE DRILL MID AND END GABLES
TO 'SYSTEM 32' REQUIREMENTS
FOR HARDWARE AND SHELVES

19mm MELAMINE BACK

NOTE:

1. REFER TO SPECIFICATION FOR
MILLWORK CONSTRUCTION AND
HARDWARE.
2. WIDTH VARIES IN STAFF LOUNGE -
REFER TO INTERIOR ELEVATIONS

CABINET TYPE U9

PROJ: 16127

SCALE: NOTED

DRAWN: JH

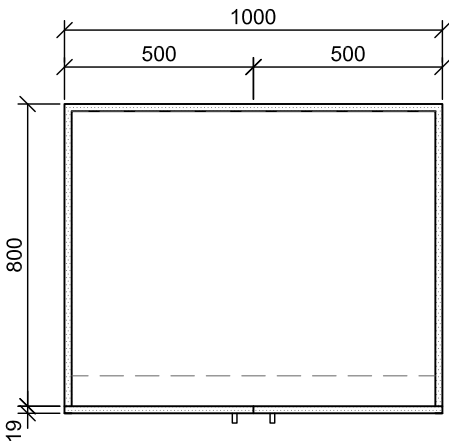
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& ASSOCIATES
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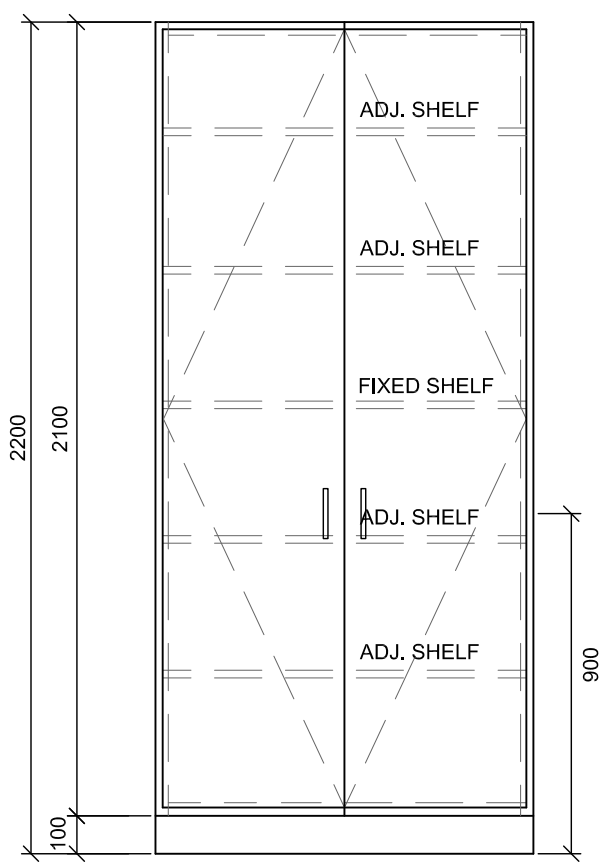


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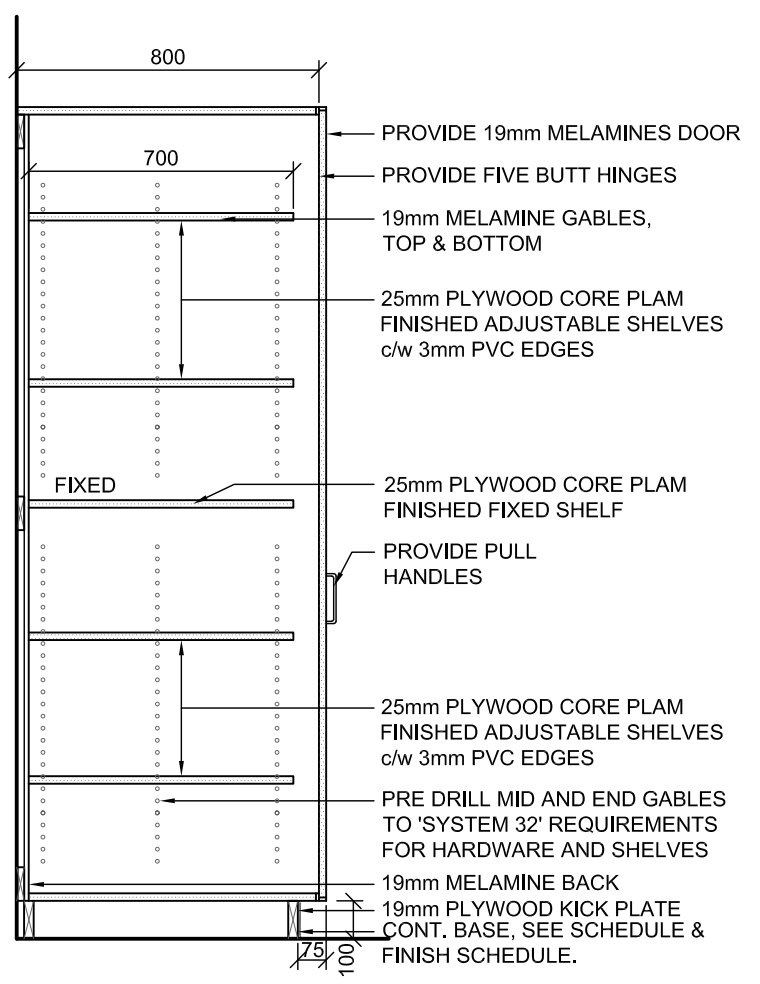
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627



PLAN VIEW

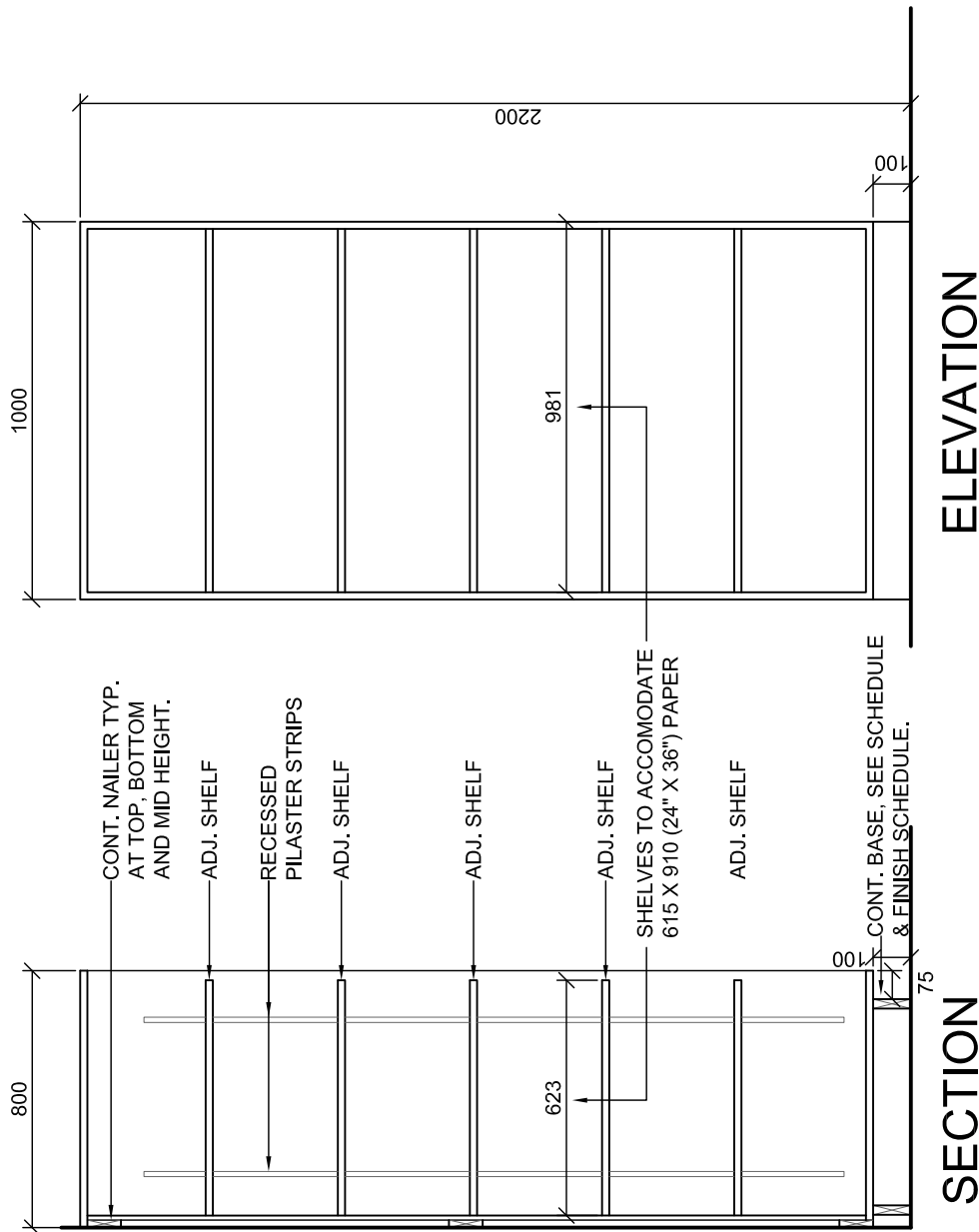


ELEVATION



SECTION

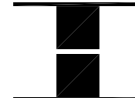
CABINET TYPE C1 TEACHER'S CLOSET	PROJ: 16127	HOSSACK & ASSOCIATES ARCHITECTS 	ISSUE/REV. 00
	SCALE: 1:20		
	DRAWN: BM		AD 630
	DATE: 17 01 23		



TALL OPEN SHELVING TYPE C5

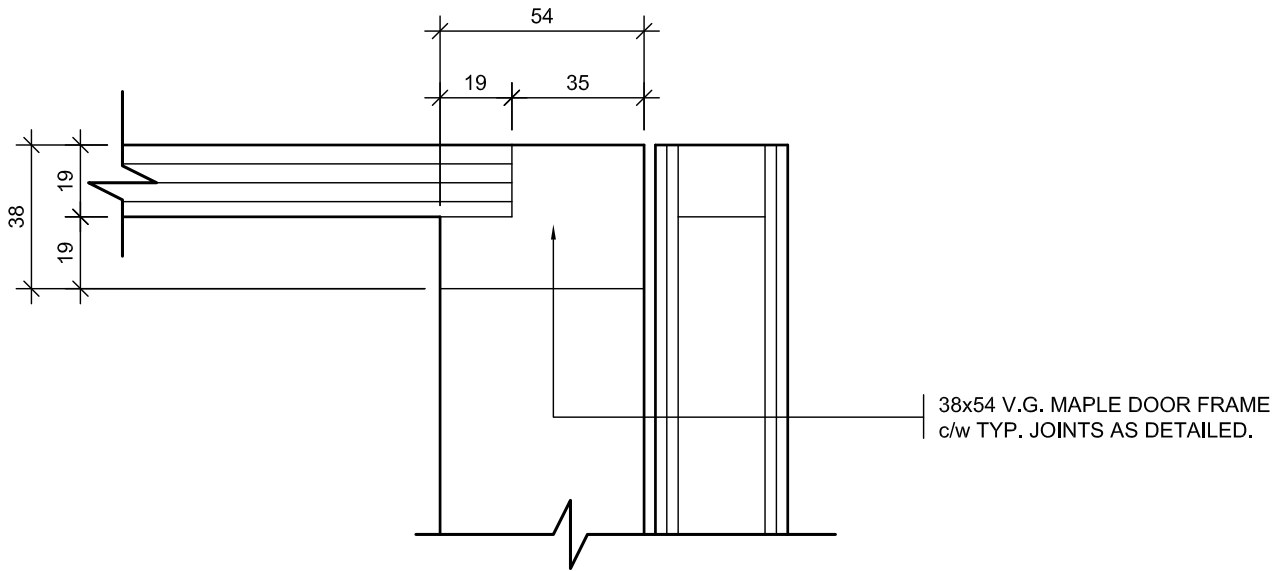
PROJ: 16127
SCALE: 1:20
DRAWN: CC
DATE: 17 01 23

**HOSSACK
& ASSOCIATES**
ARCHITECTS

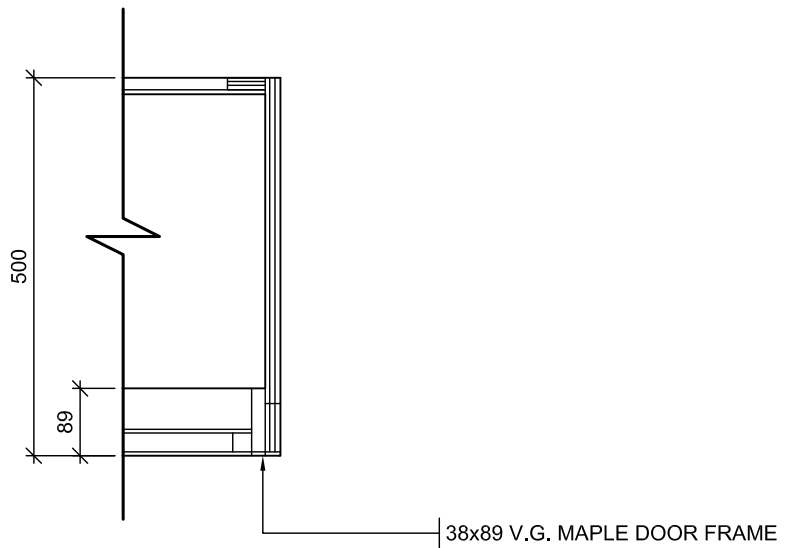


ISSUE/REV.
00

AD
634



SECTION
SCALE 1: 2



PLAN DETAIL
SCALE 1: 10

TYPICAL DETAILS FOR CABINETS
WITH 38mm DOORS

PROJ: 16127

SCALE: NOTED

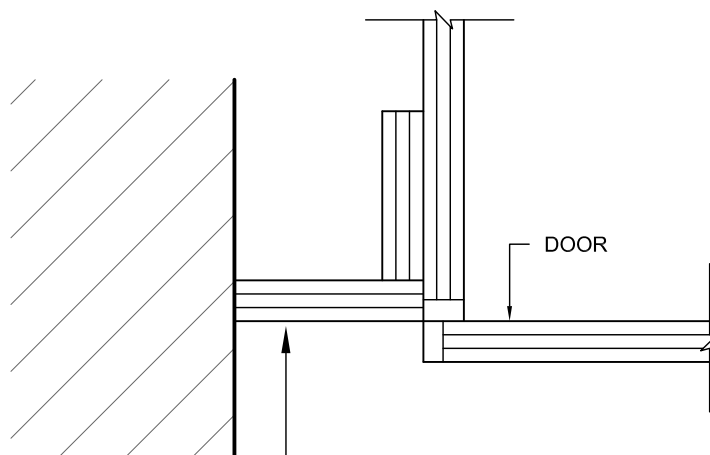
DRAWN: SS

DATE: 17 01 23



ISSUE/REV.
00

AD
652



FILLER STRIP AT ALL MILLWORK/
WALL CONNECTIONS. (TYPICAL).

UPPER CABINETS: PROVIDE AT FRONT, UNDERSIDE AND TOP

LOWER CABINETS: PROVIDE AT FRONT AND BASE

MILLWORK FILLER STRIP DETAIL

PROJ: 16127

SCALE: 1:10

DRAWN: BM

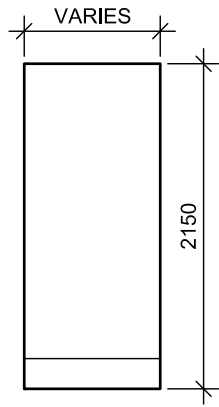
DATE: 17 01 23

**HOSSACK
& ASSOCIATES
ARCHITECTS**

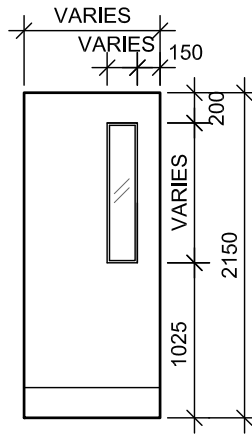


ISSUE/REV.
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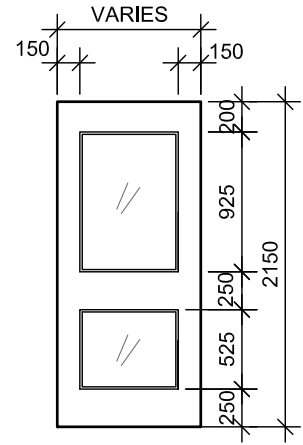
AD
653



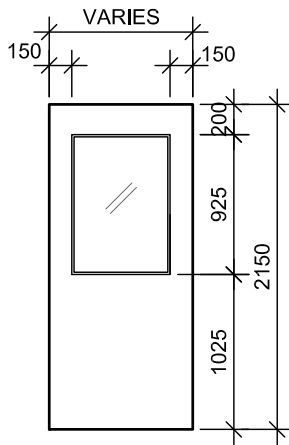
A
WD/HM INT. & EXT.



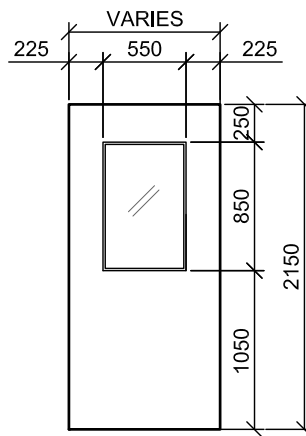
B
WD/HM INT.



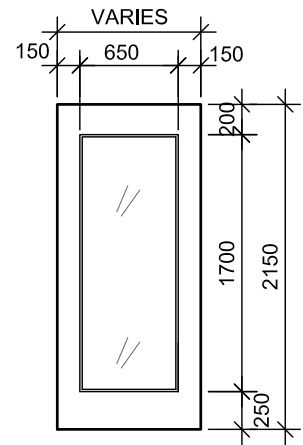
C
HM/INT. & EXT.



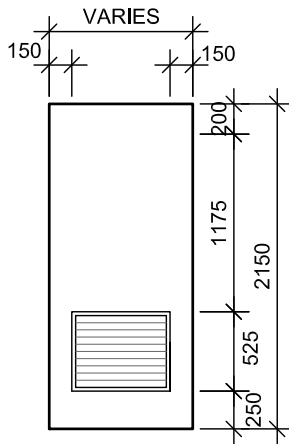
D
HM/INT. & EXT.



E
HM INT & EXT.



F
HM/INT. & EXT.



G
WD/INT.

GENERAL NOTE:

1. DOOR LITE DIMS ARE +/- AND SHOULD BE VERIFIED IN FIELD PRIOR TO RENOVATION
2. ALL EXISTING LITES SHOWN ARE EX.GWG AND SHALL HAVE NEW SAFETY GLASS FILM INSTALLED. SEE SCHEDULE & SPEC.

DOOR TYPES

PROJ: 16127

SCALE: 1:50

DRAWN: CT

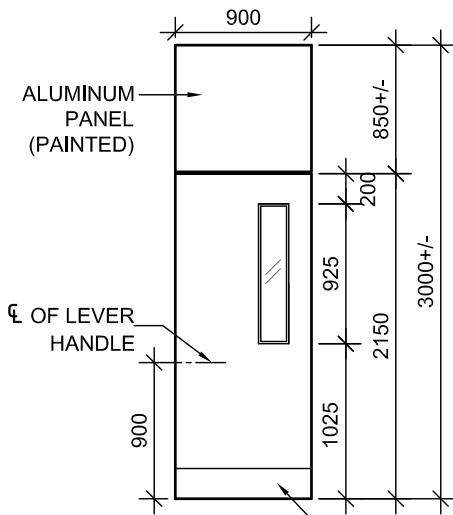
DATE: 17 01 23

**HOSSACK
& ASSOCIATES
ARCHITECTS**



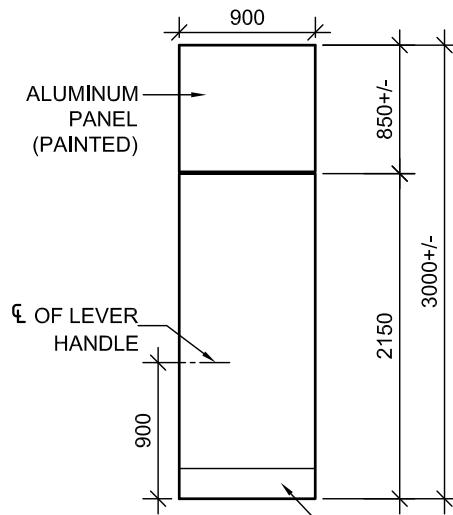
ISSUE/REV.
00

AD
800



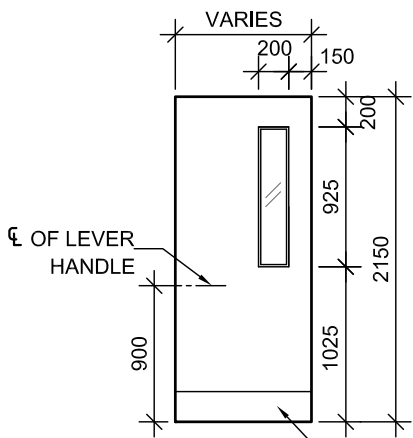
F

200mm KICKPLATE
AT EXTERIOR AND
H.T. DOORS



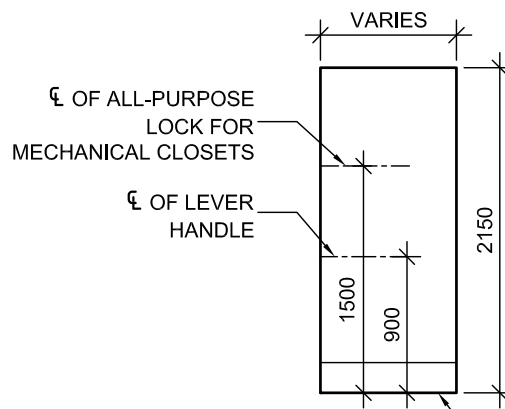
F2

200mm KICKPLATE
AT EXTERIOR AND
H.T. DOORS



G

200mm KICKPLATE
AT EXTERIOR AND
H.T. DOORS



H

200mm KICKPLATE
AT EXTERIOR AND
H.T. DOORS (VARIES)

NOTES:

1. REFER TO SPECIFICATIONS AND DOOR SCHEDULE FOR GLAZING TYPE
2. ALL DOORS AND FRAMES ARE VIEWED FROM EXTERIOR OF ROOM OR AREA SERVED
3. NOTE: ALL EX. DOORS TO BE PAINTED, WILL BE PAINTED BOTH SIDES, TYP..

DOOR TYPES

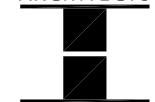
PROJ: 16127

SCALE: 1:50

DRAWN: CT

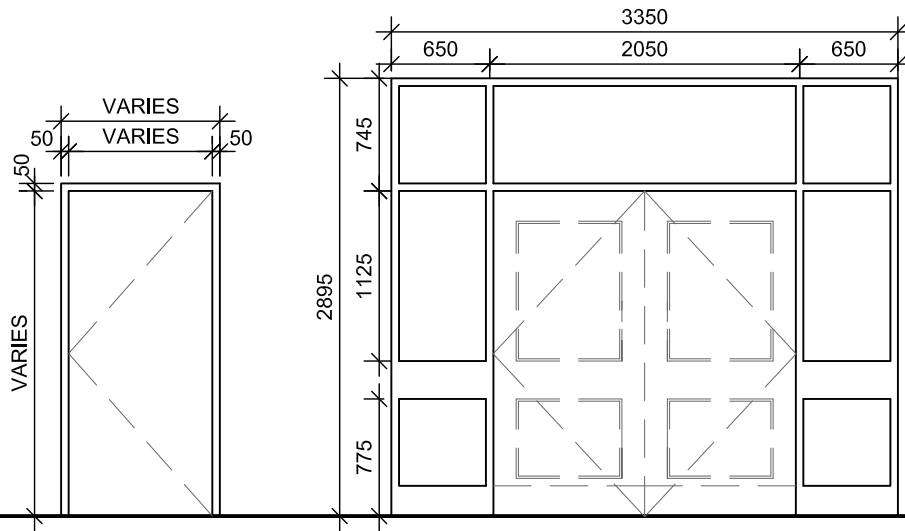
DATE: 17 01 23

**HOSSACK
& ASSOCIATES**
ARCHITECTS



ISSUE/REV.
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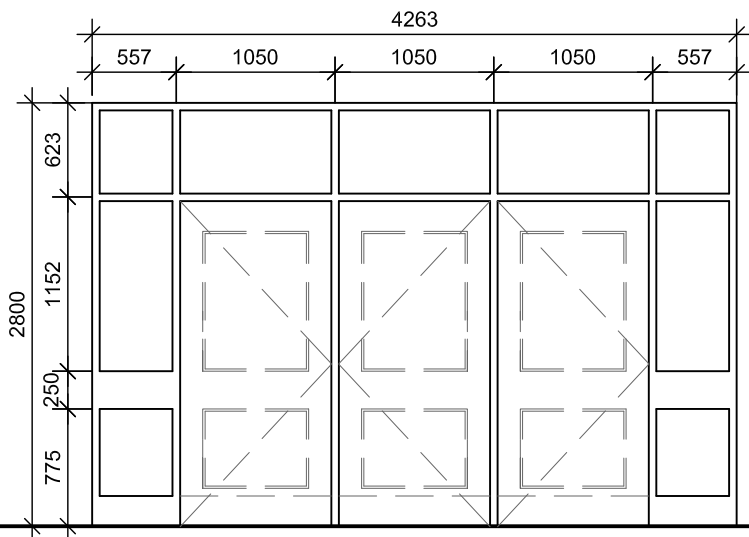
AD
800B



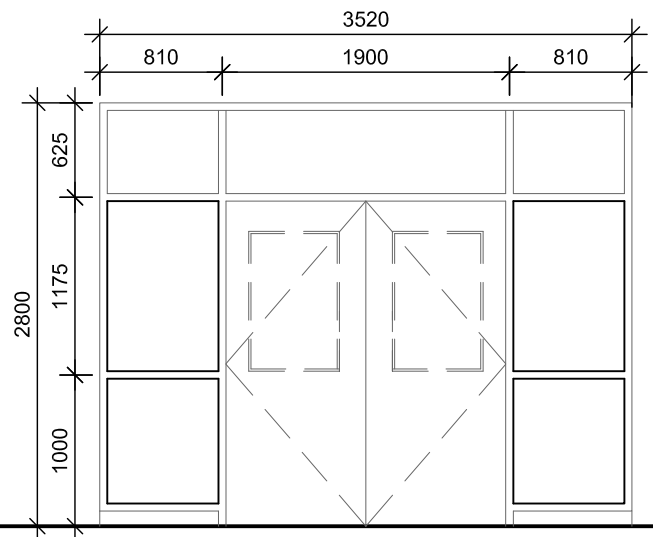
NOTE: ALL EXISTING GWG ON DOOR LITES INTERIOR SCREENS AND SIDELITES TO REMAIN WILL HAVE SAFETY GLASS FILM INSTALLED. SEE DOOR SCHEDULE AND SPEC.

TYPE 1

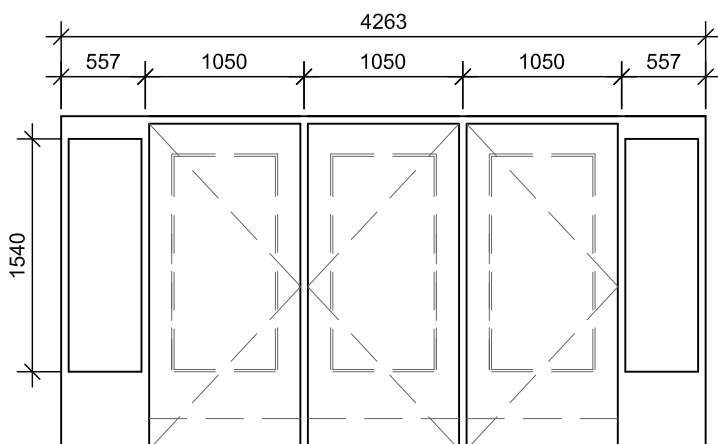
TYPE 2



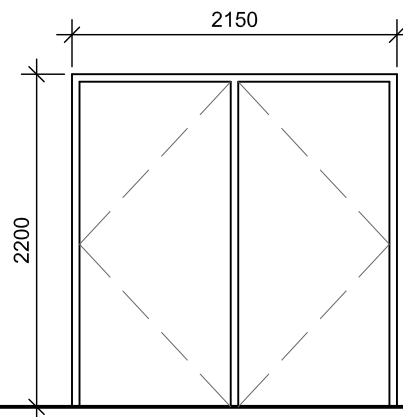
TYPE 3



TYPE 4



TYPE 5



TYPE 6

FRAME TYPE ELEVATIONS

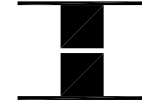
PROJ: 16127

SCALE: 1:50

DRAWN: CT

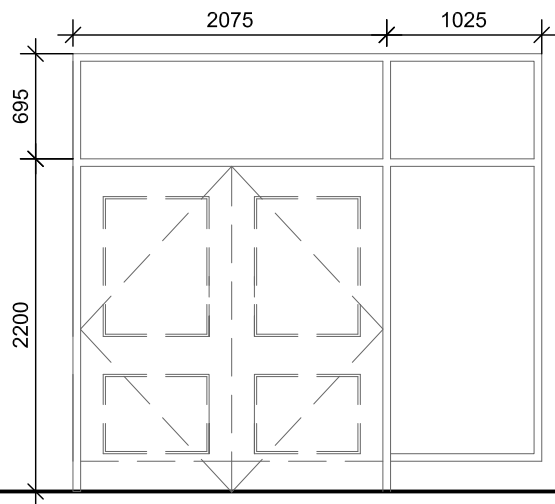
DATE: 17 01 23

**HOSSACK
& ASSOCIATES
ARCHITECTS**

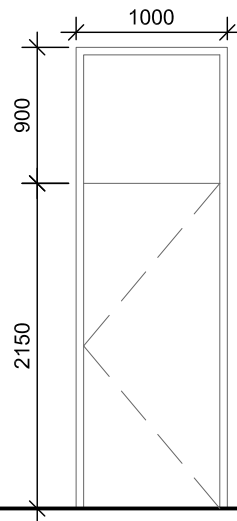


ISSUE/REV.
00

AD
801A

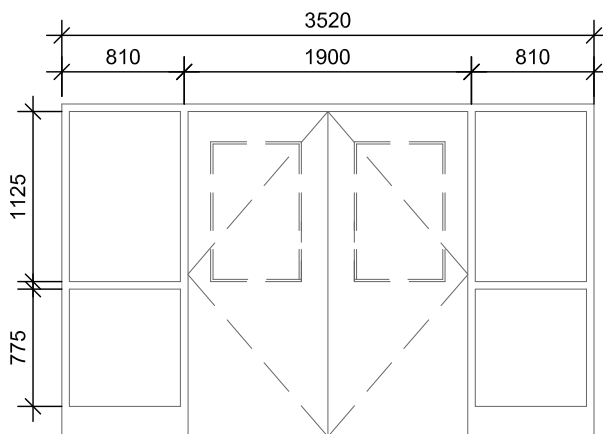


TYPE 7

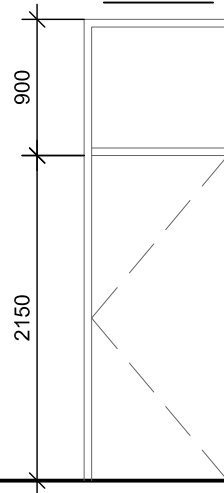


NEW INSUL. HM PANEL

TYPE 8

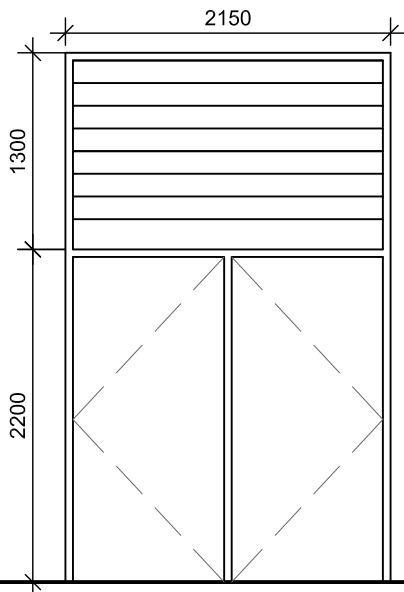


TYPE 9



EX. PANEL TO REMAIN

TYPE 10



NEW LOUVER,
SEE MECH. DWGS.

NOTE: ALL EXISTING GWG ON
DOOR LITES INTERIOR SCREENS
AND SIDELITES TO REMAIN WILL
HAVE SAFETY GLASS FILM
INSTALLED. SEE DOOR SCHEDULE
AND SPEC.

TYPE 11

FRAME TYPE ELEVATIONS

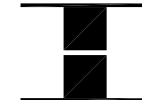
PROJ: 16127

SCALE: 1:50

DRAWN: CT

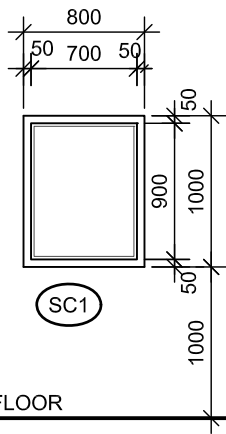
DATE: 17 01 23

**HOSSACK
& ASSOCIATES
ARCHITECTS**



ISSUE/REV.
00

AD
801B



NOTE: ALL EXISTING GWG ON
DOOR LITES INTERIOR SCREENS
AND SIDELITES TO REMAIN WILL
HAVE SAFETY GLASS FILM
INSTALLED. SEE DOOR SCHEDULE
AND SPEC.

INTERIOR SCREEN ELEVATIONS

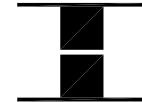
PROJ: 16127

SCALE: 1:50

DRAWN: CT

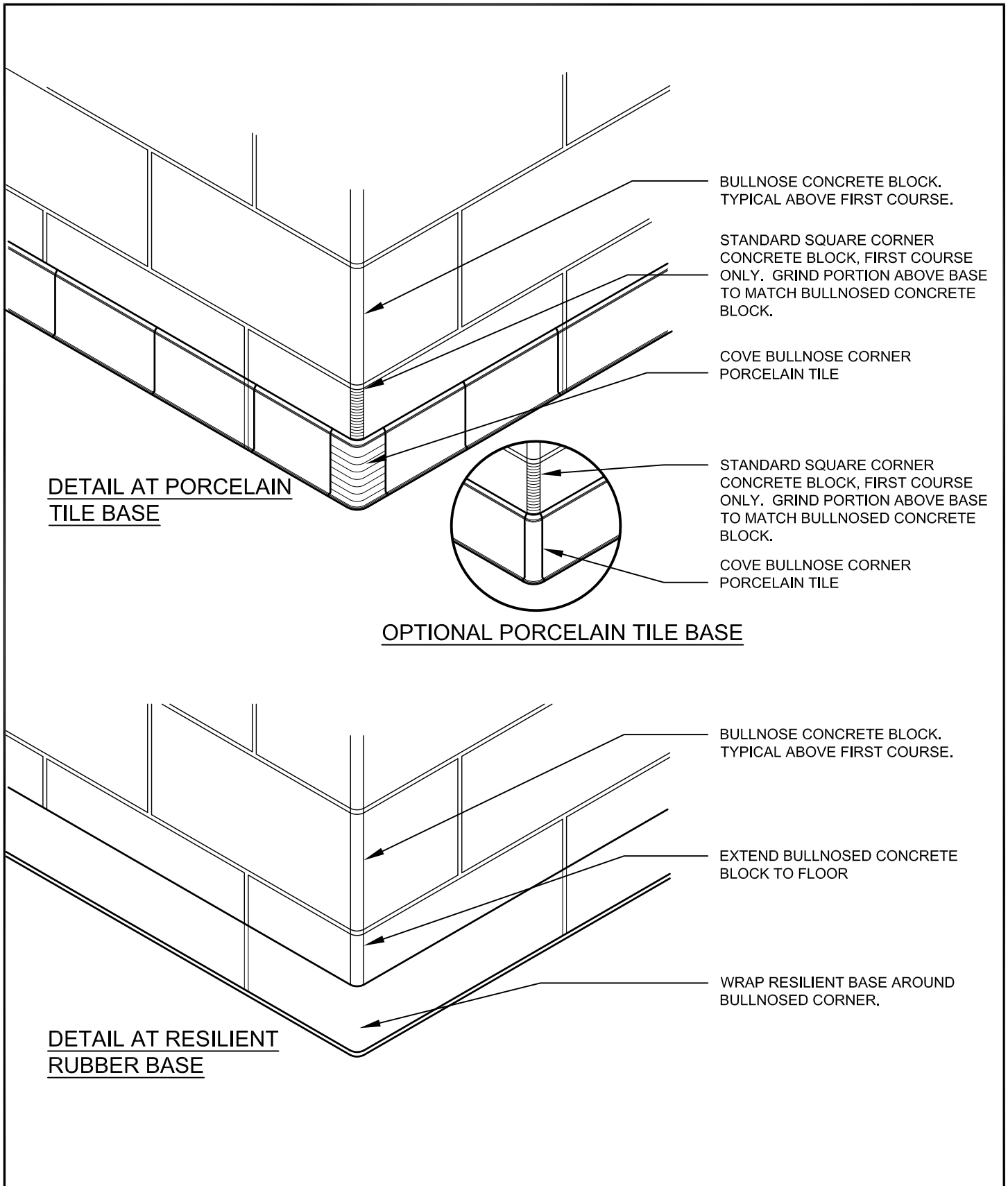
DATE: 17 01 23

**HOSSACK
& ASSOCIATES**
ARCHITECTS



ISSUE/REV.
00

AD
802



PORCELAIN TILE AND
RESILIENT RUBBER BASE DETAILS

PROJ: 16127

SCALE: NTS

DRAWN: MM

DATE: 17 01 23



ISSUE/REV.
00

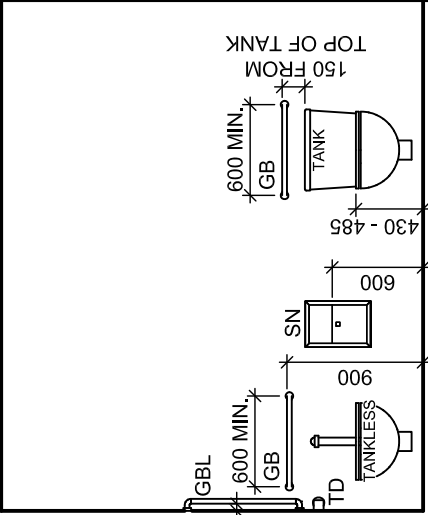
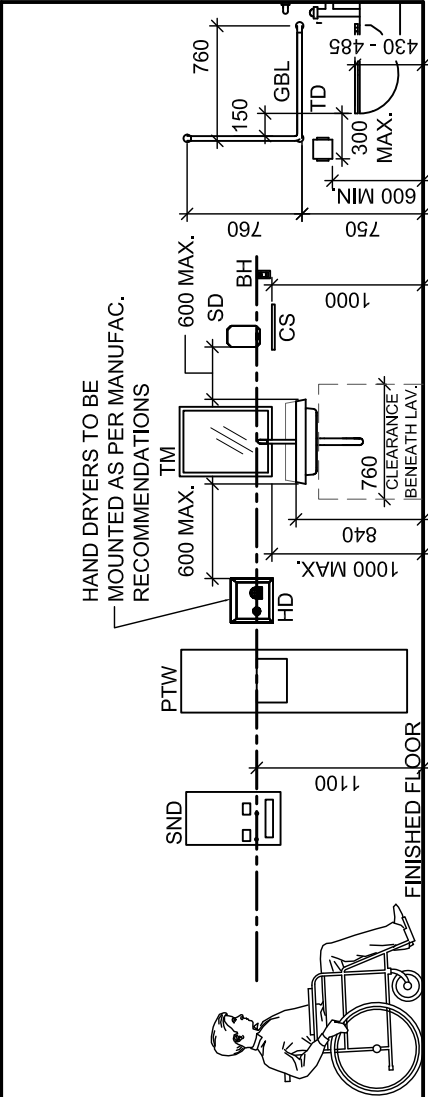
AD
903

WASHROOM FIXTURE
MOUNTING HEIGHT

PROJ: 16127
SCALE: 1:50
DRAWN:AD
DATE: 17 01 23



ISSUE/REV. 00
AD 1000



- ABBREVIATIONS
- BH BREAK-AWAY TYPE COAT HOOK
CS CONVENIENCE SHELF
HD HAND DRYER
GB GRAB BAR (STRAIGHT)
GBL GRAB BAR 'L' SHAPE
GBF GRAB BAR FOLDING TYPE
PTD PAPER TOWEL DISPENSER
- PTW PAPER TOWEL DISPENSER /
WASTE RECEPTACLE COMBO UNIT
SN SANITARY NAPKIN DISPOSAL
SND SANITARY NAPKIN DISPENSER
TM TILTED MIRROR
TD TOILET PAPER DISPENSER

- NOTES:
1. WHERE APPLICABLE, THE DIMENSION IS TO THE OPERATOR.
 2. REFER TO PROJECT FLOOR PLANS AND INTERIOR ELEVATIONS FOR WASHROOM FIXTURE LAYOUT