

Project Manual for
Construction of the Addition and Renovations to
GEORGETOWN DISTRICT HIGH SCHOOL - PHASE TWO

at

70 Guelph Line,
Georgetown, Ontario

for



The Halton District School Board

2050 Guelph Line
Burlington, Ontario

Project No.: 0818
Issued: 2009 10 15

Tender No. T09 - 57

Volume I

Bidding and Contractual Requirements
General Requirements
Specifications

Snyder

Snyder & Associates Inc.
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T. 416.966.5444 F. 416.966.4443
www.SnyderAssociates.com

1 General

1.1 LIST OF CONSULTANTS

.1 The following firms comprise the Consultant team for the Project:

.1 Architectural

Snyder & Associates Inc.
920 Yonge Street, Suite 700
Toronto, Ontario
M4W 3C7
Telephone: (416) 966-5444
Fax: (416) 966-4443

.2 Structural Engineering

YWY Engineering Inc.
208 Wycroft Road, Suite 200
Oakville, Ontario
L4K 3T8
Telephone: (905) 849-6717
Fax: (905) 849-1867

.3 Mechanical & Electrical Engineering:

Group 8 Engineering
499 King Street East, Suite 200
Hamilton, Ontario
L8N 1E1
Telephone: (905) 525-6069
Fax: (905) 582-7310

.4 Landscape Architect:

Salmona Tregunno Inc.
2620 Bristol Circle, Suite 100
Burlington, Ontario
L6H 6Z7
Telephone: (905) 829-2544
Fax: (905) 829-1985

.5 Civil Engineering:

Valdor Engineering Inc.
661 Chrislea Road
Woodbridge, Ontario
L4L 8A3
Telephone: (905) 264-0054

.6 Building Envelope Consultant:

Fishburn Building Sciences Group Inc.
15391 Steeles Avenue
Hornby, Ontario
L0P 1E0
Telephone: (905) 878-1282
Fax: (905) 878-2147

.7 Food Services Consultant:

Kaizen Foodservice Planning & Design, Inc.
1525 Cornwall Road, Unit 14
Oakville, Ontario
L6J 0B2
Telephone: (905) 338-3222
Fax: (905) 338-1522

END OF DOCUMENT

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1 Invitation

1.1 BID CALL

- .1 Offers to perform Subcontracts SC03 to SC25, signed under seal, executed, and dated will be received by the Owner, at the Main Floor reception desk in the J. W. Singleton Education Centre located at 2050 Guelph Line, Burlington, Ontario before 2:00:00 pm local time, as designated by the reception desk clock, on the 5th day of November, 2009.
- .2 Offers submitted after the above time shall be returned to the bidder unopened.
- .3 Offers will be opened publicly after 2:00 pm local time on the day of receipt of bids, at the office of the Consultant.
- .4 Amendments to the submitted offer will be permitted if received in writing prior to bid closing and if endorsed by the same party or parties who signed and sealed the offer.

1.2 INTENT

- .1 The intent of this bid call is to obtain offers to perform identified portions of the Work to complete the construction of the GEORGETOWN DISTRICT HIGH SCHOOL - PHASE TWO located at 70 Guelph Line, Georgetown, Ontario.
- .2 Contract C00 is identified as a CCDC 3 Cost Plus a Fee Contract based on the Contract Documents; and has already been awarded to Percon Construction.
 - .1 Specification Sections 00 52 03, 00 71 03, 00 72 03 and 00 73 03 apply only to Contract C00, but are included herein for information purposes.
- .3 Subcontracts SC02 through SC25 are identified as CCA 1-2001 Stipulated Sum Subcontracts. Successful Subcontractors will enter into written agreements with the Contractor, Percon Construction, based on the Contract Documents.
- .4 Substantial Performance of the Work is required before the date identified in Section 01 12 00.

1.3 CONTRACT DOCUMENTS IDENTIFICATION

- .1 The Contract Documents are identified as Project No.: 0818 as prepared by the Consultant, Snyder & Associates Inc. located at 920 Yonge Street, Suite 700, Toronto, Ontario.

2 Contract and Bid Documents

2.1 AVAILABILITY

- .1 One set of Bid Documents may be obtained at the office of the Consultant.
- .2 Return Bid Documents complete, undamaged, unmarked and reusable within 14 days of bid submission.
- .3 Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not confer a license or grant for other purposes.

2.2 EXAMINATION

- .1 Bid Documents may be viewed at the office of the Consultant.
- .2 Upon receipt of Bid Documents verify that documents are complete; notify Consultant should the documents be incomplete.
- .3 Immediately notify the Consultant upon finding discrepancies or omissions in the Bid Documents.

2.3 QUERIES AND ADDENDA

- .1 Direct queries in writing by Fax to: Anil Gokarn at Snyder & Associates Inc., Fax: (416) 966-4443.
- .2 Addenda may be issued during the bidding period. All addenda become part of the Contract Documents. Include costs in Bid Price.
- .3 Verbal answers are only binding when confirmed by written addenda.
- .4 Clarifications requested by bidders must be in writing not less than 4 Working Days before date set for receipt of bids. The reply will be in the form of an addendum, a copy of which will be forwarded to known bidders no later than 2 Working Days before receipt of bids.

2.4 PRODUCT / SYSTEM OPTIONS

- .1 Where Bid Documents stipulate a particular Product, requests for substitutions will not be considered by the Consultant less than seven days before receipt of bids.
- .2 When a request to substitute a Product is made, the Consultant may approve the substitution and will issue an Addendum to known bidders.
- .3 When requesting a substitution to specified Products, include any changes required in the Work to accommodate such substitutions. A later claim by the bidder for an addition to the Contract Price resulting from changes in the Work necessitated by use of substituted Products will not be considered.
- .4 Product or system substitutions recommended by Bidders at the time of receipt of bids may be considered by Consultant if submitted as an attachment to the Bid Form. Substitutions not approved in writing by the Consultant prior to the receipt of bids shall not be included in the base Bid Price. Refer to Section 01 25 00.
- .5 Requests for Product or system substitutions submitted with the Bid Form will be evaluated and will be either included in, or excluded from, the Contract. The Consultant will be the sole judge as to their acceptability.
- .6 Provide sufficient information to enable the Consultant to determine acceptability of such Product or system substitutions.
- .7 Provide complete information on required revisions to other work to accommodate each Product or system substitution, the dollar amount of additions to or reductions from the Bid Price, including revisions to other work.
- .8 Unless requests for substitutions are submitted prior to, or as part of the bid submission, and subsequently accepted, provide the specified Products.
- .9 Prior approval to submit requests for substitutions is not required.

3 Site Assessment

3.1 PRE-BID SITE EXAMINATION

- .1 A mandatory visit to the Place of the Work has been arranged for the following listed bidders on Wednesday October 28, 2009 at 3:00 pm local time:
 - .1 Subcontract SC04 - Mechanical
 - .2 Subcontract SC05 - Electrical.
- .2 Meet in the existing Contractor's site trailer.
- .3 Bidders visiting the Place of the Work will be required to sign in and obtain a visitor badge. Upon completion of visit, sign out and return visitor badge to Owner.

- .4 Bidders visiting the Place of the Work will be required to be accompanied at all times by a representative of the Owner and the Consultant.
- .5 No claims for extra payment to the successful Contractor will be allowed for the execution of additional work or difficulties encountered due to conditions at the Place of the Work which were visible or reasonably inferred from an examination of the Place of the Work prior to receipt of the Bids.

4 Qualifications

4.1 SUBCONTRACTORS

- .1 The Owner reserves the right to reject a proposed Subcontractor for reasonable cause. Upon such rejection, the bidder will be required to propose an alternate subcontractor with a resulting change to the Bid Price. This change can effect the status of the low bid, and may result in a different bid becoming low.
- .2 Refer to CCDC 3-1998, GC 3.8 - Subcontractor and Supplier; and CCA 1-2001, SCC 3.4 - Sub-subcontractors.

5 Bid Submission

5.1 BID INELIGIBILITY

- .1 Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind shall, at the discretion of the Owner, be declared informal.
- .2 Bids with Bid Forms and enclosures which are missing, incomplete or improperly prepared shall, at the discretion of the Owner, be declared informal.
- .3 Bids that fail to include the WSIB requirements shall, at the discretion of the Owner, be declared informal.
- .4 Bids based upon prices seeming to be so unbalanced as to adversely affect the interests of the Owner shall, at the discretion of the Owner, be declared informal.
- .5 Bids based upon an unreasonable period of time for completion of the Work shall, at the discretion of the Owner, be declared informal.
- .6 Bids are by invitation only from lists of preselected bidders. Bids received from unsolicited bidders shall be returned unopened.

5.2 SUBMISSIONS

- .1 Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- .2 Submit one copy of the properly executed offer on the Bid Forms provided, together with the required appendices in a closed opaque envelope, clearly identified with:
 - .1 the Project name and address,
 - .2 the Owner's name and address,
 - .3 the Bidder's name and address,
 - .4 the Owner's Tender Number, and
 - .5 the relevant Contract or Subcontract number and title.
- .3 Bidders wishing to submit prices for more than one Subcontract may do so on separate bid forms, submitted separately as described above. Do not combine information pertaining to multiple Contracts or Subcontracts on a single bid form.

- .4 Subcontract bids must include the appropriate reference to the Subcontract number and title. Refer to Section 01 12 00 for the summary of Subcontract numbers and titles.
- .5 An abstract of submitted bids will be made available to bidders following bid opening.

6 Bid Enclosures and Requirements

6.1 WORKPLACE SAFETY AND INSURANCE BOARD

- .1 Submit a signed confirmation from the Workplace Safety and Insurance Board (WSIB) that, at the date of the letter, the bidder maintains an account with the WSIB, and is in good standing.

6.2 TAXES

- .1 Unless specifically excluded by the Contract, include all applicable government taxes in the base Bid Price.
- .2 The General Conditions of the Contract specifically excludes Value Added Taxes, such as the federal government's Goods and Services Tax, from the Contract Price.
- .3 Refer to Supplementary Conditions for inclusion of taxes and procedures for tax rebate claims by the Owner.

6.3 BID FORM REQUIREMENTS

- .1 The bidder, in submitting an offer, agrees to complete the Work by the date indicated in the Contract Documents.
- .2 The Owner requires that the Work be completed as quickly and expeditiously as possible.

6.4 BID SIGNING

- .1 Sign and seal the Bid Form prior to submission using the most appropriate of the following methods:
 - .1 Sole Proprietorship: signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature.
 - .2 Partnership: signature of all partners in the presence of a witness who will also sign.
 - .3 Limited Company: signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the President and Secretary of the company, or the President-Secretary-Treasurer of the company, a copy of the by-law resolution of the Board of Directors authorizing them to do so, must also be submitted with the Bid in the Bid envelope.
 - .4 Joint Venture: each party of the joint venture shall execute the Bid under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

6.5 APPENDICES TO THE BID FORM

- .1 The following appendix to the Bid Form must be submitted with the Bid:
 - .1 Appendix A - Bid Documents: a complete listing of all documents and information issued by which the Bid Price was derived.

7 Offer Acceptance Or Rejection

7.1 DURATION OF OFFER

- .1 Bids shall remain open to acceptance and shall be irrevocable for a period of 60 days after the bid closing.

7.2 ACCEPTANCE OF OFFER

- .1 The Owner reserves the right to accept or reject any or all offers.
- .2 The Owner reserves the right to negotiate with the lowest acceptable bidder to verify their Bid, undertake value engineering and consider the benefit of dividing the Work into multiple Subcontracts for the different Phases. The Owner may, at their sole discretion, reject a bid during such negotiations if sufficient information and cost breakdowns are not forthcoming within a reasonable time frame.
- .3 After acceptance by the Owner, the Consultant, on behalf of the Owner, will issue to the successful bidder a written bid acceptance.
- .4 After a bid has been accepted, all rejected bids will be returned to the respective bidders with submitted bid securities and other requested enclosures.

END OF DOCUMENT

STIPULATED PRICE SUBCONTRACT BID

Owner's Tender No.: T09-57

Subcontract No. SC- _____

Project: Construction of the Addition and Renovations to
GEORGETOWN DISTRICT HIGH SCHOOL - PHASE TWO

Located At: 70 Guelph Line, Georgetown, Ontario

For: The Halton District School Board
located at
2050 Guelph Line,
Burlington, Ontario
L7R 3Z2

Subcontract Bidder

Legal Name: _____
(Company Name)

Address: _____
(Business Address)

(City, Province, Postal Code)

Subcontract Bid Price

Having examined the Bid Documents as listed in Appendix "A" to this Bid, and Addenda No. _____
to No. _____ inclusive, all as issued by *Snyder & Associates Inc.* and having visited the Place of the
Work; we hereby offer to enter into a Subcontract with the Contractor to perform the Work of Subcontract
SC- _____ required by the Bid Documents for the stipulated price of:

Dollars and _____ cents (\$ _____) in

Canadian funds, which price excludes Value Added Taxes.

Interest: Should either party fail to make payments as they become due under the terms of the Contract or in an award by arbitration or court, interest at *two percent (2%)* per annum above the prime rate on such unpaid amounts shall also become due and payable until payment. Such interest shall be compounded on a monthly basis. The prime rate shall be the lowest rate of interest quoted by the Royal Bank of Canada for prime business loans.

Declarations:

We hereby declare that:

- (a) we agree to perform the Subcontract Work in compliance with the required completion schedule stated in the Bid Documents, or if no schedule is stated, to attain Substantial Performance of the Subcontract Work within _____ weeks from commencement of the Work;
- (b) no person, firm or corporation other than the undersigned has any interest in this Bid or in the proposed Contract for which this Bid is made;
- (c) we agree to enter into a Subcontract Agreement, as identified in the Contract Documents, with the successful Contractor;
- (d) this Bid is open to acceptance for a period of sixty (60) days from the date of bid closing.

Signatures

SIGNED AND SUBMITTED for and on behalf of:

(name of bidder)

(signature)

(name and title of person signing)

(signature)

(name and title of person signing)

Witness

(signature)

(name and title of person signing)

Date: _____

N.B. Where legal jurisdiction or Owner requirement calls for:

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

Subcontract No. SC- _____

Project: Construction of the Addition and Renovations to
GEORGETOWN DISTRICT HIGH SCHOOL - PHASE TWO
70 Guelph Line, Georgetown, Ontario

Subcontract Bidder: _____
(Company Name)

LIST OF BID DOCUMENTS

The following is the list or description of the Bid Documents referred to in the Bid for the above named Project:

Drawings

As listed on the Cover Sheet of the Drawings.

Specifications

As listed in Document 00 01 10 - TABLE OF CONTENTS.

Additional Information

As described in Document 00 52 11.

- 1 General
- 1.1 AGREEMENT
 - .1 The CCDC 3-1998 Cost Plus Contract, as amended below, forms the basis of Agreement between the Owner and the Contractor.
- 1.2 AMENDMENTS TO THE AGREEMENT
 - .1 Article A-4 - Cost of the Work
 - .1 Delete Paragraph A-4.1 in its entirety and replace with the following: *"The Cost of the Work, which excludes Value Added Taxes, shall be comprised of the stipulated sum costs of subsequently awarded Subcontracts, as nominated by the Owner, and the following:*
 - .1 deposits lost;*
 - .2 the costs to the Contractor that result from any Subcontractor's or Supplier's insolvency or failure to perform;*
 - .3 royalties, patent license fees and damages for infringement of patents and cost of defending suits therefor subject always to the Contractor's obligations to indemnify the Owner as provided in paragraph 10.3.1 of GC 10.3 - PATENT FEES;*
 - .4 losses and expenses sustained by the Contractor for matters which are the subject of insurance under the policies prescribed in GC 11.1 - INSURANCE when such losses and expenses are not recoverable because the amounts are in excess of collectible amounts or within the deductible amounts;*
 - .5 legal costs, incurred by the Contractor, in relation to the performance of the Work provided that they are not caused by negligent acts or omissions of the Contractor and the Work is performed in accordance with the Contract Documents; and*
 - .6 the cost of auditing when requested by the Owner.*

Notwithstanding the foregoing and any provisions contained in the General Conditions of the Contract, it is the intention of the parties that the Cost of the Work referred to herein shall cover and include any and all contingencies other than those which are the result of or occasioned by any failure on the part of the Contractor to exercise reasonable care and diligence in the Contractor's attention to the Work. Any cost due to failure on the part of the Contractor to exercise reasonable care and diligence in the Contractor's attention to the Work shall be borne by the Contractor."
 - .2 Article A-5 - Contractor's Fee
 - .1 Delete Paragraph A-5.1.1 in its entirety.
 - .3 Article A-6 - Contract Price
 - .1 Delete Paragraph A-6.2 in its entirety.
 - .4 Article A-7 - Payment
 - .1 Revise Subparagraph A-7.1.1 to insert the phrase *"... make progress payments to Contractor subject to GC 5.4 - Progress Payment..."*.

END OF DOCUMENT

- 1 General
- 1.1 AGREEMENT
 - .1 The CCA 1-2001 Stipulated Price Subcontract, as amended below, forms the basis of Agreement between the Contractor and the Subcontractor.
- 1.2 AMENDMENTS TO THE AGREEMENT
 - .1 Delete Article 1B in its entirety.
 - .2 Delete Article 2B in its entirety.
 - .3 Delete Article 3B in its entirety.
 - .4 Article 5 - SUBCONTRACT PRICE, delete Paragraph 5.5 in its entirety.
 - .5 Article 6 - PAYMENT, Paragraph 6.2, Third Sentence; revise to read as follows: *"The Contractor shall pay the Subcontractor, in accordance with the payment procedures required by the Contract Documents, no later than thirty (30) days after the date of the Consultant's certificate of payment, 90 percent of the amount applied for or such other amount as the Consultant determines to be properly due."*
 - .6 Article 6 - PAYMENT, Paragraph 6.4; revise to read as follows: *"... and for which the Contractor or Owner might in any way be held responsible ..."*
 - .7 Article 6 - PAYMENT, Paragraph 6.4; delete Subparagraph 6.4.2 in its entirety.
 - .8 Article 6 - PAYMENT, Paragraph 6.5; revise Subparagraph 6.5.1 to read as follows: *"... the rate of interest quoted by the Bank of Canada."*

END OF DOCUMENT

1 General

1.1 AGREEMENT

- .1 The CCDC 3-1998 Cost Plus Contract, includes the Definitions of specific words and terms.

1.2 SUPPLEMENTARY DEFINITIONS

- .1 Amend Definition 2 - Contract Documents by inserting the words "*in writing*" after the words "*agreed upon*".
- .2 Amend Definition 14 - Contractor's Fee by adding the following: "*... and including amounts for all overhead and profit, bond and insurance premiums, and any costs for labour and Products required by the Contractor to undertake portions of the Work identified in the Contract Documents and not included in an Owner-nominated Subcontract.*"
- .3 Delete Definition 16 - Guaranteed Maximum Price in its entirety.
- .4 Add a new Definition for Bid Documents, as follows: "*The Bid Documents shall consist of the Contract Documents, Instructions to Bidders, Geotechnical Report, Bid Form, and other information issued for the benefit of bidders.*"
- .5 Add a new Definition for *Make Good* as follows: "*Make Good means to restore new or existing work after being damaged, cut or patched. Use materials identical to the original materials, with visible surfaces matching the appearance of the original surfaces in all details, and with no apparent junctions between new and original surfaces.*"

END OF DOCUMENT

1 General

1.1 AGREEMENT

- .1 The CCA 1-2001 Stipulated Price Subcontract includes the Definitions of specific words and terms.

1.2 SUPPLEMENTARY SUBCONTRACT DEFINITIONS

- .1 Add a new Definition for *Make Good* as follows: "*Make Good means to restore new or existing work after being damaged, cut or patched. Use materials identical to the original materials, with visible surfaces matching the appearance of the original surfaces in all details, and with no apparent junctions between new and original surfaces.*"

END OF DOCUMENT

- 1 General
- 1.1 GENERAL CONDITIONS
 - .1 CCDC 3 - 1998, The General Conditions of the Cost Plus Contract is the General Conditions between the Owner and Contractor.
- 1.2 SUPPLEMENTARY CONDITIONS
 - .1 Refer to Supplementary Conditions for amendments and supplements to the General Conditions.

END OF DOCUMENT

1 General

1.1 GENERAL CONDITIONS

- .1 CCA 1-2001, The Subcontract Conditions of the Stipulated Price Subcontract are the Subcontract Conditions between the Contractor and the Subcontractors.

1.2 SUPPLEMENTARY CONDITIONS

- .1 Refer to Supplementary Subcontract Conditions for amendments and supplements to the Subcontract Conditions.

END OF DOCUMENT

- 1 Supplements to General Conditions
- 1.1 GC 1.1 - CONTRACT DOCUMENTS
 - .1 Revise Paragraph 1.1.7 by adding the following sentences: *"The location of fixtures, outlets, conduit, piping and any other locations shown or specified but not dimensioned shall be considered approximate. The actual location shall be as approved by the Consultant and as required to suit job conditions."*
- 1.2 GC 2.2 - ROLE OF THE CONSULTANT
 - .1 Add new Subparagraph 2.2.7.1 as follows: *"Verbal instructions, regardless of the source, will not be binding on the parties to the Contract, unless otherwise confirmed in writing by the Owner or the Consultant ."*
- 1.3 GC 2.4 - DEFECTIVE WORK
 - .1 Add new Subparagraph 2.4.1.1 as follows: *"Where defective work or work not performed as provided in the Contract Documents is the responsibility of a Subcontractor or Supplier, the Contractor shall require the responsible Subcontractor or Supplier to Make Good the defective work or work not performed as provided in the Contract Documents so as to conform with the Contract Documents."*
- 1.4 GC 3.2 - CONSTRUCTION BY OWNER
 - .1 Delete Paragraph 3.2.2 in its entirety.
 - .2 Add new Subparagraph 3.2.3.5 as follows: *"Assume overall responsibility for the separate contractors and Owner's own forces and for compliance with applicable health and construction safety legislation at the Place of the Work".*
 - .3 Add new Subparagraph 3.2.3.6 as follows: *"The Owner will notify the Contractor no later than 2 Working Days prior to any other contractor or their own forces being on site. The Contractor will make all necessary arrangements to accommodate access and maintain compliance with applicable health and construction safety legislation at the Place of the Work".*
- 1.5 GC 3.5 - CONSTRUCTION SCHEDULE
 - .1 Add new Paragraph 3.5.2 as follows: *"Where portions of the Work are performed by Subcontractors or Suppliers, the Contractor shall coordinate with, and arrange for the Subcontractors and Suppliers to provide detailed construction schedules for their portion of the Work, to be submitted along with the construction schedule described herein."*
 - .2 Add new Paragraph 3.5.3 as follows: *"No change in Contract Time resulting from a change in the Work will be accepted, if, in the Consultant's opinion, such change in the Work can reasonably be accommodated within the approved schedule."*
 - .3 Amend Paragraph 3.5.1.1 by deleting the phrase *"... the first application for payment ..."* and replacing it with *"... commencing the work ..."*.
- 1.6 GC 3.6 - CONSTRUCTION SAFETY
 - .1 Amend Paragraph 3.6.1 by deleting the phrase *"Subject to paragraph 3.2.2.2 of GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS"*.
 - .2 Add new Paragraph 3.6.2 as follows: *"The Contractor shall comply and cause all of its Subcontractors and Suppliers to comply with all applicable provisions, requirements, and safety standards of the Ontario Occupational Health and Safety Act and regulations thereto. The Contractor shall be designated and hereby accepts the responsibilities and designation as "constructor" under the Occupational Health and Safety Act on the project and hereby assumes all liabilities and obligations imposed on a "constructor" by the Occupational Health and Safety Act"*.

- .3 Add new Paragraph 3.6.3 as follows: *"Prior to commencement of the Work, the Contractor shall submit to the Owner:
 - .1 Documentation of a valid Workplace Safety and Insurance Board clearance certificate and confirmation of the Contractor's WSIB CAD-7 performance rating.
 - .2 Documentation of the Contractor's insurance coverage.
 - .3 Documentation of the Contractor's safety-related programs for the Project.
 - .4 A copy of the Notice of Project filed with the Ministry of Labour."*
- .4 Add new Paragraph 3.6.4 as follows: *"The Contractor hereby represents and warrants to the Owner that appropriate health and safety instruction and training has been provided and will be provided to the Contractor's employees before the Work is commenced and agrees to provide to the Owner and Consultant satisfactory proof of such instruction and training. The Contractor further undertakes to verify that other contractors and the Owner's own forces have received appropriate health and safety instruction and training in accordance with GC 3.2."*
- .5 Add new Subparagraph 3.6.4.1 as follows: *"The Contractor shall require proof from the Subcontractors and Suppliers that appropriate health and safety instruction and training has been provided to the Subcontractor's and Supplier's employees before the Work is commenced. This information will be kept on file at the site."*
- .6 Add new Paragraph 3.6.5 as follows: *"The Contractor shall tour the appropriate area to familiarize itself with the job site prior to the commencement of the Work",*
- .7 Add new Paragraph 3.6.6 as follows: *"The Contractor shall never work in a manner that may endanger anyone"*.
- .8 Add new Paragraph 3.6.7 as follows: *"The Contractor shall indemnify and save harmless the Owner, together with the Owner's agents, officers, directors, employees, consultants, successors and assigns, from and against any and all safety infractions under the Ontario Occupational Health and Safety Act, and regulations thereto including the payment of all legal fees on a solicitor and client basis."*
- .9 Add new Paragraph 3.6.8 as follows: *"The Contractor shall ensure that its employees, Subcontractors and Suppliers comply with the foregoing conditions"*.
- 1.7 GC 3.8 - SUBCONTRACTORS AND SUPPLIERS
- .1 Revise Subparagraph 3.8.1.1 to read as follows: *"enter into contracts or written agreements with Subcontractors or Suppliers, including those nominated by the Owner, to require them to perform their work as provided in the Contract Documents;
 - .1 The Consultant will prepare the written agreements between the Contractor and each Subcontractor or Supplier, based upon a modified CCA 1-2001, Stipulated Price Subcontract, similar in content and intent of this Contract."*
- .2 Add new Subparagraph 3.8.1.4 as follows: *"immediately notify the Consultant of any acts or omissions of Subcontractors or Suppliers and of persons directly or indirectly employed by them."*
- .3 Add new Subparagraph 3.8.2.1 as follows: *"The Contractor shall not change or terminate Subcontractors or Suppliers without the prior written permission of the Owner."*
- .4 Add new Paragraph 3.8.6 as follows: *"The Owner may direct the Contractor to terminate the contract of a Subcontractor or Supplier and the Owner shall nominate a replacement Subcontractor or Supplier to complete that part or portion of the Work. The Contractor shall enter into a contract with the nominated Subcontractor or Supplier for the completion of that portion of the Work. In the event of such an instance, the Contract Time and the Contractor's Fee is to be adjusted by an appropriate amount. The Contractor may reasonably refuse to terminate the contract of a Subcontractor or Supplier if to comply with the Owner's direction would result in a breach of any of the Contractor's obligations under GC 3.6 - CONSTRUCTION SAFETY."*

- .5 Add new Paragraph 3.8.7 as follows: *"The Contractor shall involve the Consultant in any communications with the Subcontractors or Suppliers related to GC 3.5 - CONSTRUCTION SCHEDULE and PART 6 - CHANGES IN THE WORK. The Consultant may discuss issues directly with the Subcontractors and Suppliers related to GC 3.5 - CONSTRUCTION SCHEDULE and PART 6 - CHANGES IN THE WORK, however, the Consultant shall not direct or supervise the Work.."*
- 1.8 GC 3.9 - LABOUR AND PRODUCTS
- .1 Add new Paragraph 3.9.3 as follows: *"The Contractor will cooperate with the Owner to avoid labour complications and will employ workers whose presence and work will be acceptable to, and be in harmony with, other workers employed on the Work, and under conditions satisfactory to the Owner. In the event of labour difficulties resulting from the employment of workers by the Contractor or by the presence of the Contractor on the Project, the Contractor will make any necessary arrangements as required by the Owner in order to prevent delays and additional expense to the Owner."*
- .2 Add new Paragraph 3.9.4 as follows: *"The Contractor is responsible for the safe on-site storage of Products and their protection (including Products supplied by the Owner) in such a way to avoid dangerous conditions or contamination to the Products or other person or property."*
- 1.9 GC 4.1 - CASH ALLOWANCES
- .1 Delete Paragraph 4.1.1 in its entirety.
- .2 Revise Paragraph 4.1.6 by deleting the phrase *"... and the Guaranteed Maximum Price ..."*.
- .3 Add new Paragraph 4.1.8 as follows: *"Unexpended Cash Allowances will be deducted from the Contract Price."*
- 1.10 GC 5.2 - ACCOUNTING AND AUDIT
- .1 Revise Paragraph 5.2.1 by replacing the phrase *"... Cost of the Work as in accordance with Article A-3 - CONTRACT DOCUMENTS."* with *"... payments under the Contract."*
- .2 Revise Paragraph 5.2.2 by replacing the phrase *"... Cost of the Work ..."* with *"... payments under the Contract ..."*.
- 1.11 GC 5.3 - APPLICATIONS FOR PROGRESS PAYMENT
- .1 Revise Paragraph 5.3.1 to read as follows: *"The Contractor shall make monthly applications for payment on account as provided in Article A-7 of the Agreement - PAYMENT as the Work progresses."*
- 1.12 GC 5.4 - PROGRESS PAYMENT
- .1 Revise Paragraph 5.4.2 by replacing the words *"... five (5) days ..."* to read *"... fourteen (14) days ..."*.
- .2 Add a new Paragraph 5.4.3 as follows: *"The Owner shall make all payments under the Contract on account of the Cost of the Work in accordance with Article A-7 by depositing the funds into a joint chequing account, in the joint names of the Contractor and Consultant, to be used for no other purposes other than for making payments under the Contract. The Owner will notify the Contractor and the Consultant in writing once payment is deposited."*
- .3 Add new Paragraph 5.4.5 as follows: *"The Consultant, along with the Contractor, will draft and co-sign cheques as payments to the Contractor, Subcontractors and Suppliers. The Consultant will distribute payment to the Contractor, Subcontractors and Suppliers no later than twenty(20) days after the date of the certificate for payment."*

1.13 GC 5.5 - SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Add new Paragraph 5.5.5 as follows: *"The Contractor's application for a Certificate of Substantial Performance of the Work shall, without limiting the foregoing, include the following:*
 - .1 *A written statement to the Owner and the Consultant stating that:*
 - .1 *The Contract is substantially performed,*
 - .2 *The performance of the balance of the Contract is in process, and identifying the date when this Work will be completed. Where portions of the Contract can not be completed forthwith for reasons beyond the Contractor's control, the Contractor shall indicate completion dates for each outstanding portion of the Work."*
 - .2 *A statement showing the amount of holdback monies due for release and payment following the issue of the Certificate of Substantial Performance of the Work.*
 - .3 *A statement of completion with the cost value of:*
 - .1 *the portion of the Work to be completed, including any defective work or work not performed as provided in the Contract Documents.*
 - .2 *portions of the Work which can not be performed for reasons beyond the control of the Contractor.*
 - .4 *The submission of all data, operating instructions, maintenance manuals, record drawings, spare parts and materials, evidence of all tests, instructions to Owner's representatives, warranties and any other such documents to enable the Owner to operate and maintain the Project."*
- .2 Add new Paragraph 5.5.6 as follows: *"When making an application for Substantial Performance of the Work, the Contractor shall submit to the Consultant all specified warranties, bonds, maintenance manuals, records, certificates and a Statutory Declaration in a form acceptable to the Consultant, signed by the Contractor, stating that all material, work and services in connection with the Contract have been paid in full, up to the holdback, and that no liens exist, including a receipt from each Subcontractor and Supplier, stating that it has been paid in full up to the holdback for all services and materials supplied in connection with this Contract, and such other statements as the Owner and Consultant may require."*

1.14 GC 5.8 - FINAL PAYMENT

- .1 Revise Paragraph 5.8.4 by replacing the words *"... five (5) days ..."* to read *"... fourteen (14) days ..."*.
- .2 Add new Paragraph 5.8.5 as follows: *"The Owner shall make final payment under the Contract on account of the Cost of the Work in accordance with Article A-7 by depositing the funds into a joint chequing account, in the joint names of the Contractor and Consultant, to be used for no other purposes other than for making payments under the Contract. The Owner will notify the Contractor and the Consultant in writing once payment is deposited."*
- .3 Add new Paragraph 5.8.6 as follows: *"Subject to the lien legislation applicable to the Place of the Work, the Consultant, along with the Contractor, will draft and co-sign cheques as payments to the Contractor, Subcontractors and Suppliers. The Consultant will distribute payment to the Contractor, Subcontractors and Suppliers no later than twenty (20) days after the date of the certificate for payment."*

1.15 GC 5.9 - WITHHOLDING OF PAYMENT

- .1 Add new Paragraph 5.9.2 as follows, *"The Consultant shall deduct on each certificate for payment, after the 10 percent lien holdback has been deducted, a further one percent, to be set aside and held as a Contract completion security account. The accumulated amount in this account shall be released to the Contractor as part of the final payment. Partial releases will not be made."*

- .2 Add new Paragraph 5.9.3 as follows, *"If, within fifteen (15) days of written notification by Owner at any time after Substantial Performance of the Work, the Contractor does not completely finish the Work, the Owner shall have the right to complete such portions of the Work and deduct the cost for such portions, together with an appropriate administration fee, from the Contract completion security account."*

 - 1.16 GC 6.2 - CHANGE ORDER
 - .1 Revise Paragraph 6.2.1 by deleting the phrase *"... Guaranteed Maximum Price; ..."* and replacing it with *"... Contract Price; ..."*.
 - .2 Revise Paragraph 6.2.2 by deleting the phrase *"... Guaranteed Maximum Price ..."* and replacing it with *"... Contract Price ..."*.
 - .3 Add new Paragraph 6.2.3 as follows: *"The value of a change to the Contractor's Fee shall be charged as a percentage of the actual increase to the Cost of the Work, as follows:
 - .1 On additional work performed by the Contractor's own forces: 5 percent; and
 - .2 On additional work performed by the Subcontractors and Suppliers: 5 percent."*
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- 1.17 GC 6.3 - CHANGE DIRECTIVE
 - .1 Revise paragraph 6.3.1 by deleting the phrase *"... Guaranteed Maximum Price ..."* and replacing it with *"... Contract Price ..."*.
 - .2 Add new Paragraph 6.3.7 as follows: *"The value of a change to the Contractor's Fee shall be charged as a percentage of the actual increase to the Cost of the Work, as follows:
 - .1 On additional work performed by the Contractor's own forces: 5 percent; and
 - .2 On additional work performed by the Subcontractors and Suppliers: 5 percent."*
-
- 1.18 GC 7.2 - CONTRACTOR'S RIGHT TO STOP THE WORK OR TERMINATE CONTRACT
 - .1 Add new Paragraph 7.2.6 as follows: *"If the Contractor stops the Work or terminates the Contract as provided for in the preceding paragraphs, he shall ensure that the site and the Work is left and maintained in a secure and safe condition as required by authorities having jurisdiction and these Contract Documents."*
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- 1.19 GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY
 - .1 Add new Paragraph 9.2.5 as follows: *"Should there be a stoppage of the Work, for any cause, the Contractor shall assume all responsibility for protecting the Work and provide and maintain security to the building and site during such periods, with appropriate adjustments being made to the Contractor's Fee and Contract Time when it can be proven that the stoppage of the Work was not caused by any action or lack of action on the part of the Contractor."*
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- 1.20 GC 10.1 - TAXES AND DUTIES
 - .1 Add new Paragraph 10.1.2 as follows: *"With respect to taxes and duties, the Contractor shall, at the request of the Owner, assist, join in, or at the Owner's expense, make application on behalf of the Owner for any exemption, recovery or refund. The Contractor shall provide the Owner with copies, or, where required original of records, invoices, purchase orders or other documentation as may be necessary to support such application."*
 - .2 Add new Paragraph 10.1.3 as follows: *"Any amount included in the Contract or any Subcontract for tax or duty, whether or not paid, which is found to be inapplicable or for which a refund is obtained shall become the sole and exclusive property of the Owner."*

1.21 GC 10.2 - LAWS, NOTICES, PERMITS & FEES

- .1 Add to Paragraph 10.2.2 as follows: *"The Contractor shall take all necessary steps to obtain the occupancy permit, including delivering any notice of completion of the building required by the authorities having jurisdiction."*
- .2 Add new Paragraph 10.2.8 as follows: *"The Contractor's or its Subcontractor's or Supplier's compliance with statutes or regulations made thereunder or by-laws shall not relieve them of obligations set out in the Contract Documents which may be more extensive than the requirements of those statutes, regulations or by-laws."*

1.22 GC 11.1 - INSURANCE

- .1 Delete Paragraph 11.1.1 in its entirety and replace with the following: *"General liability insurance shall be in the joint names of the Contractor, the Owner, the Consultant, and any and all Subcontractors and subconsultants involved in the Work, with limits not less than \$5,000,000 per occurrence and with a property damage deductible not exceeding \$5,000. The insurance coverage shall include at least the following extensions: Premises, Property and Operations; Occurrence basis, Owners/Contractors protective, Products and Completed Operations; Blanket Contractual; Employees as Additional Insureds; Broad Form Property Damage; Broad Form Loss of Use; Personal Injury; Incidental Malpractice; Contingent Employers Liability; Cross Liability/Severability of Interests; Non-Owned Automobile Liability including Endorsement Form 96; Intentional Injury to protect persons or property, X-plate/unlicensed/specially licensed vehicles; Attached Machinery; Hostile fire exception to any pollution exclusion; Voluntary Medical Payments. To achieve the desired limit, umbrella or excess liability insurance may be used. All liability coverage shall be maintained for the completed operations hazard from the date of Substantial Performance of the Work, for 24 months following. The Policy shall be endorsed to provide the named insureds with not less than 30 days notice in writing in advance of any cancellation or change or amendment restricting coverage."*
- .2 Add new Paragraph 11.1.5 as follows: *"Notwithstanding the fact that a claim has been made under any insurance policy described in GC 11, the Contractor shall continue to perform its obligations under the Contract ."*

1.23 GC 11.2 - BONDS

- .1 Add new Paragraph 11.2.3 as follows: *"The Contractor shall at the option of the Owner provide a Performance Bond in the name of the Owner for Fifty Percent (50%) of the Contractor's Fee, to assure the faithful performance of the Contract; on Performance Bond Form, CCDC 221."*
- .2 Add new Paragraph 11.2.4 as follows: *"Bonds obtained by the Subcontractors or Suppliers will be issued in the joint names of the Contractor and the Owner (as dual obligees)."*

1.24 GC 12.3 - WARRANTY

- .1 Add new Paragraph 12.3.7 as follows: *"Should the Work be delayed due to conditions beyond the control of the Contractor, the warranty period shall commence at the time of acceptance of the Work by the Owner."*
- .2 Add new Paragraph 12.3.8 as follows: *"Where warranty repairs on such parts or portions of the Work become necessary, the Consultant will notify the Contractor which Subcontractor or Supplier is responsible to rectify the defective work or work not performed as provided in the Contract Documents."*

- 1 Supplements to Subcontract Conditions
- 1.1 SCC 1.1 - DOCUMENTS
 - .1 Delete Subparagraph 1.1.7.2 in its entirety.
 - .2 Revise Paragraph 1.1.8 as follows: *"The Consultant shall provide the Subcontractors, without charge, ..."*
 - .3 Revise Paragraph 1.1.9 by adding the following sentences: *"The location of fixtures, outlets, conduit, piping and any other locations shown or specified but not dimensioned shall be considered approximate. The actual location shall be as approved by the Consultant and as required to suit job conditions."*
- 1.2 SCC 2.2 - REVIEW AND INSPECTION OF THE WORK
 - .1 Revise Paragraph 2.2.2 as follows: *"... the Subcontractor shall give the Contractor and Consultant timely notice requesting inspection."*
- 1.3 SCC 2.3 - DEFECTIVE WORK
 - .1 Revise Paragraph 2.3.1 as follows: *"The Subcontractor shall within 5 Working Days remove from the Place of the Work and Make Good defective work that has been rejected by the Contractor or Consultant as failing to conform to the Contract Documents ..."*
- 1.4 SCC 3.4 - SUB-SUBCONTRACTORS
 - .1 Revise Subparagraph 3.4.1.3 as follows: *"be as fully responsible to the Contractor, Owner and Consultant for acts and omissions of Sub-Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Subcontractor."*
 - .2 Revise Paragraph 3.4.6 as follows: *"The Contractor or Consultant may provide to a Sub-Subcontractor information as to the percentage ..."*
- 1.5 SCC 3.5 - SHOP DRAWINGS
 - .1 Revise Paragraph 3.5.2 as follows: *"The Consultant shall determine the number of copies of Shop Drawings ...the Subcontractor shall notify the Contractor and Consultant in writing of any deviations ..."*
- 1.6 SCC 3.7 - CUTTING AND REMEDIAL WORK
 - .1 Revise Paragraph 3.7.3 as follows: *"... nor alter the work of any others without the Contractor's and Consultant's written consent, where such member, existing work or other work is apparent from the Subcontract Documents, reasonable examination or instruction of the Consultant."*
 - .2 Add a new Paragraph 3.7.6 as follows: *"Each Subcontractor shall make allowances in his own work to accommodate other Subcontractor's work. The Contractor shall coordinate the cutting and remedial work amongst Subcontractors such that all pieces come together properly."*
- 1.7 SCC 4.1 - CASH ALLOWANCES
 - .1 Revise Paragraph 4.1.3 to read as follows: *"Expenditures under cash allowances shall be authorized by the Consultant."*
- 1.8 SCC 5.1 - APPLICATION FOR PAYMENT
 - .1 Revise Paragraph 5.1.2 as follows: *"The Subcontractor shall submit to the Contractor for the Consultant's approval before the first application ..."*

- .2 Revise Paragraph 5.1.3 as follows: *"... supported by such evidence as the Consultant may reasonably direct and when accepted by the Contractor, with the approval of the Consultant, shall ..."*
 - .3 Add new Paragraph 5.1.6 as follows: *"Each application for payment must include the Subcontractor's GST Registration number."*
 - .4 Add new Paragraph 5.1.7 as follows: *"The Subcontractor shall submit with every application for payment, a "Certificate of Standing" from the Workplace Safety & Insurance Board (WSIB) stating that the Subcontractor has complied with the requirements of the Workers' Compensation Act and is in good standing as of the date of the Certificate."*
- 1.9 SCC 5.2 - WITHHOLDING OF PAYMENT
- .1 Add new Paragraph 5.2.3 as follows, *"The Consultant shall deduct on each certificate for payment, after the 10 percent lien holdback has been deducted, a further one percent, to be set aside and held as a Subcontract completion security account. The accumulated amount in this account shall be released to the Subcontractor as part of the final payment. Partial releases will not be made."*
 - .2 Add new Paragraph 5.2.4 as follows, *"If, within fifteen (15) days of written notification by Owner at any time after Substantial Performance of the Subcontract Work, the Subcontractor does not completely finish the Work, the Owner shall have the right to complete such portions of the Work and deduct the cost for such portions, together with an appropriate administration fee, from the Subcontract completion security account."*
- 1.10 SCC 6.1 - CHANGES
- .1 Revise Paragraph 6.1.1 as follows: *"The Contractor, with the approval of the Consultant, and without invalidating the Subcontract, may make changes ..."*
 - .2 Add new Paragraph 6.1.3 as follows: *"The Subcontractor shall respond to requests for information pertaining to Changes within 10 Working Days of receipt of such requests."*
- 1.11 SCC 6.2 - CHANGE ORDER
- .1 Revise Paragraph 6.2.2 as follows: *"When the Contractor, with the approval of the Consultant, and the Subcontractor agree ..."*
 - .2 Add new Paragraph 6.2.3 as follows: *"The value of a change shall be determined by actual credits and cost to the Subcontractor. Where additional work is required, the value of the change shall be the actual cost plus a percentage covering overhead and profit, after all credits included in the change have been deducted. The following percentage fee for overhead and profit shall be applied to additional work:*
 - .1 *On work performed by the Subcontractor's own forces: the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit;*
 - .2 *On work performed by Sub-Subcontractors, the Sub-Subcontractors may charge a maximum of 5 percent combined percentage for overhead and profit; and*
 - .3 *On work performed by Sub-Subcontractors, the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit on work performed by the Sub-Subcontractors."*
- 1.12 SCC 6.3 - CHANGE DIRECTIVE
- .1 Revise Paragraph 6.3.1 as follows: Insert *"... prior to the Contractor receiving the approval of the Consultant..."*

- .2 Revise Paragraph 6.3.5 as follows: *"The value of a change shall be determined by actual credits and cost to the Subcontractor. Where additional work is required, the value of the change shall be the actual cost plus a percentage covering overhead and profit, after all credits included in the change have been deducted. The following percentage fee for overhead and profit shall be applied to additional work:*
 - .1 *On work performed by the Subcontractor's own forces: the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit;*
 - .2 *On work performed by Sub-Subcontractors, the Sub-Subcontractors may charge a maximum of 5 percent combined percentage for overhead and profit; and*
 - .3 *On work performed by Sub-Subcontractors, the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit on work performed by the Sub-Subcontractors."*
- .3 Revise Subparagraph 6.3.6.1 as follows: *"... under a salary or wage schedule approved by the Contractor and the Consultant, or in the absence ..."*
- .4 Revise Paragraph 6.3.10 as follows: *"If the Contractor, does not have the approval of the Consultant or the Contractor and the Subcontractor do not agree ..."*
- .5 Revise Paragraph 6.3.11 as follows: *"... the Contractor, with the approval of the Consultant, and the Subcontractor reach an agreement on the adjustment to the Subcontract Price and to the Subcontract Time...."*
- 1.13 SCC 6.4 - CONCEALED OR UNKNOWN CONDITIONS
 - .1 Revise Paragraph 6.4.1 as follows: *"... shall notify the other party and the Consultant ..."*
 - .2 Revise Paragraph 6.4.2 as follows: *"The Contractor and the Consultant will promptly investigate such conditions and the Consultant will make a finding.... "*
 - .3 Revise Paragraph 6.4.3 as follows: *"If the Consultant finds that the conditions ... are not materially different ... the Consultant shall report the reasons for his finding to the Contractor and Subcontractor in writing."*
- 1.14 SCC 6.5 - DELAYS
 - .1 Revise Paragraph 6.5.1 as follows: *"... then the Subcontract Time shall be extended for such reasonable time as the Contractor, with the approval of the Consultant and the Subcontractor shall agree that the Subcontract Work was delayed. The Subcontractor shall be reimbursed for reasonable costs incurred by the Subcontractor as a result of such delay."*
 - .2 Revise Paragraph 6.5.2 as follows: *"... then the Subcontract Time shall be extended for such reasonable time as the Contractor, with the approval of the Consultant and Subcontractor shall agree that the Subcontract Work was delayed. The Subcontractor shall be reimbursed for reasonable costs incurred by the Subcontractor as a result of such delay."*
 - .3 Revise Paragraph 6.5.4 as follows: *"... unless notice in writing of claim is given to the Contractor and Consultant not later than ..."*
 - .4 Revise Paragraph 6.5.5 as follows: *"... no request for extension shall be made as a result of failure of the Contractor or Consultant to furnish instructions ..."*
- 1.15 SCC 7.2 - SUBCONTRACTOR'S RIGHT TO STOP THE SUBCONTRACTS WORK OR TERMINATE THE SUBCONTRACTS
 - .1 Revise Paragraph 7.2.1 as follows *"...terminate the Subcontract and such notice shall be provided to the Consultant."*
 - .2 Revise Paragraph 7.2.2 as follows: *"...terminate the Subcontract and such notice shall be provided to the Consultant."*

- .3 Revise Paragraph 7.2.3 to read as follows: *"The Subcontractor may notify the Contractor in writing that the Contractor is in default of their contractual obligation if payment is not received as stated in Article 4 of the Subcontract Agreement - PAYMENT and the Subcontractor shall provide a copy of such notice to the Consultant"*
 - .4 Revise Paragraph 7.2.4 by deleting the phrase *"... to the Contractor ..."*. Add a new Sentence to read as follows: *"The Owner may remedy the Contractor's default and the Subcontractor agrees to continue to complete the Subcontract Work for the Owner or a new Contractor nominated by the Owner"*.
- 1.16 SCC 9.3 - TOXIC OR HAZARDOUS SUBSTANCES AND MATERIALS
- .1 Revise Paragraph 9.3.2 as follows: *"... the Subcontract Time shall be extended for such reasonable time as the Contractor, with the approval of the Consultant, and the Subcontractor shall agree ..."*.
- 1.17 SCC 9.4 - CONSTRUCTION SAFETY
- .1 Add new Paragraph 9.4.2 as follows: *"Prior to commencement of the Work, the Subcontractor shall submit to the Contractor:*
 - .1 *Documentation of a valid Workplace Safety and Insurance Board clearance certificate and confirmation of the Subcontractor's WSIB CAD-7 performance rating.*
 - .2 *Documentation of the Subcontractor's insurance coverage.*
 - .3 *Documentation of the Subcontractor's safety-related programs for the Project.*
 - .4 *A copy of the Subcontractor's Form of Notification."*
- 1.18 SCC 10.1 - TAXES AND DUTIES
- .1 Add new Paragraph 10.1.3 as follows: *"With respect to taxes and duties, the Subcontractor shall, at the request of the Contractor, assist, join in, or at the Contractor's expense, make application on behalf of the Contractor for any exemption, recovery or refund. The Subcontractor shall provide the Contractor with copies, or, where required original of records, invoices, purchase orders or other documentation as may be necessary to support such application."*
 - .2 Add new Paragraph 10.1.4 as follows: *"Any amount included in the Subcontract for tax or duty, whether or not paid, which is found to be inapplicable or for which a refund is obtained shall become the sole and exclusive property of the Contractor."*
- 1.19 SCC 10.2 - LAWS, NOTICES, PERMITS & FEES
- .1 Revise Paragraph 10.2.5 as follows: *"... the Subcontractor shall notify the Contractor and Consultant in writing requesting direction immediately upon such variance or change becoming known. The Consultant will make the changes required to the Contract Documents..."*.
 - .2 Revise Paragraph 10.2.6 as follows: *"If the Subcontractor fails to notify the Contractor and the Consultant in writing; and ..."*.
 - .3 Add new Paragraph 10.2.8 as follows: *"The Contractor's and Subcontractor's compliance with statutes or regulations made thereunder or by-laws shall not relieve them of obligations set out in the Contract Documents which may be more extensive than the requirements of those statutes, regulations or by-laws."*
- 1.20 SCC 11.1 - LIABILITY INSURANCE
- .1 Revise Paragraph 11.1.1 as follows: *"Without restricting the generality of SCC 12.1 - INDEMNIFICATION, the Contractor will arrange for a project specific 'Wrap-up Liability' policy in the amounts of not less than \$5,000,000 per occurrence with a property damage deductible not exceeding \$5,000 on behalf of, and indemnification of the Owner, the Consultants, the Contractor, the Subcontractors, and any other parties as instructed by the Owner."*

1.21 SCC 11.2 - PROPERTY INSURANCE

- .1 Add new Paragraph 11.2.3 as follows: *"The Subcontractor shall be responsible for Subcontractor's Equipment Insurance covering construction machinery and equipment used by the Subcontractor for the performance of the Work. Such insurance shall be on an 'all risks' basis and be endorsed to provide the Consultant and the Owner with not less than 30 days notice in writing in advance of any cancellation, and of any change or amendment restricting coverage."*
- .2 Add new Paragraph 11.2.4 as follows: *"The Subcontractor shall maintain automobile liability insurance in respect of licensed vehicles with limits of not less than \$2,000,000 inclusive per occurrence for bodily injury, death and damage to property, and covering all licensed vehicles owned or leased by the Subcontractor. This automobile liability insurance shall be endorsed to provide the Consultant and the Owner with not less than 30 days notice in writing in advance of any cancellation, and of any change or amendment restricting coverage. Where the policy has been issued pursuant to a government-operated automobile system, the Subcontractor shall provide the Owner with confirmation of automobile insurance coverage for all automobiles registered in the name of the Subcontractor."*

1.22 SCC 12.1 - INDEMNIFICATION

- .1 Insert Paragraph 12.1.5 as follows: *"The Subcontractor shall indemnify and hold harmless the Contractor, the Owner, and the Consultant, their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings (hereinafter called "claims"), suffered or incurred on account of any obligation or a provision in the Subcontract Documents, or attributable to, the Subcontractor's performance of the Subcontract. The Subcontractor assumes towards the Contractor all the obligations and responsibilities that Contractor assumes towards Owner as set forth in the Contract Documents, insofar as applicable, generally or specifically, to the materials to be furnished and the Work to be performed under this Subcontract"*.

1.23 SCC 12.3 - WARRANTY

- .1 Add new Paragraph 12.3.7 as follows: *"Should the Work be delayed due to conditions beyond the control of the Subcontractor, the warranty period shall commence at the time of acceptance of the Work by the Owner."*

END OF DOCUMENT

1 General

1.1 SECTION INCLUDES

- .1 Title of project, type of contract, and Work of each affected separate contract.
- .2 Work sequence.
- .3 Use of premises.
- .4 Owner occupancy.

1.2 PROJECT DESCRIPTION

- .1 Work of the Contractor package and several separate Subcontract packages to be performed under a single Cost Plus Contract comprises the Project, the construction of the GEORGETOWN DISTRICT HIGH SCHOOL - PHASE TWO, located at 70 Guelph Line Georgetown, Ontario; and further identified as Project No.: 0818.

1.3 CONTRACT DOCUMENTS

- .1 Refer to CCDC 3-1998, GC 1.1 and CCA 1-2001, SCC 1.1.
- .2 The Contract Documents were prepared by the Consultant for the account of the Owner. The material contained herein reflects the Consultant's best judgement in light of the information available to him at the time of preparation. Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the Contract Documents.
- .3 These specifications are written in imperative mood in an abbreviated form. The imperative language of the technical sections is directed to the Contractor, unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "the Contractor shall", and "shall be", and similar mandatory phrases by inference in the same manner as they are applied to notes on the drawings. The words "shall be" will be supplied by inference where a colon (:) is used within sentences and phrases. Except where worded to the contrary, fulfil and perform all indicated requirements whether stated imperatively or otherwise.

1.4 CONTRACT METHOD

- .1 Single Construction Contract: The Contractor shall construct the Work under a CCDC 3 - 1998, Cost Plus contract.
- .2 Throughout the execution of the Project, the Consultant may bid portions of the Project and nominate Subcontractors, whose parts or portions of the Project will be incorporated as part of this Contract to make up the Work.
- .3 The Consultant will prepare stipulated price CCA 1 Subcontracts for execution between the Contractor and the Subcontractors.
- .4 Refer to the Supplementary Conditions and Supplementary Subcontract Conditions for information pertaining to the contractual relationship between the Contractor and the Subcontractors.
- .5 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.

1.5 ADMINISTRATIVE / PROCEDURAL SECTIONS APPLICABLE TO ALL CONTRACTS AND SUBCONTRACTS

- .1 Section 01 12 00 - Multiple Contract Summary

- .2 Section 01 21 00 - Allowances
 - .3 Section 01 23 00 - Alternatives
 - .4 Section 01 25 00 - Substitution Procedures
 - .5 Section 01 26 00 - Contract Modification Procedures
 - .6 Section 01 31 00 - Project Management and Coordination
 - .7 Section 01 32 00 - Construction Progress Documentation
 - .8 Section 01 33 00 - Submittal Procedures
 - .9 Section 01 35 00 - Special Procedures
 - .10 Section 01 40 00 - Quality Requirements
 - .11 Section 01 60 00 - Product Requirements
 - .12 Section 01 71 00 - Examination and Preparation Procedures
 - .13 Section 01 73 00 - Execution
 - .14 Section 01 73 29 - Cutting and Patching
 - .15 Section 01 74 00 - Cleaning and Waste Management
 - .16 Section 01 76 00 - Protecting Installed Construction
 - .17 Section 01 77 00 - Closeout Procedures
 - .18 Section 01 78 00 - Closeout Submittals
 - .19 Section 01 79 00 - Demonstration and Training
- 1.6 TEMPORARY UTILITIES, FACILITIES AND SERVICES
- .1 Subcontract SC02: Refer to Section 01 50 00 - Temporary Facilities and Controls.
 - .2 Each Subcontractor shall Provide and perform the following:
 - .1 Electrical extension cords from distribution sources, work lights and any special power required for Subcontract Work.
 - .2 Separate telephone service required for Subcontract Work.
 - .3 Water hoses required for Subcontract Work.
 - .4 Field offices and sheds required for Subcontract Work.
 - .5 Cleaning of Subcontract Work; delivery of debris to collection.
- 1.7 CONTRACT No. C00 - CONTRACTOR
- .1 Assume total control of the Works of the Project. Be responsible for coordination, sequencing and scheduling of work of all Contracts, ensure conformity with the Contract Documents.
 - .2 Contract C00 will be responsible for all Phases of the Work.
 - .3 Assume sole responsibility for construction means; methods, techniques, sequences and procedures, including site usage; provision of temporary utilities, facilities and services; quality control and coordination of testing and inspection services; and, site administration.
 - .4 Fulfill the role of the "constructor" as defined in the Ontario Occupational Health and Safety Act (Construction Projects). File the required Notice of Project and carry out and enforce the provisions in the Act and the requirements of the Project Health and Safety Policy.
 - .5 Report directly to the Consultant.

- .6 Conduct site management duties for the duration of the Project, including field engineering services necessary to layout the Project and ensure accurate working lines and levels for all Subcontract Work. Refer to Section 01 71 00.
- .7 Appoint a single supervisor for the duration of the Contract, until completion of the Contract. Refer to GC 3.7 - Supervisor.
- .8 Arrange for a minimum of one labourer to be present on site each Working Day until completion of the Contract.
- .9 Arrange and pay for the publication of the Project's Certificate of Substantial Performance of the Work.
- .10 Monitor site cleanliness on a daily basis and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans. Provide waste containers on site and arrange for periodic waste removal as necessary until completion of the Contract.

1.8 SUBCONTRACT No. SC02 - GENERAL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Perform cutting and patching of existing masonry as specified in Section 01 73 29.
- .4 Perform final cleaning of the Project as specified in Section 01 74 00.
- .5 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .6 Include the following Work as part of Subcontract SC02:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 01 50 00 - Temporary Facilities and Controls
 - .3 Division 02 - Existing Conditions
 - .1 02 41 19 - Selective Structure Demolition
 - .4 Division 03 - Concrete
 - .1 03 10 00 - Concrete Forming and Accessories
 - .2 03 20 00 - Concrete Reinforcing (including supply and installation of rebar for all cast-in-place concrete footings, foundation walls and slabs only)
 - .3 03 30 00 - Cast-in-Place Concrete
 - .4 03 35 00 - Concrete Finishing
 - .5 Division 05 - Metals
 - .1 05 50 00 - Metal Fabrications
 - .2 05 51 00 - Metal Stairs
 - .6 Division 06 - Wood, Plastics and Composites
 - .1 06 10 00 - Rough Carpentry
 - .2 06 20 00 - Finish Carpentry (install finish hardware only)
 - .7 Division 07 - Thermal and Moisture Protection

- .1 07 81 00 - Applied Fireproofing
- .2 07 84 00 - Firestopping
- .3 07 92 00 - Joint Sealants
- .8 Division 08 - Openings
 - .1 08 11 13 - Hollow Metal Frames (Install Only)
 - .2 08 13 13 - Hollow Metal Doors (Install Only)
 - .3 08 31 00 - Access Doors and Panels
 - .4 08 71 00 - Door Hardware (Install Hardware Only)
 - .5 08 80 00 - Glazing
- .9 Division 09 - Finishes
 - .1 09 66 13 - Portland Cement Terrazzo Flooring (including restoration)
- .10 Division 12 - Furnishings
 - .1 12 67 23 - Benches
- .11 Division 31 - Earthwork
 - .1 31 23 16 - Excavation
 - .2 31 23 23 - Fill
 - .3 31 23 33 - Trenching and Backfilling
- .12 Division 32 - Exterior Improvements
 - .1 32 11 23 - Aggregate Base Courses (excluding exterior works)

1.9 SUBCONTRACT No. SC03 - MASONRY

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC03:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 01 50 00 - Temporary Facilities and Controls (temporary heat for masonry only).
 - .3 Division 4 - Masonry
 - .1 04 05 00 - Common Work Results for Masonry
 - .2 04 05 10 - Masonry Mortaring and Grouting
 - .3 04 05 19 - Masonry Anchorage and Reinforcing
 - .4 04 05 23 - Masonry Accessories
 - .5 04 21 00 - Clay Unit Masonry
 - .6 04 22 00 - Concrete Unit Masonry
 - .7 04 22 26 - Decorative Concrete Unit Masonry
 - .4 Division 07 - Thermal and Moisture Protection
 - .1 07 21 00 - Thermal Insulation (cavity wall rigid insulation only).
 - .2 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders
 - .5 Division 08 - Openings
 - .1 08 31 00 - Access Doors and Panels (Install Only)

1.10 SUBCONTRACT No. SC04 - MECHANICAL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC04:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 15 - Mechanical
 - .1 15010 - General Provisions
 - .2 15020 - Testing, Adjusting & Balancing
 - .3 15200 - Insulation - General Provisions
 - .4 15201 - Pipe Insulation
 - .5 15202 - Duct & Plenum Insulation
 - .6 15400 - Plumbing & Drainage - General Provisions
 - .7 15401 - Piping
 - .8 15402 - Plumbing Accessories
 - .9 15403 - Plumbing Fixtures
 - .10 15404 - Hot Water Storage Heaters
 - .11 15405 - Fire Extinguishers
 - .12 15500 - Sprinklers
 - .13 15700 - Pipe & Fittings - General Provisions
 - .14 15701 - Pipe & Fittings
 - .15 15702 - Piping Devices
 - .16 15703 - Hot Water Heating Devices
 - .17 15705 - Natural Gas Equipment
 - .18 15706 - Pumps
 - .19 15707 - Heating Units
 - .20 15708 - Water Treatment
 - .21 15800 - Air Distribution - General Provisions
 - .22 15801 - Duct Construction
 - .23 15802 - Ductwork Accessories
 - .24 15803 - Vibration Isolation
 - .25 15804 - Grilles & Diffusers
 - .26 15805 - Air Filters
 - .27 15806 - Stacks & Vents
 - .28 15807 - Weather Louvres & Brick Vents
 - .29 15808 - Commercial Fans
 - .30 15809 - Air Terminal Units
 - .31 15810 - Roof-Mounted Package - HVAC Units
 - .32 15811 - Heat Recovery Unit
 - .33 15812 - Range Hoods & Accessories
 - .34 15813 - Existing Equipment
 - .35 15900 - Temperature Controls

- .36 15950 - Refrigeration - General Provisions
- .37 15951 - Pipe & Fittings
- .38 15952 - Air Conditioning Equipment

1.11 SUBCONTRACT No. SC05 - ELECTRICAL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC05:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 16 - Electrical
 - .1 16010 - General Provisions
 - .2 16205 - Electrical Service
 - .3 16212 - Concrete Base for Outdoor Transformer
 - .4 16215 - Grounding for Outdoor Transformer
 - .5 16223 - Service Entrance Board
 - .6 16230 - Panelboards - Breaker Type
 - .7 16240 - Moulded Case Circuit Breakers
 - .8 16245 - Contactors
 - .9 16255 - Disconnect Switches - Fused & Non-Fused
 - .10 16260 - Fuses
 - .11 16300 - Basic Materials & Methods
 - .12 16301 - Conductors
 - .13 16304 - Armoured Cables
 - .14 16310 - Fastenings & Supports
 - .15 16315 - Wire & Box Connectors, 0-1000V
 - .16 16320 - Conduit
 - .17 16350 - Surface Raceway Systems
 - .18 16355 - Wireways & Auxiliary Gutters
 - .19 16365 - Splitters, Junction, Pull Boxes & Cabinets
 - .20 16375 - Outlet Boxes, Conduit Boxes & Fittings
 - .21 16380 - Wiring Devices
 - .22 16381 - Occupancy & Daylight Sensor Lighting Control Devices
 - .23 16470 - Motor Starters
 - .24 16512 - Addition to Existing TV Distribution System
 - .25 16516 - Addition to Existing Intercom, Paging & Clock System
 - .26 16530 - Communication Raceway System
 - .27 16540 - Telecommunications Cabling System
 - .28 16600 - Fire Alarm System
 - .29 16700 - Wiring for Mechanical Equipment
 - .30 16800 - Lighting
 - .31 16920 - Addition & Modifications to Existing Security System
 - .32 16965 - Unit Equipment for Emergency Lighting

.33 16995 - Modular Control Panels

1.12 SUBCONTRACT No. SC06 - FOOD SERVICES

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC06:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 11 - Equipment
 - .1 11 40 00 - Foodservices Equipment

1.13 SUBCONTRACT No. SC07 - STRUCTURAL STEEL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC07:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 05 - Metals
 - .1 05 12 00 - Structural Steel Framing
 - .2 05 21 00 - Steel Joist Framing
 - .3 05 30 00 - Metal Decking

1.14 SUBCONTRACT No. SC08 - MEMBRANE ROOFING

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.

- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC08:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 07 - Thermal and Moisture Protection
 - .1 07 50 13 - Common Work Results for Roofing
 - .2 07 50 16 - Wood Blocking for Roofing
 - .3 07 50 19 - Sealants for Roofing
 - .4 07 51 00 - Built-Up Bituminous Roofing
 - .5 07 62 13 - Sheet Metal for Built-Up Roofing.
- 1.15 SUBCONTRACT No. SC09 - ALUMINUM WINDOWS
- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC09:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 08 - Openings
 - .1 08 41 13 - Aluminum-Framed Entrances and Storefronts
 - .2 08 44 13 - Glazed Aluminum Curtain Wall
 - .3 08 51 13 - Aluminum Windows
- 1.16 SUBCONTRACT No. SC10 - HOLLOW METAL DOORS AND FRAMES (SUPPLY ONLY)
- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.

- .4 Include the following Work as part of Subcontract SC10:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 08 - Openings
 - .1 08 11 13 - Hollow Metal Frames (Supply Only)
 - .2 08 13 13 - Hollow Metal Doors (Supply Only)
- 1.17 SUBCONTRACT No. SC11 - ELEVATING DEVICES
 - .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC11:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 14 - Conveying Systems
 - .1 14 42 16 - Vertical Wheelchair Lift.
- 1.18 SUBCONTRACT No. SC12 - SIGNAGE
 - .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC12:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.

- .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
- .3 Division 10 - Specialties
 - .1 10 14 00 - Signage
 - .2 10 14 53 - Traffic Signage

1.19 SUBCONTRACT No. SC13 - SITE WORKS

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC13:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 31 - Earthwork
 - .1 31 11 00 - Clearing and Grubbing
 - .2 31 22 13 - Rough Grading
 - .4 Division 32 - Site Improvements
 - .1 32 11 23 - Aggregate Base Courses (excluding interior works)
 - .2 32 12 16 - Asphalt Paving
 - .3 32 13 13 - Concrete Paving
 - .4 32 16 13 - Concrete Curbs and Gutters
 - .5 32 17 23 - Pavement Markings
 - .6 32 92 23 - Sodding
 - .7 32 93 00 - Trees, Shrubs, Groundcovers and Maintenance

1.20 SUBCONTRACT No. SC14 - OPERABLE PARTITIONS

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC14:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.

- .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
- .3 Division 10 - Specialties
 - .1 10 22 26 - Operable Partitions

1.21 SUBCONTRACT No. SC15 - PAINTING AND FINISHING

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC15:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 09 - Finishes
 - .1 09 90 00 - Painting and Coating

1.22 SUBCONTRACT No. SC16 - MILLWORK

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC16:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 06 - Wood and Plastics
 - .1 06 20 00 - Finish Carpentry (excluding finish hardware installation).
 - .2 06 24 00 - Laminated Plastic
 - .3 06 40 00 - Architectural Woodwork

1.23 SUBCONTRACT No. SC17 - DRYWALL AND ACOUSTICS

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC17:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 06 - Wood, Plastics and Composites
 - .1 06 16 43 - Gypsum Sheathing
 - .4 Division 08 - Openings
 - .1 08 31 00 - Access Doors and Panels (Install in Gypsum Board Only)
 - .5 Division 09 - Finishes
 - .1 09 21 16 - Gypsum Board Assemblies
 - .2 09 51 23 - Acoustical Tile Ceilings
 - .3 09 81 00 - Acoustic Insulation
 - .4 09 84 13 - Fixed Sound Absorptive Panels
 - .5 09 84 13.13 - Fixed Sound-Absorptive Cementitious Panels

1.24 SUBCONTRACT No. SC18 - FLOORING

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC18:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 09 - Finishes
 - .1 09 30 00 - Tiling
 - .2 09 65 00 - Resilient Flooring
 - .3 09 68 00 - Carpeting

1.25 SUBCONTRACT No. SC19 - RESILIENT ATHLETIC FLOORING

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC19:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 09 - Finishes
 - .1 09 65 66 - Resilient Athletic Flooring

1.26 SUBCONTRACT No. SC20 - FINISH HARDWARE SUPPLY

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract SC20:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 08 - Openings
 - .1 08 71 00 - Door Hardware.

1.27 SUBCONTRACT No. SC21 - RESERVED

1.28 SUBCONTRACT No. SC22 - METAL WALL PANELS

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.

- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC22:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 05 - Metals
 - .1 05 40 00 - Cold-Formed Metal Framing
 - .4 Division 06 - Wood, Plastics, and Composites
 - .1 06 16 43 - Gypsum Sheathing
 - .5 Division 07 - Thermal and Moisture Protection
 - .1 07 21 00 - Thermal Insulation (metal panel insulation only)
 - .2 07 42 13 - Metal Wall Panels
 - .3 07 42 16 - Aluminum Wall Panel Assemblies
- 1.29 SUBCONTRACT No. SC23 - TOILET COMPARTMENTS
- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC23:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 10 - Specialties
 - .1 10 21 13.13 - Metal Toilet Compartments
 - .2 10 28 13 - Toilet Accessories.
- 1.30 SUBCONTRACT No. SC24 - VISUAL DISPLAY BOARDS
- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.

- .4 Include the following Work as part of Subcontract SC24:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 10 - Specialties
 - .1 10 11 00 - Visual Display Boards.
- 1.31 SUBCONTRACT No. SC25 - METAL LOCKERS
 - .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
 - .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
 - .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
 - .4 Include the following Work as part of Subcontract SC25:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 10 - Specialties
 - .1 10 51 13 - Metal Lockers.
- 1.32 CONTRACTOR USE OF PREMISES
 - .1 Contractor shall limit use of the Place of the Work for execution of the Work, for storage, and for access, to allow:
 - .1 Owner occupancy,
 - .2 Work by other contractors,
 - .3 Public usage.
- 1.33 OWNER OCCUPANCY OF EXISTING FACILITIES
 - .1 Owner will occupy existing facilities during entire construction period for execution of normal operations.
 - .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- 1.34 PARTIAL OWNER OCCUPANCY OF THE WORK
 - .1 Owner may temporarily occupy designated areas of the Work for the purpose of storing furnishings and equipment, installing equipment and continuance of operations.

- .2 In accordance with GC 5.9 - Non-Conforming Work, partial Owner occupancy will not be considered as an acceptance of the Work, nor in any way relieve the Contractor of his responsibility to complete the Work.

1.35 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Refer to CCDC 3, GC 5.4.
- .2 Substantial Performance of the Work for all phases of the Work is required for Owner occupancy before November 26, 2010.
- .3 Completion of interim phases of the Work is required as indicated in the Schedule of Required Completion Dates, appended to this Section.

END OF SECTION

- 1 General
- 1.1 CASH ALLOWANCES
 - .1 Refer to GC 4.1 - Cash Allowances.
 - .2 Submit to the Consultant, if directed, before submission of final application for payment, certified copies of all invoices and statements from Suppliers or Subcontractors furnishing Products purchased under a cash allowance.
 - .3 The amount of each allowance, for Work specified in the respective specification Sections:
 - .1 Subcontract SC-02:
 - .1 Include the stipulated sum of \$300,000 for unforeseen eventualities.
 - .2 Subcontract SC-04:
 - .1 Include the stipulated sum of \$45,000 for air and water balancing.
 - .3 Subcontract SC-05:
 - .1 Security System: Include the stipulated sum of \$2,500 for miscellaneous upgrades to the existing security system hardware and software to accommodate new door contacts and motion sensors as required by Owner.
 - .2 Fire Alarm System: Include the stipulated sum of \$4,000 for miscellaneous devices in hidden or missed confined spaces which are to be replaced with new addressable devices.
 - .3 Computer System: Include the stipulated sum of \$5,000 for miscellaneous upgrades to the existing system hardware and head end equipment to accommodate new computer drops, rack equipment and fiber optic revisions as required by Owner.
 - .4 Testing: Include the stipulated sum of \$6,000 for ground potential rise (GPR) analysis covering entire existing medium and high voltage systems up to 44 kV hydro pole and do the required modifications.
 - .5 Stage Lighting: Include the stipulated sum of \$4,500 for for remote dimming control panel for stage lighting remote control lighting and dimming system console and wiring remote panel to be located in Control Room E122D.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Product substitution procedures.
- 1.2 PRODUCT SUBSTITUTION PROCEDURES
 - .1 Requests for substitution will only be considered when submitted in sufficient time to permit proper evaluation by the Consultant.
 - .2 When requesting Consultant review of a proposed Product substitution, demonstrate that the proposed substitute will perform equally as well or better as the specified Product.
 - .3 Accompany each request for substitution with a list of properties for both the specified Product and the proposed substitute, including the following information:
 - .1 Product identification, including manufacturer's name, address, telephone and fax numbers, and web site address where available.
 - .2 Manufacturer's Product data sheets, including material descriptions, compliance with applicable reference standards, and performance and test data.
 - .3 A summarized comparison of physical properties and performance characteristics for the specified Product and the proposed substitution, and clearly highlighting significant variations.
 - .4 Indication of availability of maintenance services and sources of replacement materials and parts, including associated costs and time frames.
 - .5 Indication of cost savings and reduction of construction schedule.
 - .6 Verification that the substitute will not result in additional costs or a reduction in performance to other portions of the Work.
 - .7 Reason for requesting the substitution.
 - .4 The clauses "or equal", "or approved equal", or other similar clauses, will not be construed as an invitation to submit requests for substitution or to unilaterally substitute Products in place of the specified Products and systems.
 - .5 Failure to order specified Products in adequate time to meet the approved construction schedule will not be a valid reason to submit a request for substitution. In accordance with GC 6.5 - Delays, such delays remain the responsibility of the Contractor, and will not result in an extension to the Contract Time or be subject to reimbursement by the Owner.
 - .6 The Owner is under no obligation to consider Product or system substitutions recommended by the Contractor.
 - .7 Remove and replace substitutions incorporated into the Work without the Consultant's written approval.

END OF SECTION

1 General

1.1 CONTRACT MODIFICATION PROCEDURES

- .1 Refer to GC 6.1 - Changes, GC 6.2 - Change Order and GC 6.3 - Change Directive.
- .2 Once a Proposed Change has been issued by the Consultant, it shall be the responsibility of the Contractor to ensure that no work is carried out that may increase the cost of the variation contemplated.
- .3 The Consultant will assess the fair market cost of each change before issuing a Change Order. Assist the Consultant with this task by quoting variations in a complete manner, listing:
 - .1 quantity of each material,
 - .2 unit cost of each material,
 - .3 man hours involved,
 - .4 cost per hour,
 - .5 Subcontractor quotations,
 - .6 mark-up.
- .4 The Consultant may require further quotations in order to show a breakdown of costs.
- .5 The Owner and the Consultant will not be responsible for delays to the Work resulting from late, incomplete or inadequately broken down valuations submitted by the Contractor.
- .6 Minor variations may be made in the project from time to time as approved by the Consultant. Such alterations or adjustments shall not constitute a change in cost unless a request is made at the time. No extra will be contemplated except where a clear indication is made that extra payment is claimed, in which case a Proposed Change or Change Directive will be issued by the Consultant in accordance with GC 6.1 - Changes or GC 6.3 - Change Directive. Unless this procedure is followed, no claims for extras will be allowed.

END OF SECTION

1 General

1.1 COORDINATION

- .1 Coordinate the Work to ensure the Work proceeds safely and expeditiously.
- .2 Ensure adequate communication among involved parties.
- .3 Allocate mobilization areas of the Place of the Work; for field offices and sheds, for access, traffic, and parking facilities.
- .4 Coordinate use of the Place of the Work and facilities through procedures for submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.
- .5 Submit information required for preparation of coordination and interference drawings. Review and approve revised drawings for submission to Consultant.

1.2 OTHER CONTRACTORS

- .1 Cooperate with any separate contractor employed by the Owner and, if necessary, co-ordinate with their work.
- .2 Submit necessary information to Owner to assist in the required scheduling of such contractors.

1.3 CONTINUANCE OF OWNER OPERATIONS

- .1 Coordinate and schedule the Work to minimize any disruption of the normal functions of the existing building.
- .2 Changes to the traditional scheduling of construction may be required and certain portions of the Work may not be able to proceed in continuous sequence.
- .3 Every reasonable effort will be made to cooperate with the construction process.
- .4 The Owner may modify proposed scheduling where such changes are in the best interests regarding the operation of the existing building.

1.4 PROJECT MEETINGS

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

- .9 Schedule meetings at regular 14 day intervals, on a day that is determined as convenient by Contractor and Consultant.

1.5 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Owner, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned a minimum of 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include the following:
 - .1 Appointment of official representative of participants in the Work;
 - .2 Schedule of Work, progress scheduling;
 - .3 Schedule of submissions of shop drawings, samples, colour chips;
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences;
 - .5 Delivery schedule of specified equipment;
 - .6 Site security;
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements;
 - .8 Owner provided products;
 - .9 Record drawings;
 - .10 Maintenance manuals;
 - .11 Take-over procedures, acceptance, warranties;
 - .12 Monthly progress claims, administrative procedures, photographs, holdbacks;
 - .13 Appointment of inspection and testing agencies or firms;
 - .14 Insurances, transcripts of policies.

1.6 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings biweekly.
- .2 During course of Work, schedule progress draw meetings monthly.
- .3 Submit to Consultant a copy of the application for payment not less than two Working Days before scheduled progress draw meeting. Consultant may require changes to the application for payment prior to progress draw meeting.
- .4 Contractor, major Subcontractors involved in Work, Consultant, and Owner are to be in attendance.
- .5 Notify parties minimum 4 days prior to meetings.
- .6 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .7 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting;
 - .2 Review of Work progress since previous meeting;
 - .3 Field observations, problems, conflicts;
 - .4 Problems impeding construction schedule;
 - .5 Review of off-site fabrication delivery schedules;
 - .6 Corrective measuring and procedures to regain project schedule;
 - .7 Revision of construction schedule;
 - .8 Progress, schedule, during succeeding work period;

- .9 Review submittal schedules, record drawings: expedite as required;
- .10 Maintenance of quality standards;
- .11 Review of proposed changes for affect on construction schedule and on completion date;
- .12 Other business.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Schedules.
 - .2 Construction photographs.
- 1.2 SUBMISSION REQUIREMENTS
 - .1 Submit initial schedules within 15 days after award of Contract and resubmit updated schedule with each application for payment.
 - .2 Submit one translucent reproduction, plus two opaque copies to be retained by the Consultant.
- 1.3 CONSTRUCTION SCHEDULE - CRITICAL PATH METHOD
 - .1 Include complete sequence of construction activities.
 - .2 Include dates for commencement and completion of each major element of construction.
 - .3 Show projected percentage of completion of each item as of first day of month.
 - .4 Indicate progress of each activity to date of submission of the schedule.
 - .5 Update schedule monthly and resubmit with each application for progress payment. The Consultant will not review an application for payment that does not include an updated construction schedule.
 - .6 Show changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.
 - .7 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays, and impact on schedule.
 - .2 Corrective action recommended and its effect.
 - .3 Effect of changes on schedules of other contractors.
- 1.4 ADDITIONAL SCHEDULES
 - .1 Concurrently with construction schedule, submit a schedule of values, a cash flow schedule, a shop drawing schedule and an equipment delivery schedule in formats acceptable to Consultant.
 - .2 Cash Flow Schedule: broken down on a monthly basis, indicating anticipated monthly progress billings for duration of Contract.
 - .3 Schedule of Values: to requirements of the Contract.
 - .4 Submittal Schedule:
 - .1 Refer to GC 3.10 - Shop Drawings.
 - .2 Indicate anticipated submission dates and review periods for shop drawings, samples, lists of materials and other documentation.
 - .3 Highlight critical items, including latest date for submittal review by Consultant.
 - .4 Design sequence of submissions to reflect requirements of construction schedule.
 - .5 Equipment Delivery Schedule: indicate list of manufactured equipment complete with order dates and anticipated delivery dates.

1.5 PROGRESS PHOTOGRAPHS

- .1 Concurrently, with monthly application for payment, submit three sets of four 200 x 250 mm sized colour photographs.
- .2 Digital submissions will be accepted in place of hard copy, provided the images are formatted as either Bitmap (.bmp) or JPEG (.jpg) image files.
- .3 Photographs shall be taken by an experienced photographer.
- .4 Positions of photographs to be determined by Consultant.
- .5 Photographs will be properly exposed and in focus, with unobstructed views.
- .6 Identify each photograph with:
 - .1 name of Project,
 - .2 name of photographer,
 - .3 description of view, and
 - .4 date photograph was taken.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Shop drawings and product data.
 - .2 Samples.
- 1.2 ADMINISTRATIVE
 - .1 Submit to Consultant submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
 - .2 Work affected by the submittal shall not proceed until review is complete.
 - .3 Review submittals prior to submission to the Consultant. Submittals not stamped, signed, dated and identified will not be reviewed by Consultant.
 - .4 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
 - .5 Include with each submission a duplicate transmittal document indicating the following:
 - .1 Date of initial submission,
 - .2 Date of each resubmission, and
 - .3 Project title and Consultant's project number.
 - .6 Indicate on each submission, the following information:
 - .1 Name of Contractor,
 - .2 Name of Subcontractor,
 - .3 Name of supplier (as applicable),
 - .4 Name of manufacturer (as applicable),
 - .5 Name of person responsible for preparation of submission, and
 - .6 Relevant specification Section numbers.
- 1.3 SUBMITTALS PRIOR TO START OF WORK
 - .1 Submit the following documents within the time stipulated, or, if not stipulated, prior to first application for payment:
 - .1 Insurance certificates,
 - .2 Bonds,
 - .3 Workplace Safety and Insurance Board certificates,
 - .4 Construction schedule,
 - .5 Interference drawings,
 - .6 Schedule of values,
 - .7 Cash flow schedule,
 - .8 Shop drawing schedule, and
 - .9 Equipment delivery schedule.
- 1.4 INTERFERENCE DRAWINGS
 - .1 Prepare a set of interference drawings, identifying and resolving potential conflicts among various parts of the Work, including fire suppression systems, HVAC ductwork, plumbing and drainage lines, lighting, and electrical systems.
 - .2 Submit three copies of interference drawings to Consultant prior to start of Work.
 - .3 Coordinate and review interference drawings with affected Subcontractors prior to commencement of their portions of the Work.
- 1.5 SHOP DRAWINGS AND PRODUCT DATA
 - .1 Refer to GC 3.11 - Shop Drawings.

- .2 Prepare shop drawings in metric measurement only. Shop drawings containing only imperial measures may be rejected.
- .3 Submit one reproducible copy and 4 opaque copies of Shop Drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
- .4 Submit 5 copies of Product data sheets or brochures for requirements requested in specification Sections and as the Consultant may reasonably request where Shop Drawings will not be prepared due to standardized manufacture of product.
- .5 The Consultant's review of the Shop Drawings does not authorize changes in either the Contract Price or Contract Time.
- .6 After review, the Consultant will return the reproducible transparency to Contractor. Produce and distribute the necessary copies to affected parties.

1.6 SAMPLES

- .1 No later than 3 weeks after the award of the Contract, submit to Consultant the following information:
 - .1 a complete list of Suppliers and/or manufacturers intended for use in the completion of the Contract.
 - .2 all colour samples required by the individual sections for selection by Consultant. Include the preparation of any representative panels of materials or colours deemed necessary by the Consultant.
- .2 Adjustments made on samples by the Consultant are not intended to change the Contract Price or Contract Time. If adjustments affect the Contract Price or Contract Time, state such in writing to the Consultant prior to proceeding with the Work.

END OF SECTION

- 1 General
- 1.1 DRAINAGE
 - .1 Provide temporary drainage and pumping as necessary to keep the excavations and the Place of the Work free from water.
 - .2 Dispose of water containing silt in suspension in accordance with local authority requirements.
 - .3 Maintain existing drainage, above ground and underground, adjacent to the Work or affected by the Work.
 - .4 Before commencing any portion of the Work likely to affect the drainage of water from the existing building or the Place of the Work, provide necessary alternative drainage systems to ensure that water will be conducted to alternative outlets. Do not block or impede any drain, roof outlet or rainwater leader after such safety precautions have been made.
- 1.2 CONSTRUCTION SAFETY
 - .1 Refer to GC 3.6 - Construction Safety.
 - .2 Assume the role of "Constructor" as defined by applicable safety legislation.
 - .3 Provide a copy of the registration filed with a Director under the provincial Occupational Health and Safety Act (Construction Projects); referred to as "Registration Forms of Construction and Employers of Workers".
 - .4 Hold regular, scheduled safety meetings.
- 1.3 NOISY WORK RESTRICTIONS
 - .1 Schedule noisy work, or work requiring the use of pneumatic tools, in a manner to avoid disturbance to existing building occupants. This may require portions of the Work to be performed outside normal working hours.
- 1.4 SPECIAL PROCEDURES FOR CONTRACTORS WORKING IN EXISTING BUILDINGS
 - .1 Comply with Owner's procedures and requirements for contractors performing work in existing buildings.
 - .2 Conform to the latest edition of "Guidelines For Maintaining Fire Safety During Construction in Existing Buildings", as issued by the Office of the Fire Marshal.
- 1.5 HEALTH AND SAFETY REQUIREMENTS
 - .1 Prepare and initiate a Health and Safety Plan in accordance with appropriate regulatory agencies' requirements prior to commencing work activities involving the excavation, transport or handling of potentially contaminated material.
 - .2 Submit final draft of Health and Safety Plan to the Consultant for review prior to implementation of Plan.
 - .3 Adhere to approved Health and Safety Plan for the duration of the removal and disposal of contaminated material from the Place of the Work.
 - .4 Provide and maintain a safe working environment for on-site personnel and minimize the impact of construction activities on the general public and the surrounding environment.
 - .5 Supply workers, Consultants, inspectors and other site-visitors with appropriate personal protective equipment.

- .6 Should any unforeseen, or site-peculiar safety related factor, hazard, or condition become evident during the performance of the work, notify the authority having jurisdiction and the Consultant immediately, and take prudent temporary action to establish and maintain safe working conditions until suitable permanent action can be implemented. Safeguard workers, the public and the surrounding area from contamination.
- .7 Perform routine air monitoring at the Place of the Work, testing for organic vapours, explosive conditions and oxygen deficient conditions. Evacuate work area immediately and implement corrective measures if unsatisfactory conditions are discovered.
- .8 In the event of injury to on-site personnel, contact the designated hospital and describe the injury prior to or during transport of injured personnel. Transport the injured personnel to the defined medical facility along a predefined route.
- .9 Take appropriate measures to minimize the contact of vehicles and equipment with potentially contaminated materials. Vehicles, equipment and workers which do contact contaminated materials shall be decontaminated in an approved manner prior to leaving the Place of the Work.

1.6 SECURITY DEPOSITS

- .1 When the Owner has submitted security deposits to the authorities having jurisdiction prior to the award of a particular Subcontract, the responsible Subcontractor shall reimburse the Owner the deposit amount. Failure to reimburse the Owner the required amount will result in the postponement of payment of the Subcontractor's first application for payment.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Regulatory requirements.
 - .2 References.
 - .3 Inspection and testing requirements.
 - .4 Testing and mix designs.
 - .5 Mock-ups.
 - .6 Mill tests.
- 1.2 REGULATORY REQUIREMENTS
 - .1 Conform to the latest editions of the following regulatory requirements, hereinafter referred to as codes:
 - .1 The Ontario Building Code;
 - .2 The Ontario Fire Code;
 - .3 The Ontario Plumbing Code;
 - .4 The Canadian Electrical Code;
 - .5 The Construction Lien Act;
 - .6 The Occupational Health and Safety Act (Construction Projects);
 - .7 The Elevating Devices Act;
 - .8 The Workplace Hazardous Materials Information System Regulation (WHMIS);
 - .9 Waste Audits and Waste Reduction Workplans; and
 - .10 Industrial, Commercial and Institutional Source Separation Programs.
 - .2 Conform to requirements of authorities having jurisdiction, including public utilities.
 - .3 Nothing contained in the Contract Documents shall be so construed as to be in conflict with any law, by-law, or regulation of the municipal, regional, provincial, or other Authorities Having Jurisdiction. Perform all work in conformity with all such regulatory requirements.
- 1.3 PERMITS AND FEES
 - .1 Refer to GC 10.2 - Laws, Notices, Permits and Fees.
 - .2 Determine detailed requirements of authorities having jurisdiction.
 - .3 Pay construction damage deposits levied by municipality in connection with the issuance of a building permit.
- 1.4 REFERENCES
 - .1 Where edition date is not specified, consider that references to manufacturer's data, and published codes, standards and specifications are made to the latest edition or revision, approved by the issuing organization.
 - .2 Reference standards and specifications are quoted to establish minimum standards. Work which in quality exceeds the specified minimum will be considered to conform.
 - .3 The requirements of the Contract Documents govern over the requirements of reference standards and specifications.
 - .4 Standards, specifications, associations and regulatory agencies are generally referred to throughout the Contract Documents by their abbreviated designations, as listed below:
 - .1 AA The Aluminum Association
 - .2 AAMA Architectural Aluminum Manufacturer's Association

.3	ACI	American Concrete Institute
.4	AISI	American Iron and Steel Institute
.5	AMCA	Air Movement and Air Control Association
.6	ANSI	American National Standards Institute
.7	ARI	Air Conditioning and Refrigeration Institute
.8	ASME	American Society of Mechanical Engineering
.9	ASTM	American Society for Testing and Materials
.10	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc.
.11	AWMAC	Architectural Woodwork Manufacturers Association of Canada
.12	CGA	Canadian Gas Association
.13	CGSB	Canadian General Standards Board
.14	CISC	Canadian Institute of Steel Construction
.15	CRCA	Canadian Roofing Contractors' Association
.16	CSA	Canadian Standards Association
.17	CSC	Construction Specifications Canada
.18	CSSBI	Canadian Sheet Steel Building Institute
.19	CWC	Canadian Wood Council
.20	NFPA	National Fire Protection Association
.21	OPCA	Ontario Painting Contractors' Association
.22	SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
.23	ULC	Underwriters Laboratories of Canada
.24	ULI	Underwriters Laboratories Incorporated
.25	WHI	Warnock-Hersey International

1.5 QUALITY ASSURANCE

- .1 Quality of work shall be the best quality, executed by the workers experienced and skilled in the respective duties for which they are employed.
- .2 Maintain good order and discipline among workers engaged on the Project. Do not employ on the Work anyone not skilled in the tasks assigned.
- .3 Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.
- .4 Decisions as to the quality or fitness of work in cases of dispute rest solely with the Consultant, whose decision is final.

1.6 QUALITY CONTROL

- .1 Refer to GC 2.3 - Review and Inspection of the Work.

1.7 TESTING AND INSPECTION SERVICES

- .1 Independent Inspection and Testing Agencies will be engaged by the Owner for the purpose of inspecting and testing portions of the Work.
- .2 Cost of testing and inspection shall be paid directly by Owner.
- .3 Supply equipment required for executing inspection and testing by the appointed agencies.
- .4 Employment of inspection and testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.
- .5 If defects are revealed during inspection and testing, the appointed agency will request additional inspection and testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no additional cost to Owner. Pay costs for retesting and reinspection.

- .6 Allow inspection and testing agencies access to the Work, off-site manufacturing and fabrication plants.
 - .7 Cooperate to provide reasonable facilities for such access.
 - .8 Notify the appropriate agency and Consultant in advance of the requirement for tests, in order that attendance arrangements can be made.
 - .9 Submit samples or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
 - .10 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- 1.8 DEFECTIVE WORK
- .1 Refer to GC 2.4 - Defective Work.
- 1.9 QUALITY CONTROL REPORTS
- .1 Forward copies of inspection and test reports promptly to each affected Subcontractor.
- 1.10 TESTS AND MIX DESIGNS
- .1 Furnish test results and mix design as may be required.
 - .2 The costs of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.
- 1.11 MOCK-UP
- .1 Prepare mock-ups for portions of the Work specifically requested in the Contract Documents. Include work of all Sections required to provide each mock-up.
 - .2 Construct mock-ups in locations acceptable to Consultant.
 - .3 Prepare mock-up for Consultant review with reasonable promptness and in an orderly sequence, so as not to cause delay in the Work.
 - .4 Failure to prepare mock-up in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .5 If requested, the Consultant will assist in preparing a schedule fixing the dates for preparation.
 - .6 Specification section identifies whether the mock-up may remain as part of the Work or must be removed.
- 1.12 MILL TESTS
- .1 Submit mill tests certificates as may be requested.
- 1.13 EQUIPMENT AND SYSTEMS
- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
 - .2 Refer to facility services Sections for definitive requirements.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Temporary utilities.
 - .2 Construction facilities.
 - .3 Construction aids.
 - .4 Vehicular access and parking.
 - .5 Temporary barriers and enclosures.
 - .6 Temporary controls.
 - .7 Project identification.
- 1.2 ADMINISTRATIVE REQUIREMENTS
 - .1 Provide and maintain temporary utilities, facilities and controls in order to execute the Work expeditiously.
 - .2 Maintain temporary utilities, facilities and controls in a neat and tidy condition.
 - .3 Remove temporary utilities, facilities and controls from the Place of the Work after use.
- 1.3 TEMPORARY UTILITIES
 - .1 Temporary Electricity
 - .1 Provide and pay for temporary power during construction to provide adequate temporary lighting; operation of power tools; temporary heating and ventilation; and to ensure the proper completion of the Work.
 - .2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.
 - .3 Provide and maintain temporary electrical systems to CSA C22.1-1990, Canadian Electrical Code, Part 1 - Temporary Wiring.
 - .2 Temporary Heating, Cooling and Ventilating
 - .1 Provide temporary heating and cooling required during construction period, including attendance, maintenance and fuel.
 - .2 Maintain temperatures of minimum 10 degrees Celsius and maximum of 35 degrees Celsius in areas where construction is in progress, unless indicated otherwise in specifications.
 - .3 Temporary heaters will be forced hot air type, operated in a well ventilated location. Vent direct fired heaters directly to exterior and extend vent beyond wall face to avoid staining. Open flame heaters or salamanders are not permitted.
 - .4 Uniformly distribute heat to avoid hot and cold areas and to prevent excessive drying.
 - .5 Upon approval of the Owner, the permanent heating system of the building, or portions thereof, may be used when available. Be responsible for damage thereto.
 - .6 On completion of Work, replace filters in permanent heating system and clean all ducts.
 - .7 Provide minimum one air change per hour for enclosed areas receiving architectural finishes.
 - .8 Prior to commencement of Work using hazardous or volatile adhesives, coatings or substances, install adequate mechanical ventilation.
 - .9 Do not allow excessive build up of moisture in building.
 - .3 Temporary Lighting: Provide and maintain suitable lighting during hours of darkness at danger points.
 - .4 Temporary Telephone: Provide temporary telephones and fax machines necessary for own use and use of Consultant.

- .5 Temporary Water:
 - .1 Provide and pay for a continuous supply of potable water for construction use.
 - .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.

- 1.4 CONSTRUCTION FACILITIES
 - .1 Field Offices and Sheds
 - .1 Provide and maintain in clean condition during progress of Work, adequately lighted, heated and ventilated Contractor's office with space for filing and layout of Contract Documents.
 - .2 Subcontractors may provide their own offices as necessary. Direct the location of these offices.
 - .3 Do not store building materials or equipment in construction office.
 - .4 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

 - .2 First Aid
 - .1 Provide appropriate emergency and first aid equipment as prescribed by authorities having jurisdiction.
 - .2 Mount emergency and first aid equipment in a prominent and easily accessible location with easily identifiable labels.
 - .3 A minimum of one person trained in basic first aid shall be on site at all times. This person may perform other duties, but must be immediately available to render first aid when needed.

 - .3 Sanitary Facilities
 - .1 Provide sufficient separate sanitary facilities for workers in accordance with local health authorities.
 - .2 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.
 - .3 New sanitary facilities may not be used during the construction period.
 - .4 Except where connected to municipal sewer system, periodically remove wastes from the Place of the Work.

- 1.5 CONSTRUCTION AIDS
 - .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
 - .2 Hoists and cranes shall be operated by qualified operator.
 - .3 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs as required for the safe execution of the Work.

- 1.6 VEHICULAR ACCESS AND PARKING
 - .1 Construct and maintain temporary roads and accesses.
 - .2 Clean private and municipal roadways as necessary or as directed by Consultant.
 - .3 Coordinate access restrictions with Subcontractors and Suppliers.
 - .4 Provide temporary drainage measures to maintain adequate drainage at the Place of the Work and surrounding areas.
 - .5 Remove snow from temporary roads and accesses to allow complete access to the Place of the Work.
 - .6 Maintain access of emergency vehicles to the Place of the Work at all times.

- .7 Parking will be permitted at the Place of the Work, provided it does not disrupt the performance of the Work.
- 1.7 TEMPORARY BARRIERS AND ENCLOSURES
- .1 Protective Enclosures:
 - .1 Erect suitably high solid protective enclosures around entire perimeter of the Place of the Work to protect the public, workers, public and private property from injury or damage. Provide locking gates to restrict access to only authorized personnel and vehicles.
 - .2 Provide and maintain full safety protection at open shafts in floors, roof decks and other working surfaces.
 - .3 Provide and maintain suitable warning signs as required by all applicable regulations and by-laws.
 - .2 Weather Enclosures:
 - .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
 - .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
 - .3 Dust Barriers:
 - .1 Provide dust tight screens or partitions to localize dust generating activities, and for the protection of workers, finished areas of Work and the public.
 - .2 Maintain and relocate protection until such Work is complete.
 - .4 Security Measures:
 - .1 Maintain security of construction site by control of access through enclosing fences, barricades, and hoardings during times work is in progress, and by locking hardware otherwise.
 - .2 After new building is enclosed, maintain its security by adequate barriers to entry, and by temporary doors equipped with locking hardware.
 - .3 Maintain security at all times construction is shut down due to strikes or lockouts.
 - .4 Make Good damage resulting from vandalism or other breaches of security.
 - .5 Replace stolen and damaged Products resulting from breaches of security.
- 1.8 TEMPORARY CONTROLS
- .1 Erosion and Sediment Control: Provide erosion and sedimentation fencing with filter mat as required by authorities having jurisdiction.
 - .2 Drainage: refer to Section 01 35 00.
 - .3 Clean catch basins and storm lines on site as required to ensure their continuous operation during the execution of the Work.
- 1.9 PROJECT IDENTIFICATION
- .1 Provide and erect, within 3 weeks of signing Contract, a project sign in a location designated by Consultant.
 - .2 Construction sign to be 2.4 x 2.4 metre size; of wood framing and plywood construction painted with exhibit lettering produced by a professional sign painter.
 - .3 Indicate on sign, the name of the Project, Owner, Consultant and Contractor, of a design style established by the Consultant.

- .4 Maintain sign in clean condition.
- .5 Remove and dispose of sign when directed by Consultant.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Product requirements.
 - .2 Owner furnished products.
 - .3 Delivery, storage and handling requirements.
- 1.2 BASIC PRODUCT REQUIREMENTS
 - .1 Refer to GC 3.9 - Labour and Products.
- 1.3 OWNER FURNISHED ITEMS
 - .1 Owner's Responsibilities
 - .1 Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions and certificates to Contractor.
 - .2 Deliver supplier's bill of materials to Contractor.
 - .3 Arrange and pay for delivery to the Place of the Work in accordance with progress schedule.
 - .4 Inspect deliveries jointly with the Contractor.
 - .5 Submit claims for transportation damage.
 - .6 Arrange for replacement of damaged, defective or missing items.
 - .7 Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor.
 - .2 Contractor's Responsibilities
 - .1 Designate submittals and delivery date for each product in progress schedule.
 - .2 Review shop drawings, product data, samples, manufacturer's instructions and other submittals. Submit to Consultant notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - .3 Receive and unload products at the Place of the Work.
 - .4 Inspect deliveries jointly with Owner, record shortages and damaged or defective items.
 - .5 Handle Products at the Place of the Work, including uncrating and storage.
 - .6 Protect Products from damage and from exposure to elements.
 - .7 Assemble, install, connect, adjust and finish Products.
 - .8 Conduct installation inspections required by public authorities.
 - .9 Repair or replace items damaged by Contractor or Subcontractors at the Place of the Work.
- 1.4 PRODUCT DELIVERY REQUIREMENTS
 - .1 Ensure that Products are packaged, delivered and stored to prevent damage and to ensure that their moisture content is not increased beyond manufactured or specified installation limits.
 - .2 Label packaged goods to completely describe contents.
 - .3 Immediately review Product delivery requirements and anticipate foreseeable supply delays for any items.
 - .4 In the event of failure to notify the Consultant at commencement of Work, the Consultant reserves the right to substitute more readily available products of similar character, at no increase in Contract Price.

1.5 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- .1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Provide necessary protection for those materials that require it.
- .3 Store Products in a neat and tidy manner.
- .4 Store packaged or bundle Product in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in the Work.
- .5 Do not allow Product to be placed in contact with the ground nor with other materials that could stain them. Store Product subject to damage from weather in weatherproof enclosures.
- .6 Store paint and other volatile substances in a separate structure located at least 15 metres from the building and equipped with a fire extinguisher.
- .7 Store materials within the building only as approved by Owner. Move materials stored within the building should they be a hindrance to the work or delivery of other materials.
- .8 Receive, handle, protect and store Products purchased by the Owner for the Work as it is delivered to the premises.
- .9 Remove flammable rubbish and packing materials such as sawdust, paint cans, wood shavings, etc. from the Place of the Work.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Field engineering.
 - .2 Concealed conditions.
 - .3 Acceptance of existing conditions.
- 1.2 SUBMITTALS
 - .1 Submit name and address of surveyor to Consultant.
 - .2 On request of Consultant, submit documentation to verify accuracy of field engineering work.
 - .3 Submit certificate signed by surveyor certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.
 - .4 Maintain a complete, accurate log of control and survey work as it progresses.
 - .5 On completion of foundation and major site improvements, prepare a certified survey showing dimensions, locations, angles, and elevations of Work.
- 1.3 QUALITY ASSURANCE
 - .1 Surveyor: registered land surveyor, acceptable to Owner.
- 1.4 FIELD ENGINEERING
 - .1 Retain services of a surveyor.
 - .2 Existing base horizontal and vertical control points are designated on Drawings.
 - .3 Locate, confirm and protect control points prior to starting work. Preserve permanent reference points during construction.
 - .4 Make no changes or relocations without prior written notice to Consultant.
 - .5 Report to Consultant when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or location.
 - .6 Require surveyor to replace control points in accordance with original survey control.
 - .7 Establish 2 permanent bench marks at the Place of the Work, referenced to established bench marks by survey control points. Record locations with horizontal and vertical data in Project Record Documents.
 - .8 Establish lines and levels, locate and lay out by instrumentation.
 - .9 Stake for grading, fill and topsoil placement and landscaping features.
 - .10 Stake slopes and berms.
 - .11 Establish pipe invert elevations.
 - .12 Stake batter boards for foundations.
 - .13 Establish foundation and column locations and floor elevations.
 - .14 Establish lines and levels for mechanical and electrical work.
- 1.5 CONCEALED CONDITIONS
 - .1 Refer to GC 6.4 - Concealed or Unknown Conditions.

1.6 EXAMINATION AND ACCEPTANCE OF CONDITIONS

- .1 Verify conditions are ready to receive installation.
- .2 Ensure substrate surfaces are clean, dimensionally stable, cured and free of contaminants such as oil, sealers and curing compounds.
- .3 Notify Consultant in writing of unacceptable conditions.
- .4 Commencement of installation means acceptance of conditions.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Execution requirements.
- 1.2 COLD WEATHER REQUIREMENTS
 - .1 Perform the Work continually and avoid weather delays.
 - .2 Provide temporary heating and cold weather working measures during the cold weather periods and winter months. Refer to Section 01 50 00.
 - .3 Construction delays, whether the responsibility of the Contractor or otherwise, which result in unanticipated or extended winter work will not be considered justification for claims for additional payments.
 - .4 Uniformly distribute heat to avoid hot or cool areas or excessive drying.
- 1.3 SITE STORAGE AND OVERLOADING
 - .1 Refer to GC 3.12 - Use of the Work.
- 1.4 EXISTING UTILITIES
 - .1 When breaking into or connecting to existing services' utilities, execute Work at times directed by local governing authorities, with a minimum of disturbance to Work, and pedestrian and vehicular traffic.
 - .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in a manner approved by authority having jurisdiction and stake otherwise record location of capped service.
- 1.5 EXECUTION REQUIREMENTS
 - .1 Unless otherwise indicated in the specifications, install or erect Products in accordance with manufacturer's instructions.
 - .2 Improper installation or erection of Products, due to failure to comply with these requirements, authorizes Consultant to require removal and reinstallation at no increase in Contract Price.
 - .3 In finished areas, conceal pipes, ducts, and wiring in floors, walls and ceilings, except where indicated otherwise.
 - .4 Extra payment for incidental furring or other enclosure will not be approved.
 - .5 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
 - .6 Prevent electrolytic action between dissimilar metals and materials.
 - .7 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the affected specification Section.
 - .8 Prevent overloading of any part of the Work. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.
 - .9 Remedial Work: Refer to GC 3.13 - Cutting and Remedial Work, and Section 01 73 29.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Requirements and limitations for cutting and patching portions of the Work.
- 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 contractors.
 - .8 Date and time work will be executed.
- 1.3 MATERIALS
 - .1 Required for original installation.
 - .2 Change in Materials: Submit requests for substitutions as specified in Section 01 25 00.
- 1.4 PREPARATION
 - .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of work.
 - .3 Beginning of cutting and patching means acceptance of existing conditions.
 - .4 Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of project from damage.
 - .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
- 1.5 EXECUTION
 - .1 Execute cutting, fitting, and patching including excavation and fill to complete the Work.
 - .2 Fit the several parts together, to integrate with other work.
 - .3 Uncover work to install ill-timed work.
 - .4 Remove and replace defective and non-conforming work.
 - .5 Remove samples of installed work for testing.
 - .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.
 - .7 Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.

- .8 Employ properly trained labourers to perform cutting and patching for weather-exposed and moisture-resistant elements, and for visually-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed with masonry materials without prior written approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire-rated wall, ceiling or floor construction, completely seal voids with firestopping and smoke seal materials, full thickness of the construction element.
- .13 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Progress cleaning.
 - .2 Final cleaning.
 - .3 Waste management and disposal procedures.
 - .4 Hazardous waste disposal procedures.
- 1.2 PROGRESS CLEANING
 - .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other contractors.
 - .2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
 - .3 Remove waste material and debris from the Place of the Work in an approved manner at the end of each Working Day.
 - .4 Clean interior areas prior to installing finishing Products.
 - .5 Maintain areas free of dust and other contaminants during finishing operations.
- 1.3 FINAL CLEANING
 - .1 Refer to GC 3.14 - Cleanup.
 - .2 Provide professional cleaning by a recognized, established cleaning company.
 - .3 Standards Meeting: Prior to final cleaning, hold a meeting on site to determine the acceptable standard of cleaning. Owner, Consultant, Contractor and cleaning Subcontractor to be in attendance.
 - .4 Lock each room after completing final cleaning in that area.
 - .5 Restrict access to areas that have been final cleaned. Re-clean areas that have been accessed by workers prior to Owner occupancy.
 - .6 Remove stains, dirt and smudges from finished surfaces. Conform to respective manufacturers' recommendations.
 - .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, and plastic laminate.
 - .8 Replace broken, scratched or disfigured glass.
 - .9 Clean electrical and mechanical fixtures and other fittings of labels, wrappings, paper and other foreign material.
 - .10 Vacuum clean and dust building interiors, including inside ducts, blowers and coils and behind grilles, louvres and screens.
 - .11 Wax, seal, shampoo and prepare floor finishes as recommended by manufacturers.
 - .12 Power wash exterior paved surfaces.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Fire and burning of rubbish and waste materials at the Place of the Work is not permitted.
- .2 Burying of rubbish and waste materials at the Place of the Work is not permitted.
- .3 Disposal of waste or volatile materials, such as kerosene, mineral spirits, oil or paint thinner into storm or sanitary sewers is prohibited. Collect such waste materials in appropriate containers and dispose of in accordance with the regulations and guidelines of the authority having jurisdiction.
- .4 Provide on-site disposal service for rubbish accumulated by Subcontractors and Suppliers, in accordance with the requirements of the local municipality.
- .5 Prevent extraneous materials from contaminating air beyond application areas by providing temporary enclosures as specified in Section 01 50 00.
- .6 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .7 Deposit packaging materials in appropriate container at the Place of the Work for recycling or reuse.
- .8 Avoid using landfill waste disposal procedures when recycling facilities are available.
- .9 Keep discarded packaging away from children.

1.5 HAZARDOUS WASTE DISPOSAL

- .1 If and when required, remove and dispose of contaminated material in accordance with the regulations and guidelines of the authority having jurisdiction.
- .2 Contaminated material shall be transported by a licensed waste hauling company. Submit a copy of the "Certificate of Approval" to the Consultant prior to the transport of any contaminated material.
- .3 Stockpile suspected contaminated material temporarily in neat and secure stockpiles overlying a double layer of 0.20 mm thick high density polyethylene. Isolate stockpiles from remainder of the Site and cover with a single layer of 0.20 mm thick polyethylene to prevent entry, wind disturbance or the collection of surface water.
- .4 Do not transport potentially contaminated material until such material has been identified by the appropriate authority.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Protection of installed construction.

1.2 PROTECTING INSTALLED CONSTRUCTION

.1 Adequately protect parts of the Work that are completed and in-progress.

.2 Protect Products from cold-weather during construction. Make Good damage to the Work resulting from lack of adequate heating protection.

.3 As soon as the Work is sufficiently advanced, and in order to prevent delay, enclose the Work using tarpaulins, plastic sheeting or glazing and temporary doors, with locks to doors as required.

.4 Following completion of the roof system, adequately ventilate the Work to prevent moisture build-up under the new roof membrane. Coordinate requirements with roofing Subcontractor's recommendations.

.5 Provide protection for finished and partially finished building finishes and equipment during performance of the Work.

.6 Protect existing trees and vegetation designated to remain from construction damage. Provide snow fencing or other protection where directed by Consultant.

.7 Make Good parts or portions of the Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Closeout procedures.
- 1.2 CLOSEOUT PROCEDURES
 - .1 Conform to OAA/OGCA Document 100.
 - .2 Video Inspections of Underground Site Services
 - .1 Prior to applying for Substantial Performance of the Work, conduct a video inspection of the interior condition of underground site service systems, including water mains, storm sewers and sanitary sewers.
 - .2 Pay all costs of video inspection as a Cost of the Work.
 - .3 Submit video record to Consultant.
 - .3 Above Ceiling Work
 - .1 Prior to installation of gypsum board ceilings and placement of acoustical lay-in ceiling tiles, advise Consultant that above-ceiling work is complete and ready for review. Allow minimum 72 hours notice for any cancellation or changes; failure to do so may result in back charges to Contractor for costs of Owner's personnel.
 - .2 Owner, Consultant, and affected subconsultants will conduct above-ceiling review and prepare list of deficiencies.
 - .3 Correct deficiencies and advise Consultant when they have been corrected.
 - .4 Do not install gypsum board ceilings or acoustical ceiling panels until Consultant has verified that all above-ceiling deficiencies have been corrected.
 - .5 The substantial performance inspection may not proceed until all above-ceiling deficiencies have been corrected.
 - .4 Substantial Performance of the Work
 - .1 Prior to requesting Substantial Performance of the Work, prepare and submit a complete deficiency list.
 - .2 Owner, Consultant, and affected subconsultants will review the Work and may require additional items to be added to the deficiency list.
 - .3 Prior to requesting Substantial Performance of the Work, submit the following:
 - .1 Written statement that the Work has been substantially performed in accordance with the Contract Documents, and is ready for use.
 - .2 Verification that operation of systems has been demonstrated to Owner.
 - .3 Two copies of complete and reviewed operations and maintenance manuals.
 - .4 Inspection and acceptance certificates required from regulatory agencies.
 - .5 Life safety systems verification.
 - .5 Final Payment
 - .1 When all deficiencies have been corrected, but not later than 60 days after the date of Substantial Performance of the Work, request a final review of the Work.
 - .2 Owner, Consultant, and affected subconsultants will review the Work and notify the Contractor of outstanding deficiencies.
 - .3 After expiry of 60 day period, Owner may elect to correct outstanding deficiencies and deduct resulting costs from final payment. Deficient work shall be valued at 150 percent of normal cost with no item less than \$50.00.
 - .4 Prior to claiming final payment, submit:
 - .1 record drawings.
 - .2 a complete set of reviewed Shop Drawings, 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.
 - .3 maintenance manuals.

- .4 a final accounting of all approved changes to the Contract Price, including adjustments to cash allowances.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Closeout submittals.
- 1.2 OPERATION AND MAINTENANCE MANUALS
 - .1 Submit two final copies of operating and maintenance manuals to Consultant as described above.
 - .2 Organize data in the form of an instructional manual in binders of commercial quality, 8-1/2" x 11" size, maximum ring size.
 - .3 Cover: Identify each binder with typed or printed title "Project Record Documents"; list title of Project, identify subject matter of contents.
 - .4 Arrange content by systems, under Section numbers and sequence of Table of Contents.
 - .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
 - .6 Extended Warranties: arranged in systematic order matching specification format;. Include a listing of extended warranties. Each warranty must indicate the name and address of the Project, the name of the Owner and the corresponding Section number and title, and the issuer's name, address, telephone and fax number, contact person information, seal and signature.
 - .7 Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
 - .8 Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
 - .9 As a minimum requirement, include the following material as applicable:
 - .1 Table of Contents. If more than one volume is required, provide a cross-reference contents page at the front of each volume.
 - .2 Complete list of Subcontractors and Suppliers, indicating name, address, telephone and fax numbers, contact person information, and description of work performed.
 - .3 Complete list of Products used in the Work, indicating Product name, part number or code and manufacturer for each listing.
 - .4 Finish hardware schedule, as amended.
 - .5 Schedule of paints and coatings, including identification of each surface with applicable paint or coating used. Enclose copy of colour schedule.
 - .6 Maintenance instructions for all finished surfaces.
 - .7 Brochures, cuts of equipment and fixtures.
 - .8 Operating and maintenance instructions for equipment.
 - .9 Valve manual.
 - .10 Controls schematics.
 - .11 Air and water balancing reports.
 - .12 Extended warranties.
 - .13 Maintenance contracts.
 - .14 Other data required by the Contract Documents.
- 1.3 AS-BUILT DOCUMENTS
 - .1 Promptly record revisions, omissions and additions on a set of black line opaque Drawings and in the Project Manual. These documents must be kept up to date at all times. *Failure to do so will result in postponement of payment.*
 - .2 Record information concurrently with construction progress.

- .3 Do not conceal work until required information is recorded.
- .4 Specifications: legibly mark each item to record actual construction, including manufacturers, trade name, and catalog number of each project actually installed, particularly optional items and substitute items.
- .5 Other Documents: maintain manufacturers' certifications, inspection certifications, hardware schedules, colour schedules and field test records as required by the individual specification Sections.

1.4 RECORD DOCUMENTS

- .1 Prior to Substantial Performance of the Work, collect as-built documents and have information transferred to a set of reproducible sepias for submission to the Consultant.
- .2 Mark revised drawings as "RECORD DRAWINGS". Include all revisions, with special emphasis on mechanical, electrical, structural steel and reinforced concrete.
- .3 Employ a competent draftsman to indicate changes on the sepia set of Record Drawings.

1.5 SPARE PARTS AND MAINTENANCE MATERIALS

- .1 Two weeks prior to Substantial Performance of the Work, submit to Consultant any special tools or equipment supplied for maintenance purposes.
- .2 Spare parts and maintenance materials provided shall be new, not damaged or defective, and of same quality and manufacture as Products provided in the Work. If requested, furnish evidence as to type, source and quality of Products provided.
- .3 Defective Products will be rejected, regardless of previous inspections. Replace products at own expense.
- .4 Store spare parts and maintenance materials in a manner to prevent damage, or deterioration.
- .5 Provide spare parts, special tools, maintenance and extra materials in quantities specified in individual specification Sections.
- .6 Provide items of same manufacture and quality as items in Work.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 System start-up procedures.
 - .2 Testing, adjusting and balancing procedures.
 - .3 Demonstration and training.
- 1.2 REFERENCES
 - .1 Associated Air Balance Council (AABC): National Standards for Field Measurements and Instrumentation, Total Systems Balance, Air Distribution Hydronics Systems.
- 1.3 QUALITY ASSURANCE
 - .1 Testing Organization: Current member in good standing of AABC certified to perform specified services.
 - .2 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.
- 1.4 SUBMITTALS
 - .1 Prior to start of Work, submit names of specialty personnel proposed to perform services.
 - .2 Submit 3 copies of final reports on applicable forms.
- 1.5 SYSTEM START-UP PROCEDURES
 - .1 Comply with procedural standards of certifying associations under whose standards these services will be performed.
 - .2 Arrange for affected Subcontractors to send senior and capable personnel for demonstrations, training and start-up instructions prior to system start-up.
 - .3 Start-up the following equipment and systems, bringing them to expected operational levels:
 - .1 Wheelchair lift.
 - .2 Heating, ventilating and air conditioning.
 - .3 Building security.
 - .4 Fire detection.
 - .5 Fire suppression.
 - .4 Report to Consultant any deficiencies or defects noted during start-up.
 - .5 Prepare each system for testing and balancing.
- 1.6 TESTING, ADJUSTING AND BALANCING PROCEDURES
 - .1 Test equipment, balance distribution systems, and adjust devices for building equipment and systems noted above.
 - .2 Cooperate with testing organization, provide access to equipment and systems.
 - .3 Notify testing organization 7 days prior to when the Project will be ready for testing, adjusting, and balancing.
 - .4 Provide instruments required for test, adjust, and balance operations.
 - .5 Verify systems installation is complete and in continuous operation.
 - .6 Verify lighting is turned on when lighting is included in cooling load.

- .7 Verify equipment is in full operation.
- 1.7 DEMONSTRATION AND TRAINING
- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment location.
 - .2 Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed upon times.
 - .3 Instruct personnel in the phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
 - .4 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .5 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during demonstrations.

END OF SECTION

- 1 General
 - 1.1 SECTION INCLUDES
 - .1 Selective demolition and removal as indicated, including breaking out of structure, removal of fittings and preparation of existing surfaces for subsequent work.
 - 1.2 REFERENCES
 - .1 CSA S350-M1980 (R2003): Code of Practice for Safety in Demolition of Structures.
 - 1.3 SUBMITTALS
 - .1 Submit three copies of each photograph taken of existing conditions to Consultant.
 - 1.4 QUALITY ASSURANCE
 - .1 Qualifications: a firm specializing in the work of this Section, and using only adequate equipment and skilled workers; and having a minimum five years documented experience.
 - .2 Demolition Supervisor: an individual experienced in the work of this Section to ensure that all demolition work is carried out safely, expeditiously and without unnecessary damage to materials and surfaces that are designated to remain.
 - 1.5 REGULATORY REQUIREMENTS
 - .1 Permits and Fees: include the cost of tipping charges and other related fees necessary for the completion of the demolition operations.
 - .2 Utilities: Obtain approval from the appropriate authorities prior to commencing demolition operations.
 - .3 Hazardous Waste: Refer to Section 01 74 00.
 - 1.6 SITE CONDITIONS
 - .1 Inspect and photograph existing adjacent surfaces and assemblies.
 - .2 Record conditions and stability in a manner suitable for evaluation of possible damage caused by demolition operations.
 - .3 Approximate locations of existing building services may be indicated on Drawings. The Consultant assumes no responsibility for the accuracy of this information.
 - 1.7 SEQUENCING AND SCHEDULING
 - .1 Schedule demolition activities to minimize disruption to existing building operations.
 - .2 Verify demolition schedule with Consultant prior to commencement of the Work.
 - .3 Protect occupants from dust and from any danger arising from the work of this Section. Refer to Section 01 50 00.
- 2 Products
 - 2.1 EQUIPMENT
 - .1 Demolition: appropriate equipment for the phase of work contemplated.
 - .2 Do not use heavy equipment for making openings in existing walls or in confined spaces where damage to other work may result.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify locations and construction of structures to be demolished.
- .3 Verify construction and details of other existing and adjacent property.
- .4 Verify location of utility and other services.

3.2 PREPARATION

- .1 Erect shoring, bracing and other temporary structures to prevent collapse, settlement and movement of property. Refer to Section 01 50 00.
- .2 Provide and maintain dust protection screen as specified in Section 01 50 00.
- .3 Barricade all access by unauthorized persons to areas in which demolition is in progress.
- .4 Post danger signs in conspicuous locations to warn persons that demolition is in progress.
- .5 Erect protection to provide safe access that must be maintained to existing areas still occupied by public.
- .6 Protect adjacent property from damage caused by demolition operations.
- .7 Remove flammable and contaminated materials, and refuse from area before demolition operations commence.
- .8 Arrange for the disconnection, capping and plugging of any building services that may be affected by demolition operations.

3.3 DEMOLITION

- .1 Perform demolition work in an expeditious and safe manner. Conform to CSA S350-M.
- .2 Confine demolition operations to only the areas required.
- .3 Prevent and contain the spread of dust.
- .4 Do not drop debris more than one storey unless in an enclosed chute. Lower large components carefully, under control and fully supported at all times.
- .5 Withdraw or flatten protruding nails as demolition operations proceed.

3.4 SALVAGE

- .1 Carefully remove materials scheduled for salvage. Protect from damage.
- .2 Store salvaged materials in secure locations, protected from damage.
- .3 Items not scheduled for salvage become the property of the Contractor.

3.5 CLEANING

- .1 Leave the Place of the Work in a clean and orderly condition, ready for use by others.
- .2 Remove debris as specified in Section 01 74 00.
- .3 Remove protections, barricades and other temporary constructions on completion of demolition operations.

- .4 Make Good property and materials damaged during demolition operations.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Provide all labour, materials, plant and equipment to complete the concrete formwork indicated on the drawings and specified herein.
- .2 In addition to requirements specified above, provide other work and perform other services whether or not specifically required by Contract Documents, necessary for completion of work of this section.

1.2 RELATED SECTIONS

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 30 00 – Cast-in-Place Concrete.
- .3 Section 03 35 00 – Concrete Finishes.
- .4 Section 05 12 00 – Structural Steel Framing.

1.3 REFERENCES

- .1 Conform with the Ontario Building Code Regulations 350/06 as amended by O.Reg. 137/07, and any applicable acts of any authority having jurisdiction and the following:
 - CSA A23.1-04
 - CSA A23.2-04
 - CSA A23.3-04
 - CSA S269.1-1975 (R2003)
 - CSA S269.2-M87 (R2003)
 - CSA S269.3-M92 (R2008)
- .2 Where there are differences between the specifications and drawings and the codes standards or acts, the most stringent shall govern.

1.4 TOLERANCES

- .1 Perform forming operations and place hardware so that finished concrete will be within the tolerances set out in A23.1.
 - .1 Variations in building lines which result in extension of the building over lot lines or restriction lines will not be permitted.
- .2 These tolerances are acceptable with regard to structural requirements. Interfacing tolerances may not be compatible with the above. Review and coordinate interfacing tolerances so that the various elements come together properly.

1.5 DESIGN

- .1 Formwork and Shoring.
 - .1 Design formwork and shoring to safely support vertical and lateral loads until they can be supported by the structure. Design formwork for loads and lateral pressures recommended in CSA S269.1

- .2 Design and provide shoring and bracing to excavations and underpinning to safely withstand any lateral pressures to which they may be subjected.

1.6 SUBMITTALS

- .1 Submit Shop Drawings as specified in Section 01 33 00.
- .2 Shop Drawings: Clearly indicate method of construction, materials, arrangement of joints, ties shores, sills, liners and locations of temporary parts and other complete details necessary for fabrication and erection of the component parts of the temporary structure.
- .3 Shop Drawings must be stamped, signed and dated by the fabricator's design engineer who will also provide field review.

1.7 QUALITY ASSURANCE

- .1 Fabricator's Design Engineer: design, erect and maintain concrete formwork and falsework under the direct supervision of a professional engineer, experienced in such work and licensed in the Province of Ontario

2. Products

2.1 MATERIALS

- .1 Forms
 - .1 Formwork lumber: plywood and wood formwork materials shall conform to CSA O86-01 and CSA O325-07.
 - .2 Sheathings for exposed surfaces: New, Douglas Fir Plywood not less than 19 mm thick, concrete form grade, sanded one side, conforming to CSA O325.
 - .3 Walls and Studs: Eastern spruce, construction or standard grade, selected for straightness, 38mm x 89mm minimum surface one side and one edge, except that 64mm x 89mm minimum shall be used at vertical joints in plywood sheathing.
 - .4 Grooves, Reglets & Chamfers: White pine dressed or rigid formed plastic type to exact size.
- .2 Form Ties: Acrow-Richmond Ltd. Snap Tys. For Architecturally exposed concrete, use Cone-Tight Tyscrus 12mm diameter with TSP plug.
- .3 Form Release Agent: "Duogard" by W.R. Meadows of Canada or approved equal.
- .4 Premoulded Joint filler:
 - .1 Bituminous fibre board – "Sealtight Fibre" by W.R. Meadows of Canada Ltd.
 - .2 Impregnated pre-compressed polyurethane form – "Greyflex" by Emseal Corporation.
- .5 Dovetail Anchor Channels: To CSA A370, minimum 0.65mm thick, galvanized steel with insulation filled slots.
- .6 Waterstops: 150 "Sealtight PVC" by W.R. Meadows of Canada Ltd.
- .7 Expansion Joint Filler and Cover: As specified on drawings or as manufactured by Emseal Corporation.

3 Execution

3.1 FORMWORK

.1 General

- .1 Erect, support, brace, and maintain formwork to safely support vertical and lateral loads until they can be supported by the structure.

.2 Construction

- .1 Form footing sides unless footings are shown to be placed against undisturbed soil.
- .2 When using earth forms, hand trim sides and bottoms, and remove loose dirt prior to placing concrete.
- .3 Where shown, camber formwork such that hardened concrete, prior to stripping of forms, is cambered as shown. Maintain beam depth and slab thickness from cambered surface.
- .4 Camber slabs and beams 1 in 500 of span unless shown otherwise.
- .5 Mark building, grid or other lines on forms to permit the accurate positioning of reinforcing steel.
- .6 Construct templates and supports to rigidly fix reinforcing dowels in the forms prior to concreting.
- .7 Provide suitable markers to indicate the location and configuration of continuing concrete members so that dowels can be positioned accurately in relation to their position in the continuing members.
- .8 Set anchor bolts, templates, steel connection units, hardware, or other inserts into the forms and secure them rigidly so that they do not become displaced during concreting. Set and secure these items to the tolerances specified and required in the appropriate Sections.

.3 Sleeves, Chases and Formed Openings

- .1 Form sleeves, chases and openings except where such items are specified to be formed or sleeved by the appropriate trade.
- .2 All openings, sleeves, chases are not necessarily shown on the structural drawings nor are their sizes or locations shown. Refer to architectural, mechanical and electrical drawings and specifications for openings and sleeving requirements not shown, located and dimensioned on the structural drawings.
- .3 No sleeves, chases and openings through structural members shall be formed without the Consultant's approval.
- .4 Exposed Concrete Forms
 - .1 Make joints of forms sufficiently tight to prevent leakage of concrete fines at corners of exposed beams, walls and columns or at the corners of exposed edges of slabs, and other concrete exposed to view in the finished building.
 - .2 Provide 19 mm chamfer strips at all exposed corners and edges of concrete and

19 mm v-joints at control joints.

- .3 Form panels for exposed concrete may be reused 3 times, providing the tie holes are reused and panels are not damaged in a way that will cause visual defects.

3.2 CONSTRUCTION JOINTS

- .1 Obtain approval from the Consultant for location and details of construction joints not shown.

3.3 EXPANSION AND CONTROL JOINTS

- .1 Construct expansion and control joints at the location indicated and in accordance with the details shown.
- .2 Construct clean expansion joints free of foreign material, likely to impair the proper operation of the joint.
- .3 Provide a non-extruding joint filler in expansion joints for the full area between adjacent concrete members. Anchor the filler material to one of the adjacent members or between concrete members and adjacent members of other materials.

3.4 WATERSTOPS

- .1 Install waterstops to provide continuous water seal. Do not distort or pierce waterstop to hamper performance. Do not displace reinforcement when installing waterstops. Tie waterstops rigidly in place.
- .2 Splice in accordance with the manufacturer's printed instructions and as follows. Only straight heat sealed butt joints permitted in filed. Shop weld corners and intersections.
- .3 Where waterstops are noted to be installed into existing work, sawcut appropriately sized slots into the existing work and grout waterstops into the slots. Make waterstops continuous for the full length of the joint. Splice waterstops so that the waterstopping action will not be interrupted.

3.5 QUALITY CONTROL

- .1 Implement a system of quality control to ensure that the minimum standards specified herein are attained.
- .2 Bring to the attention of the Consultant any defects in the work or departures from the Contract Documents which may occur during construction. The Consultant will decide upon corrective action and give recommendations in writing.
- .3 The Consultant's general review during construction and inspection and testing by Independent Inspection and Testing Companies reporting to the Consultant are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibility.

3.6 NOTIFICATION

- .1 Prior to commencing significant segments of the work, give the Consultant and Independent Inspection and Testing Companies appropriate notification so as to afford them reasonable opportunity to review the work. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

3.7 INSPECTION AND TESTING

- .1 The Owner will appoint an Independent Inspection and Testing Companies to make inspections or perform tests as the Consultant directs. The Independent Inspection and Testing Companies shall be responsible only to the Consultant, and shall make only such inspections or tests as the Consultant may direct.

3.8 DEFECTIVE MATERIALS AND WORK

- .1 Where evidence exists that defective work has occurred or that work has been carried out incorporating defective materials, the Consultant may have tests, inspections or surveys performed, analytical calculations of structural strength, made and the like, in order to help determine whether the work must be corrected or replaced. Tests, inspections or surveys or calculations carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, the work may be acceptable.
- .2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where this would, in the Consultant's opinion, cause undue delay or give results not representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the Consultant.
- .3 Materials or work which fail to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the work regardless of previous inspection. If rejected, defective materials or work shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Provide all labour, materials, plant and equipment to complete the concrete reinforcement work indicated on the drawings and specified herein.
- .2 In addition to requirements specified above, provide other services, whether or not specifically required by Contract documents, necessary for completion of work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Section 03 10 00 – Concrete Formwork and Accessories.
- .2 Section 03 30 00 – Cast-in-Place Concrete.

1.3 REFERENCES

- .1 Conform with the Ontario Building Code Regulations 350/06 as amended by O.Reg. 137/07, and any applicable acts of any authority having jurisdiction and the following:
 - CSA A23.1-04
 - CSA A23.2-04
 - CSA A23.3-04
 - CAN/CSA-G30.5-M1983 (R1998)
 - CAN/CSA-G30.18-M92 (R2007)
 - CSA W186-M1990 (R2007)
 - RSIC - Reinforcing Steel Institute of Canada (RSIC), Manual of Standard Practice.
- .2 Where there are differences between the specifications and drawings and the codes, standards or acts, the most stringent shall govern.

1.4 TOLERANCES

- .1 Perform fabrication and setting so that completed work will be within the tolerances set out in A23.1.
- .2 These tolerances are acceptable with regard to structural requirements. Interfacing tolerances may not be compatible with the above. Review and coordinate interfacing tolerances so that the various elements come together properly.

1.5 QUALIFICATION

- .1 Welding Reinforcement
 - .1 Be qualified by the Canadian Welding Bureau under the requirements of W186.

1.6 SAMPLES AND ACCESSORIES

- .1 General
 - .1 Supply samples of all materials and the following, the cost of which shall be paid for by this trade.
- .2 Reinforcement

- .1 Provide the Consultant access to the reinforcement fabricator's plant. Inform the Consultant of the period during which fabrication will be undertaken.
- .2 Cut samples of reinforcing steel designated by the Consultant from steel shipped to jobsite. Replace cut reinforcement or splice where permitted by the Consultant.
- .3 Support Accessories
 - .1 Provide samples of support accessories (chairs, bolsters, spacers) which are intended to be used.

1.7 SUBMITTALS

- .1 Submit Shop Drawings as specified in Section 01 33 00.
- .2 Shop Drawings for Reinforcement
 - .1 Reproduction of the structural drawings, to serve as shop drawings, will be permitted. Cost of reproduction to be paid for by this section. Any identification or reference to the Owners or Consultants is to be removed from all structural drawings which are used as shop drawings.
 - .2 Prepare reinforcement placing drawings and bar lists taking into account all openings and recesses shown on the architectural, structural, mechanical and electrical drawings, and on the sleeving shop drawings.
 - .3 Completely dimension openings, recesses and sleeves, and relate to suitable grid lines and elevation datum.
 - .4 Prepare placing drawings to a minimum scale of 1:50 in a clear complete manner that will permit placing of reinforcement to be performed without reference to contract drawings.
 - .5 Detail reinforcement in accordance with the contract documents, A23.1 and detailing standards in RSIC Manual of Standard Practice.
 - .6 Where 10M top bars are shown, provide adequate chairs, bolsters or supports to ensure that these bars are not bent or displaced prior to or during the concreting operation.
 - .7 As a minimum, show the following:
 - .1 Bar sizes, spacing, location and quantities of reinforcement, welded wire fabric.
 - .2 Identification of each bar with a code mark corresponding to the bar lists.
 - .3 Detail sections to fully illustrate placement of reinforcement at areas such as openings, change of levels, spandrel, stairs and wherever else required.
 - .4 Large scale detail sections at areas of steel concentrations such as at intersections of beams and columns, column splices or wherever else required.
 - .5 Placing sequence for reinforcement such as intersections of beams and beams, slabs and beams, and within flat slabs.
 - .6 Minimum clearances between reinforcement and minimum concrete protection to reinforcement.
 - .7 Location and embedment of dowels.

- .8 Location, number and type of support accessories, including support bars suitably sized and spaced to rigidly support the weight of reinforcement and construction load.
- .8 Submit code marks or symbols used on reinforcement of each manufacturer so that Consultant may identify grades and sizes of reinforcement.
- .3 Shop drawings for Welding Reinforcement
 - .1 Submit drawings showing, as a minimum, the following: locations, elevations and size of welds, welding procedures and techniques, stamped as approved by the Canadian Welding Bureau.
 - .2 Submit drawings showing, as a minimum, the following: Location, elevations and size of splices, materials and procedures.
- .4 Certificates
 - .1 Canadian Manufacture: Provide Consultant with certified copy of reports of reinforcing steel showing physical and chemical analysis minimum (1) week prior to commencing work.
 - .2 Weldable Reinforcement: Submit reports of chemical compositions and verification of weldability.
 - .3 Submit code marks or symbols used on reinforcement of each manufacturer so that Consultant may identify grades and sizes of reinforcement.
- .5 Substitutions
 - .1 Substitution of different size bars permitted only upon written approval of Consultant.
- .6 As-Built Drawings
 - .1 Mark on a complete set of final reproducible drawings any changes, additions or deletions that occur during construction as a result of the Contractor's work, change orders, or for any other reasons.
- 2 Products
- 2.1 MATERIALS
 - .1 Reinforcing Steel: Only Canadian manufactured deformed steel to CSA Standards of G30 Series and to the material specification shown on the drawings.
 - .2 Welded Steel Wire Fabric: conforming to G30.5. Provide in flat sheets only.
 - .3 Chairs, bolsters, bar supports, spacers: to A23.1. In the case of concrete exposed to view or weather use plastic support chairs.
 - .4 Tie wires and Support Accessories for Epoxy Coated Reinforcement
 - .1 Plastic ties or plastic-coated wire.
 - .2 Plastic support chairs only.
- 3 Execution

3.1 FABRICATION

- .1 Fabricate reinforcement in accordance with A23.1 and the RSIC Manual of Standard Practice.
- .2 Identify with a tag each bundle of bars with a code mark corresponding to that appearing on the bar list.
- .3 Bend reinforcement once only and at room temperature. Do not straighten or rebend reinforcement. Do not use bars with kinks or bends not shown on the drawings.
- .4 Replace bars which develop cracks or splits.

3.2 PLACING

- .1 Prior to concreting, accurately place reinforcement, support and secure against displacement, as indicated on reviewed placing drawings and in accordance with A23.1. Tack welding of reinforcement to secure in place will not be permitted.
- .2 Set column anchor bolts and wall dowels prior to concreting with wooden templates or other approved means.
- .3 Do not drive or force reinforcement into fresh concrete.
- .4 Secure reinforcement in walls using sufficient spacers on each face to maintain the requisite distance between reinforcement and column or wall face and so that vertical bars are plumb.
- .5 Where toppings are placed on waterproof membranes, vapour barriers and the like, prevent reinforcement or tie wire contacting these items.
- .6 Preassemble column and beam cages as necessary. Do not “spring” or bend ties and stirrups in order to place longitudinal reinforcement.
- .7 Pre-tie reinforcement for footings and lower into place so as not to disturb the soil at founding elevation.
- .8 Provide splices only where shown on the Contact Drawings. No other splices will be permitted without approval of the Consultant.

3.3 FIELD BENDING

- .1 Do not field bend reinforcement except where indicated or authorized in writing by Consultant.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.4 WELDED WIRE FABRIC

- .1 Where no reinforcement is shown, provide 152 x 152 MW18.7/MW18.7 welded wire fabric at mid-depth in slabs on grade or walks or toppings 60 mm in thickness or greater, unless noted otherwise on drawings.
- .2 Lap ends and sides of fabric not less than 300 mm.

3.5 CONSTRUCTION JOINTS

- .1 Obtain approval from the Consultant for details of construction joints not shown.

- .2 Continue reinforcement through the joint in its normal position. Add additional reinforcement across the joint as shown or directed.

3.6 QUALITY CONTROL

- .1 Provide a system of quality control to ensure that the minimum standards specified herein are attained.
- .2 Bring to the attention of Consultant any defects in the work or departures from the Contract Documents which may occur during Construction. The Consultant will decide upon corrective action and give recommendations in writing.
- .3 The Consultant's general review during construction and inspection and testing by Independent Inspection and Testing Companies reporting to the Consultant are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibility.

3.7 NOTIFICATION

- .1 Prior to commencing significant segments of the work, give the Consultant and Independent Inspection and Testing Companies appropriate notification so as to afford them reasonable opportunity to review the work. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

3.8 INSPECTION AND TESTING

- .1 Appointment of Independent Inspection and Testing Companies.
- .2 The Owner will appoint the Independent Inspection and Testing Company to make inspections or perform tests as the Consultant directs. The Independent Inspection and Testing Company shall be responsible only to the Consultant, and shall make only such inspections or tests as the Consultant may direct.
- .3 When defects are revealed, the Consultant may request, at the Contractor's expense, additional inspection or testing to ascertain the full extent of the defect.
- .4 Tests on Reinforcing Steel by Independent Inspection and Testing Companies.
 - .1 A series of specimens for each grade and size of reinforcing steel contained in any 100 tons of steel shipped may be tested. A series of tests will include two bars for each test required of each size and grade of steel used. Reinforcing steel tests will be made in accordance with CSA Standards G30 Series.
 - .2 Non-destructive tests may be made on welded reinforcement.

3.9 DEFECTIVE MATERIALS AND WORK

- .1 Where evidence exists that defective work has occurred or that work has been carried out incorporating defective materials, the Consultant may have tests, inspections or surveys performed, analytical calculations of structural strength made, and the like, in order to help determine whether the work must be replaced. Tests, inspections or surveys or calculations carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, the work may be acceptable.
- .2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where this would, in the Consultant's opinion, cause undue delay or give results

not representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the consultant.

- .3 Materials or work which fail to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the work regardless of previous inspection. If rejected, defective materials or work shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Provide labour, material, equipment and services necessary for complete supply and installation of cast-in-place concrete including formwork and reinforcing steel. This includes but is not necessarily limited to the following:
 - .1 structural concrete elements indicated on drawings;
 - .2 non-structural concrete elements indicated on drawings;
 - .3 concrete slabs on grade;
 - .4 concrete topping and house keeping pads;
 - .5 build-in anchors, slots, sleeves etc. supplied and/or required by other trades;
 - .6 other work specified herein.
- .2 In addition to requirements specified above, provide other services, whether or not specifically required by Contract Documents, necessary for completion of work of this section.

1.2 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Formwork and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 35 00 – Concrete Finishing.
- .4 Section 04 05 00 – Common Work Results for Masonry.
- .5 Section 05 12 00 – Structural Steel Framing.
- .6 Section 05 30 00 – Metal Decking.

1.3 REFERENCES

- .1 Comply with application of Codes and Standards as follows:
 - CAN/CSA-A23.1-04
 - CAN/CSA-A23.2-04
 - CSA CAN3-A23.3-04
 - CSA G30.18-M92 (R2007)
 - CSA G30.5-M1983 (R1998)
 - CSA S269.1-1975 (R2003)
 - CSA S269.3-M92 (R2008)

1.4 SUBMITTALS

- .1 Submit shop and erection drawings as described in Section 01 33 00
- .2 Concrete mix design
- .3 Reinforcement – Refer to Section 03 20 00.
- .4 Formwork – Refer to Section 03 10 00.
- .5 Inspection and Testing Reports.

1.5 RECORD DOCUMENTS

- .1 Record the time, date, delivery slip serial number and location in building of each concrete pour, and identify the related test cylinders. Also note air temperature. Keep these records at the site until project is completed.
- .2 File duplicate copies of concrete delivery slips on which record:
supplier, serial number of slip, date, truck number, contractor, project, concrete class, yardage in load, and time of first mixing of aggregate, cement and water.
- .3 Record on a set of drawings:
 - .1 time and date of each pour,
 - .2 high and low temperatures during each pour,
 - .3 date of removal of forms in each area.
- .4 Records on a set of drawings the founding elevations of all footings and variations of foundation work from that indicated on drawings.
- .5 Make these records available on site for inspection at all times.

1.6 TOLERANCES

- .1 For Cast-in-place Concrete, comply with CAN/CSA-A23.1, Clause 6.4.
- .2 For placing a reinforcement, comply with CAN/CSA-A23.1, Clause 6.6.8.
- .3 For placing of embedded parts, comply with CAN/CSA-A23.1, Clause 6.7.3.

2 Products

2.1 MATERIALS

- .1 Concrete Materials: Ready mix, controlled concrete shall be used throughout. Conforming to CAN/CSA-A23.1, clause 5 for methods on measuring materials, batching, mixing and delivery, except where specified otherwise.
 - .1 Cement Type:
Normal Portland cement, Type 10 to CAN/CSA-A5-98
 - .2 Water:
Clean and free from any injurious amounts of oil, acid, alkali, organic matter, sediment or any other deleterious substances. Verify that no slats are present which will cause efflorescence.
 - .3 Aggregate:
 - .1 Natural sand, gravel or crushed rock to meet specified requirements of CAN/CSA-A23.1 for quality and control of fine and coarse aggregates and their grading. Incorporate aggregate from the same source for entire project for concrete exposed to view.
 - .2 Slabs and toppings 50mm thick and less, use coarse aggregate of Group 1, 10mm.
 - .3 For slabs, beams, columns, walls and bonded toppings 50mm thick and more, use coarse aggregate of Group 1, 20mm ± 5mm.

- .4 For footings and basement and foundation walls more than 300mm thick, coarse aggregate of Group 1, 40mm \pm 5mm may be used.
- .5 Maximize size of aggregate in congested locations shall be 10 mm when directed by the Consultant.
- .4 Air Entraining Admixtures:
Conform to ASTM C260-06
- .5 Water Reducing Admixtures:
Conform to ASTM C494-05
- .2 Steel Reinforcement – Refer to Section 03 20 00.
- .3 Formwork – Refer to Section 03 10 00.
- .4 Non-shrink Grout: Sealtight CG-86 by W.R. Meadows of Canada Ltd.
- .5 Dry Pack Grout: Pre-mixed composition of non-metallic aggregate and cement with sufficient water for mixture to retain its shape when made into a ball by hand and capable of attaining compressive strength of 35MPa at 28 days.

2.2 MIXES

- .1 Design mix in accordance with CAN/CSA-A23.1, Table 5, Alternative (1) Design the mix such that concrete will be homogeneous, uniformly workable, readily placeable into the corners and angles of forms and around reinforcement, but without permitting materials to segregate or excessive free water to collect on the surface.
 - .1 Compressive Strength: As indicated on Drawings.
 - .2 Class of Exposure: Conforming to Table 1 & 2 of CSA-A23.1.
 - .3 Maximum Water/Cement Ratio: Maximum of 0.65 conforming to Table 1 & 2 of CSA-A23.1.
 - .4 Provide concrete with an average slump of 80mm \pm 20mm.
 - .5 Air Content: Conforming to Table 4 of CAN/CSA-A23.1, according to class of exposure.
 - .6 Maximum and Minimum Mass of Air Dry Concrete: For normal mass concrete, 2400 kilograms per cubic metre, maximum and 2250 kilograms per cubic metre, minimum. For variance from specified requirements, request approval from Consultant. Provide 320 Kg/cubic meter for exposure Class "C1" concrete.
- .2 Admixtures:
 - .1 Follow the recommendations of CAN3-A266.4, Guidelines for the Use of Admixtures in Concrete, unless otherwise specified herein.
 - .2 Use admixtures in accordance with the manufacturer's instructions, except as specified herein.
 - .3 Introduce admixtures into the concrete mix in liquid form by adding it to the mix water.

- .4 No calcium chloride shall be used in any concrete.
- .5 No admixtures other than air entraining agents will be permitted in the concrete without the express approval of the Consultant.
- .6 Take admixtures into account when designing mix, and ensure that they are compatible with each other and with joint compounds.

3 Execution

3.1 PREPARATION

- .1 Design, fabricate and erect formwork to CAN/CSA-A23.1 and CSA-S269.1 and CAN/CSA-S269.3. Maintain formwork to safely support vertical and lateral loads until they can be supported by the concrete structure. Construct forms so members will be of correct size, shape, alignment, elevation and position.
 - .1 Unless specified otherwise, conform to tolerances expressed in Clause 6.4 of CAN/CSA-A23.1. Design formwork for loads and lateral pressures in accordance with CSA-S269.1 & CSA-S269.3.
 - .2 Build forms to permit adjustment of height, easy dismantling and stripping, and such that removal will not damage the concrete.
 - .3 Accurately set anchor bolts, steel templates, steel connection units or other inserts into the forms and secure them rigidly so that they do not become displaced during concreting. Set and secure these items to the tolerances required in the appropriate dimensions.
 - .4 Coat surfaces of forms to be in contact with concrete with non-staining form release agent specified herein before. Apply surface treatment in accordance with manufacturer's written recommendations.
- .2 Fabricate, handle and place reinforcement according to reviewed placing drawings and to CAN/CSA-A23.1. Execute fabrication accurately to dimensions indicated on Drawings so that reinforcement may be placed to tolerances specified in CAN/CSA-A23.1.
 - .1 Support slab top bars on approved continuous high chairs within 3mm of correct height.
 - .2 Maximum spacing of line of chairs: 1200mm.

3.2 EXAMINATION

- .1 Examine work of other trades upon which the work of this Section depends and report any discrepancies to the Consultant.
- .2 Ensure that work embedded in concrete of installed under slabs on grade is completed before concrete is placed.
- .3 Ensure that no water is present and no flooding water is permitted on foundation beds and skim coats where footings and other concrete work is to be placed. Place concrete only on frost-free ground. Remove previously frozen bearing surfaces.
- .4 Ensure that foundations bear on undisturbed soil. If bearing surfaces are disapproved because conditions do not meet those anticipated during design, make adjustments as directed. Extra cost for such adjustments will be paid as described in Section 01200. No extra payment will be made for adjustments made necessary because of damage to bearing

surfaces caused by weather, traffic or removal of frozen material, or by presence of adjacent construction or services incorporated in the work.

- .5 Ensure that compacted fill has been placed to meet specified requirements, and that under-slab services have been installed, inspected, tested and approved.
- .6 Keep excavations dry while placing concrete. Pump if necessary.

3.3 INSTALLATION

.1 General

- .1 Place, transport and consolidate concrete as specified in CAN/CSA-A23.1 as recommended by ACI 304 and 309, and under the supervision of a competent foreman at all times.
- .2 Inform Consultant at least 24 hours before each concrete placing operation.
- .3 Obtain approval from Consultants of soil bearing, formwork and reinforcing, before placing concrete.
- .4 Do not place concrete during or before rain. If rain occurs after placing and before initial set of concrete, cover with waterproof material until set.
- .5 Cold-weather and Hot-weather Protection: To Clause 7.4 of CAN/CSA-A23.1.
- .6 Do not use calcium chloride or other chemical in mix to reduce freezing point of concrete.
- .7 Ready-mixed (mixed in transit) concrete shall be, completely discharged within period of 1 hour after mixing water has been added to dry material except when concrete materials are heated, in which case reduce this period to 30 minutes. When concrete is delivered at air temperature below 4°C, ensure temperature at work of not less than 16°C or more than 32°C.
- .8 DO NOT add water to ready-mixed concrete on site.
- .9 Use vibrators for placement of concrete.

.2 Joints: Concrete joints conforming to Clause 7.3 of CAN/CSA-A23.1.

.1 Construction Joint

- .1 The location and details of construction joint not shown on drawings shall be subject to Consultant's approval.
- .2 Install continuous waterstops in wall and slab below ground location shown, fixed rigidly in forms prior to concreting. Waterstop splices to be heat welded in such a manner that the water stopping action will not be impaired.
- .3 Immediately before next pour, clean construction joint, saturate with water, brush with grout of neat cement and place new concrete while paste is still damp.

.3 Control Joints in Slabs on Grade:

- .1 Within 24 hours of completion of concrete floor slabs or toppings, saw 3mm wide control joints into surface of concrete $\frac{1}{4}$ the depth of slabs.

- .2 Locate control joints on centre lines of columns, and as otherwise indicated on drawings.
(4000mm maximum spacing)
- .3 Fill saw-cut control joints with filler. Refer to Section 03 35.00.
- .4 Provide premoulded joint filler for full depth of slab on grade at isolation joints location.
- .4 Slabs on Metal Decking
 - .1 Concrete slabs on metal decking shall be of thickness and reinforced as shown on drawings.
 - .2 Pout concrete from buggies or spouts on to mortar boards to be shovelled on to the forms and spread to the required thickness. Dumping of concrete from buggies, wheelbarrows or spouts directly on to the metal forms will not be permitted.
- .5 Anchor Bolts and Grouting Under Base and Bearing Plates
 - .1 Receive, handle and set anchor bolts in place in accordance with requirements of trade supplying these items and properly protect to maintain correct alignment.
 - .2 Roughen concrete under steel column base plates to facilitate bond for grout.
 - .3 Grouting under steel column base plates and steel beam bearing plates shall not be less than 25mm thick, composed of premixed nonshrink grout and water mixed in accordance with manufacturer's instructions to provide a workable mix. If grout space is 41mm and over, add 1-¼ parts of 6mm pea gravel to the mixture noted above.
 - .4 Grout under steel column base plates and steel beam bearing plates; anchor bolts; railings and handrail posts; and all other locations where grout is indicated.
- .6 Footings
 - .1 Pour footings to their full design depth in one operation. Pour exterior column footings and exterior wall footings integrally.
 - .2 Dowel and key concrete footings and foundation walls.
- .6 Concrete Stairs and Concrete Stair Fill
 - .1 Construct stairs to detail and finish with rough textured non-slip finish.
 - .2 Fill stair treads with concrete and finish with rough textured non-slip finish or smooth finish for applied finish where indicated.
- .7 Inserts
 - .1 Receive, handle and set inserts in place in accordance with requirements of trade supplying these items and properly protect to maintain correct alignment to Consultant's satisfaction.

3.4 FINISHING

- .1 Formed Concrete Surfaces:

- .1 After removal of Forms, remove, replace and repair defects in exposed concrete surfaces according to CAN/CSA-A23.1, Clause 7.7. Refer honeycombed areas to the Consultant for designation as structural or non-structural and repair according to CAN/CSA-A23.1.
 - .2 Bring the surfaces of all exposed interior and exterior concrete to a Smooth-Rubbed Finish not later than 6 hours after removal of forms and in accordance with the requirements of CAN/CSA-A23.1.
 - .3 The producing of smooth surfaces by means of cement plaster will not be permitted unless otherwise specified or scheduled.
 - .4 After concrete has cured, examine concrete surfaces and repair all cracks. Rout cracks out with mechanical router to a minimum depth of 40mm, then clean and fill cracks with "Sealtight Rezi-Weld Flex" by W.R. Meadows of Canada Ltd.
 - .5 Grout tie-holes in concrete flush to concrete surface. Grout with finishing cement mortar using same sand and cement as used in concrete. Pack grout into place to fill tie-hole; finish to match adjacent concrete surface.
 - .6 Refer to Section 03 35 00 for sandblast finishing.
- .2 Concrete Floors:
- .1 Unless noted otherwise, complete slabs surfaces flat to 3mm in 3000mm or sloped to drains, ready for finishing.
 - .2 Refer to Section 03 35 00 for finishing.
 - .3 Make good temporary openings left in concrete work for pipes, conduit, ducts, shoring and other suck work, using mix or mortar of same proportions as surrounding work, reinforced with wire mesh as required and finish to matching surrounding work.

3.5 FIELD QUALITY CONTROL

- .1 Formwork and Shoring: To conform with Clause 7.2.8 of CSA S269.1 and shall be site reviewed by the formwork designer at the contractor's expense.
- .2 Reinforcement: Will be site reviewed by the Consultants and/or inspection and testing company as described in Section 01 40 00.
- .3 Concrete: An independent inspection and testing company, as described in Section 01 40 00, will carry out such inspection and testing.
 - .1 One test will be conducted for:
Each pour of less than 100 cu. meter.
Each 100 cu. meter, or
Each class of concrete used each day.
 - .2 One test consists of:
Slump test
Air test
Three cylinders
Job cured cylinders when requested.
 - .3 Make strength test of one cylinder from each sampling at 7 days and of other two cylinders from same samplings at 28 days.

3.6 CLEAN UP

- .1 Remove from the site excess and waste materials and debris resulting from work of this Section.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Provide labour materials, equipment and services necessary for complete finishing of concrete work as follows:
 - .1 concrete finishing;
 - .2 concrete curing and sealing;
 - .3 control joints;
 - .4 crack repair;
 - .5 other work specified herein.
- .2 In addition to requirements specified above, provide other work and perform other services whether or not specifically required by Contract Documents, necessary for completion of work of this section.

1.2 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Formwork and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 30 00 – Cast-in-Place Concrete.

1.3 QUALIFICATIONS

- .1 Work of this section shall be performed by an approved, established floor finishing company having a proven record of satisfactory workmanship for a period of at least 5 years.

1.3 PROTECTION

- .1 Keep traffic which would affect or disturb the curing procedures off the finished surfaces for a period of 7 days minimum.
- .2 Protect exposed concrete finish against damage until the building is accepted by the Owner.
- .3 Protect floors which are to receive an architectural finish against contamination by oil, paint or other deleterious materials.
- .4 Protect items set into floors from damage; ensure that alignment is not disturbed.

2 Products

2.1 MATERIALS

- .1 Combination Surface Hardener and Sealing Compound: Saniseal 100 by Master Builders Technologies, or Sealtight Med-cure by W.R. Meadows of Canada Ltd.
- .2 Curing and Sealing Compound: Masterseal by Master Builders Technologies, or Sealtight CS-309 by W.R. Meadows of Canada Ltd.
- .3 Non-metallic hardener: Sealtight Type R Premixed by W.R. Meadows of Canada Ltd.
- .4 Joint sealer for control joints in floors which will be left exposed: Epoxy type, Sealtight Rezi-weld by W.R. Meadows of Canada Ltd.

- .5 Joint filler for control joints in floors which will be covered by an architectural finish. Same as specified for exposed control joints, or use sand, cement and additive grout mixture, mixed 2 parts sand, 1 part cement, and 1 part additive.
- .6 Additive: Intralok by W.R. Meadows of Canada Ltd.
- .7 Non-slip inserts: Type 610 aluminum Super Grit manufactured by Wooster Products Inc., or other approved manufacturer.

3 Execution

3.1 TOLERANCES

- .1 Completed surfaces shall not vary more than 3mm in 3000mm from dead level except where slopes, and slopes to drains are required.

3.2 CONTROL JOINTS

- .1 Provide sawcut control joints in concrete slab on grade and toppings, located on column centre lines, unless closer spacing is indicated.
- .2 Make sawcuts no sooner than 12 hours nor later than 24 hours after finishing, depending upon drying conditions. Do not fill sawcuts for at least 28 days, then clean out sawcuts using brushes and compressed air removing all dirt and foreign material. Fill sawcuts with filler. Finish to match surrounding surfaces.
- .3 Fill control joints with epoxy filler where exposed; fill control joints to be covered with architectural finish using either epoxy joint filler as for exposed location, or the sand/cement/grout mixture specified under Materials.
- .4 Rake out dirt in joints with appropriate tool. Blow dirt out of joints with compressed air. Clean the floor surface by vacuuming with industrial type vacuum cleaner.
- .5 Apply filler in accordance with manufacturer's instructions, using the recommended application method.

3.3 NON-SLIP INSERTS

- .1 Supply and install non-slip inserts in concrete and concrete filled stairs at nosing of landings and treads unless they are shown to have architectural applied finish.
- .2 Finish inserts slightly above adjacent surfaces.
- .3 Stop inserts 75mm short of each side.

3.4 COMBINATION CURING AND SEALING COMPOUND

- .1 Apply combinations curing and sealing compounds in strict accordance with manufacturer's specifications and as required to properly cure and seal the surfaces.

3.5 LEVELLING AND FLOATING

- .1 Strike off concrete after it's placed, level and flush and then level and consolidate with a wooden darby or bullfloat. Complete levelling and consolidation before free moisture (bleeding) rises to surface.

- .2 When concrete has stiffened sufficiently to sustain foot pressure and after removing free bleed water, float concrete with hand or power float.
- 3.6 BROOM FINISH FOR BOND
- .1 After floating, broom the substrate with a stiff bristle broom in one direction.
- 3.7 STEEL TROWEL FINISH
- .1 After floating, trowel surface with steel hand of float trowel keeping blade flat at first and raising blade angle a little more on subsequent passes. Leave surface smooth, dense, of fine uniform texture without a swirl.
- 3.8 NON-SLIP SWIRL FINISH
- .1 During final trowelling, impart a slightly rough and textured surface to concrete by spin trowelling, moving the trowel in a “swirling” or circular motion in such a way as to produce a spin trowelled (swirled) texture of patten on the surface.
- 3.9 BROOM FINISH FOR NON-SLIP
- .1 After steel trowelling, lightly broom the surface with a bristle broom to obtain a fine even texture finish.
- 3.10 SHAKE HARDENED CONCRETE FINISH
- .1 After levelling and floating, shake apply $\frac{1}{2}$ of the hardener as soon as concrete is firm enough to support weight of workmen and equipment and no standing water is present on the surface. Apply hardener evenly over the floor surface in one direction commencing along wall doorways, columns and the like.
 - .2 Machine float just enough to bring moisture completely through the shake and to embed and compact the shake into the base concrete.
 - .3 Immediately following the floating of the first shake apply the balance of the hardener. Spread evenly and in a direction perpendicular to the first shake. Float as specified for the first shake.
 - .4 Additional floating to further compact the surface may be done depending on time and setting characteristics of the concrete.
 - .5 After floating steel trowel floor to non-slip swirl finish.
 - .6 Total shake application of hardener shall not be less than 6 kg per sq. m.
- 3.11 REMEDIAL WORK
- .1 Grind floor levels which do not comply with the specified tolerances to the tolerances required or level with epoxy or latex compound.
 - .2 Obtain Consultant approval of method for correcting tolerances before proceeding.
 - .3 Immediately prior to installation of applied floor finished but not sooner than 28 days after concrete has been placed, examine concrete floor surfaces and repair cracks. Rout cracks which exceed 0.8mm in width with mechanical router to 9mm square cross section. Clean and fill cracks as specified for control joints.
- 3.12 SCHEDULE

- .1 Apply following finishings to corresponding surfaces:

FINISH	SURFACE
.1 Hand or mechanical	Surface to receive membrane, insulation or unbonded terazzo topping
.2 Steel Trowel Finish	Surface left exposed, or coated to receive another finish such as seamless flooring, resilient or ceramic tile, carpet and other similar finishes.
.3 Hardened Concrete	Surface designated for “Concrete Hardener” in finish Schedule.
.4 Use machine float swirl finish in traffic and garage areas which are to receive hardener.	
.5 Obtain services of trained technician from staff of surface hardener manufacturer to give instructions in proper use of material during periods of installation.	

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Procedures for masonry construction.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 10 - Masonry Mortaring and Grouting.
 - .2 Section 04 05 19 - Masonry Anchorage and Reinforcing.
 - .3 Section 04 05 23 - Masonry Accessories.
 - .4 Section 04 21 00 - Clay Unit Masonry.
 - .5 Section 04 22 00 - Concrete Unit Masonry.
 - .6 Section 04 22 26 - Decorative Concrete Unit Masonry.
 - .7 Section 05 12 00 - Structural Steel Framing: steel lintels and bearing plates.
 - .8 Section 05 50 00 - Metal Fabrications: fabricated metal items.
 - .9 Section 08 11 13 - Hollow Metal Frames.
 - .10 Section 08 44 13 - Glazed Aluminum Curtain Walls.
 - .11 Section 08 51 13 - Aluminum Windows.
- 1.3 REFERENCES
 - .1 CSA A371-04 (R2009): Masonry Construction for Buildings.
 - .2 CSA S304.1-04: Masonry Design of Buildings (Limit States Design).
- 1.4 ENVIRONMENTAL REQUIREMENTS
 - .1 Conform to CSA A371.
 - .2 Provide heated enclosures and heat as necessary during cold weather construction.
 - .3 Protect freshly laid masonry from drying too rapidly during hot weather, by means of waterproof, non-staining coverings.
- 1.5 SUBMITTALS
 - .1 Submit masonry analysis and testing reports, prepared by an independent agency to Consultant, as specified in Section 01 40 00.
- 1.6 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: as follows:
 - .1 Two samples of each type of masonry unit specified, illustrating colour, texture and extremities of colour range;
 - .2 One sample of each type of masonry reinforcement and tie specified in Section 04 05 19;
 - .3 One sample of each type of masonry accessory specified in Section 04 05 23; and
 - .4 as required for testing purposes.

1.7 QUALITY ASSURANCE

- .1 Applicator: company specializing in commercial masonry work with a minimum of 5 years documented experience.

1.8 MOCK-UPS

- .1 Construct mock-up as specified in Section 01 40 00.
- .2 Mock-Up Panel: 1 200 x 1 800 mm size, illustrating veneer cladding types, textures and colours; mortar joint thickness, tooled finish and colour. Include structural back-up materials, air and vapour barrier materials, through-wall flashing and weephole vents, wall insulation, wall ties and connectors, and a partial window frame, illustrating the window head, jamb and sill conditions.
- .3 Report mortar colour loading rate for acceptable panel.
- .4 Remove mock-up panel from the Place of the Work upon Substantial Performance of the Work.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver Products to the Place of the Work in dry condition.
- .3 Keep Products dry until use.
- .4 Store Products under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
- .5 Protect masonry units from damage.

2 Products

2.1 SOURCE QUALITY CONTROL

- .1 Perform shop testing by independent inspection agency as specified in Section 01 40 00.
- .2 Refer to individual specification Sections for Product-specific shop testing requirements.

3 Execution

3.1 QUALITY OF WORK

- .1 Construct masonry plumb, level and true to line, with vertical joints in alignment.
- .2 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .3 Maintain masonry courses to uniform width.
- .4 Lay masonry in full bed of mortar, properly jointed with other work.
- .5 Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- .6 Maintain dry masonry beds and lay only dry masonry units. Do not pre-soak masonry units in cold weather.
- .7 Fully bond intersections, and external corners.

- .8 Do not use chipped, cracked or otherwise damaged units in exposed and loadbearing masonry walls.
- .9 Build in items required to be built into masonry.
- .10 Brace door frames to maintain plumb. Fill spaces between frame jambs and masonry with grout.
- .11 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .12 Place grout as required to maintain an adequate level of structural bearing surface with no voids and to a depth as indicated on Drawings.
- .13 Prevent ingress of mortar and grout in cores of acoustical masonry units.
- .14 Ensure cores of acoustical concrete masonry units remain free of mortar to maintain sound transmission and noise reduction capabilities.

3.2 JOINTING

- .1 Make vertical and horizontal joints equal and of uniform thickness.
- .2 Tooled Joints: Allow joints to set just enough to remove excess water, then tool joints with round jointer to result in smooth, compressed, uniformly concave joints.
- .3 Flush Joints: Strike flush joints that will be concealed within the wall or which will receive a coating of plaster, tile, insulation, resilient base, bituminous foundation protection, or other joint-concealing finish. Do not strike flush mortar joints designated to receive painted or other thin finishes.

3.3 CUTTING

- .1 Cut out masonry neatly for recessed or built-in objects.
- .2 Make cuts straight, clean and free from uneven edges.
- .3 Make Good masonry which has cracked or broken as a result of cutting in built-in objects.

3.4 PARGING

- .1 Use parging mortar as specified in Section 04 22 00.
- .2 Apply parging in 2 coats not less than 10 mm thick.
- .3 Roughen first coat to ensure a good bond for second coat. Allow first coat to dry a minimum of 24 hours before applying second coat.
- .4 Dampen first coat with water before applying second coat.

3.5 SUPPORT OF LOADS

- .1 Use 20 MPa strength grout as specified in Section 04 05 10, where grout fill is used instead of solid masonry units.
- .2 Install building paper below voids to be filled with grout. Keep paper 25 mm back from faces of units.

3.6 PROVISIONS FOR MOVEMENT

- .1 Leave a 10 mm deflection space below shelf angles.
- .2 Leave a 10 mm space between masonry and vertical structural elements.

- .3 Leave a 25 mm space between top of non-loadbearing walls and partitions and structural elements. Fill space with compressible material and seal both sides as specified in Section 07 92 00. Do not use wedges.
- .4 Provide continuous movement control joints, properly sealed with backing rod and joint sealant, interior and exterior surfaces of wall system to ensure water tightness; where indicated on Drawings, and as follows:
 - .1 at all column locations, and
 - .2 spaced along continuous lengths of wall, maximum 6.0 metres OC.

3.7 LOOSE STEEL LINTELS

- .1 Install loose steel lintels. Centre lintel over opening width.
- .2 Bridge openings less than 450 mm wide with 6 mm thick mild steel plate lintels, bearing minimum 100 mm on each side of opening and set on dry pack grout. Width of plate to be equal to the wall thickness less 15 mm.

3.8 TEMPORARY WALL BRACING

- .1 Provide engineered temporary bracing for masonry walls to resist wind pressure and other lateral loads during and after erection until permanent lateral support is in place.

3.9 PROTECTING MASONRY

- .1 Refer to Section 01 76 00.
- .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind-driven rain, until masonry is completed and protected by flashings or other permanent construction.
- .3 Protect masonry and other work from marking and other damage.
- .4 Protect completed work from mortar droppings. Use non-staining coverings.

3.10 FIELD QUALITY CONTROL

- .1 Field Inspection: Consultant will inspect installed masonry and reject masonry that is chipped, cracked, or blemished (streaked, stained or otherwise damaged), as described below.
- .2 Masonry will be inspected to be free of chips, cracks or other blemishes on the finished face or front edges of the masonry units exceeding 10 mm or that can be seen from a distance of 3.0 metres. Masonry units supplied with a rusticated face will be inspected for cracks and blemishes only.
- .3 Make Good rejected masonry as directed by Consultant.

3.11 TOLERANCES

- .1 Conform to CSA A371.

3.12 CLEANING

- .1 Clean masonry as work progresses.
- .2 Allow mortar droppings on masonry to partially dry then remove by means of brushing with a stiff fibre brush.
- .3 Post-Construction: Clean one-half of mock-up panel as directed below and leave for one week. If no harmful effects appear and after mortar has set and cured, clean masonry as follows:
 - .1 Protect windows, sills, doors, trim and other work from damage.

- .2 Remove large particles with stiff fiber brushes wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
 - .3 Scrub with solution of 25 mL trisodium phosphate and 25 mL household detergent dissolved in 1 L of clean water using stiff fibre brushes, then clean off immediately with clean water using hose.
 - .4 Repeat cleaning process as often as necessary to remove mortar and other stains.
- .4 Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Mortar and grout for unit masonry.
- 1.2 PRODUCTS FURNISHED OR INSTALLED UNDER OTHER SECTIONS
 - .1 Section 05 12 00 includes non-shrinking grout for structural steel.
- 1.3 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 21 00 - Clay Unit Masonry.
 - .3 Section 04 22 00 - Concrete Unit Masonry.
 - .4 Section 04 22 26 - Decorative Concrete Unit Masonry.
- 1.4 REFERENCES
 - .1 ASTM C207-06: Standard Specification for Hydrated Lime for Masonry Purposes.
 - .2 CSA A179-04 (R2009): Mortar and Grout for Unit Masonry.
 - .3 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).
 - .4 CAN/CSA-A3001-03: Cementitious Materials for Use in Concrete.
 - .5 CAN/CSA-A3002-03: Masonry and Mortar Cement.
- 1.5 RESPONSIBILITY
 - .1 Make Good work that includes mortar not meeting the required specification. This includes the removal of the affected walls and the reconstruction of such walls using new materials.
- 1.6 PRODUCT DATA
 - .1 Submit Product data as specified in Section 01 33 00.
 - .2 Product Data: on design mix, indicating Proportion or Property specification method used, required environmental conditions and admixture limitations.
- 1.7 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Verification Samples: 2 ribbons of mortar, illustrating colour and colour range.
 - .1 Complete upon acceptance, confirmation of site-mixed colour additive proportional to mix batch site.
 - .2 Prepare and submit sample colour ribbons for each days work for review of consistency.
- 1.8 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver Products in original unbroken and undamaged packages with the maker's name and brand distinctly marked thereon, and upon delivery store in a shed until used on the work.
 - .3 Store or pile sand on a plank platform and protect from dirt and rubbish. Store mortar materials and sand in such a manner as to prevent deterioration or contamination by foreign materials.

1.9 PROJECT CONDITIONS

- .1 Maintain materials and surrounding air temperature to minimum 5 degrees Celsius and maximum 50 degrees Celsius prior to, during, and 48 hours after completion of masonry work.
- .2 Do not use anti-freeze, liquid salts, or other substances to lower the freezing point of mortar or grout. Conform to CSA A179.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of masonry cement having Product considered acceptable for use:
 - .1 St. Lawrence Cement.
 - .2 Lafarge Construction Materials.
- .2 Manufacturers of hydrated lime having Product considered acceptable for use:
 - .1 Genlime Group L.P.
 - .2 Rockwell Lime Company.
- .3 Manufacturers of dry, combined materials for mortar having Product considered acceptable for use:
 - .1 Daubois.
 - .2 Jiffy Mortar Systems.
 - .3 Genlime Group L.P.
- .4 Manufacturers of mortar pigment having Product considered acceptable for use:
 - .1 Bayer Pigments.
 - .2 Elementis Pigments.
 - .3 Hamburger Company.
- .5 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Portland Cement: to CAN/CSA-A3001, Type GU; Grey colour.
- .2 Masonry Cement: to CAN/CSA-A3002, Type N.
- .3 Hydrated Lime: to ASTM C207, Type S-Special.
- .4 Mortar Aggregate: natural sand, to CSA A179, standard masonry type; clean, dry, protected against dampness, freezing, and foreign matter.
- .5 Grout Aggregate: to CSA A179, as follows:
 - .1 Coarse: maximum 10 mm size; 27 percent by volume.
 - .2 Fine: clean well graded sharp sand; 54 percent by volume.
- .6 Water: potable, clean and free of deleterious amounts of acids, alkalies or organic materials.

2.3 ADMIXTURES

- .1 Plasticizer: water reducing type, reducing porosity and absorption to increase bond strength.
- .2 Water Repellent: mixture of calcium carbonate and hydrous magnesium aluminum silicate powders; eg. Hydrocide Powder by Degussa Building Systems.
- .3 Colour: liquid manufactured or natural oxide pigment, colour and loading as selected by Consultant.

2.4 MORTAR MIXES

- .1 Mortar for Use with Loadbearing Concrete Unit Masonry: to CSA A179, Type 'S' using the Proportion specification method; portland cement-masonry cement mix; c/w water repellent admixture.
- .2 Mortar for Use with Non-loadbearing Concrete Unit Masonry: to CSA A179, Type 'N' using the Proportion specification method; masonry cement mix; c/w water repellent admixture.
- .3 Mortar for Use with Clay Unit Masonry and Decorative Concrete Unit Masonry: to CSA A179, Type 'N' using the Proportion specification method; portland cement-hydrated lime-sand mix; comprised of 1-part hydrated lime, 1-part Portland cement, 6-parts mortar aggregate; c/w integral colour as selected by Consultant; minimum 3 colours required.

2.5 MORTAR MIXING

- .1 Thoroughly mix mortar ingredients in proper quantities needed for immediate use to CSA A179.
- .2 Add mortar colour and admixtures to requirements of manufacturer's instructions.
- .3 Provide uniformity of mix and colouration.
- .4 Take representative samples for testing consistency of strength and colour to CSA A179.
- .5 Use mortar within 2 hours after mixing at temperatures of 26 degrees Celsius, or 2-1/2 hours at temperatures under 10 degrees Celsius.

2.6 GROUT MIXES

- .1 Reinforced Cores, Bond Beams and Lintels: 20 MPa strength at 28 days; 200 - 250 mm slump; mixed to requirements of CSA A179, Fine Grout.

2.7 GROUT MIXING

- .1 Thoroughly mix mortar ingredients accurately in measured quantities needed for immediate use.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Request Consultant inspection of spaces to be grouted.

3.2 PREPARATION

- .1 Apply bonding agent to existing concrete surfaces.
- .2 Plug clean-out holes with masonry units to prevent leakage of grout materials.
- .3 Brace masonry for wet grout pressure.
- .4 Remove excess mortar from grout spaces.

3.3 APPLICATION

- .1 Install mortar and grout as specified in Sections 04 21 00, 04 22 00 and 04 22 26.
- .2 Work grout into masonry cores and cavities to eliminate voids.
- .3 Do not displace reinforcement while placing grout.

3.4 FIELD QUALITY CONTROL

- .1 Perform inspection and testing of mortar and grout mixes as specified in Section 01 40 00.
- .2 Submit sample cubes for laboratory testing and test data as specified in Section 01 40 00 and to CSA S304.1 and CSA A179.
- .3 Test mortar for compressive strength to CSA A179 and as follows:
 - .1 Test three 50 mm cubes at 7 days and three 50 mm cubes at 28 days.
 - .2 Mortar for Concrete Unit Masonry: perform one test for every 500 sq. m. of wall, but not less than one set of tests for each storey height of each building.
 - .3 Mortar for Masonry Veneer: perform one test for every 250 square metres of wall, but not less than one set of tests for each storey height of each building.
- .4 Test grout for slump and compressive strength to CSA A179 and as follows:
 - .1 Take one set of grout cylinders at least daily for each 20 cubic metres of grout poured and whenever the mix design changes.
 - .2 Cylinder Sets: comprised of minimum three cylinders.
 - .3 Test one cylinder at 7 days and two cylinders at 28 days.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Reinforcement, ties and anchors for use with unit masonry.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 05 10 - Masonry Mortaring and Grouting.
 - .3 Section 04 05 23 - Masonry Accessories.
 - .4 Section 04 21 00 - Clay Unit Masonry.
 - .5 Section 04 22 00 - Concrete Unit Masonry.
 - .6 Section 04 22 26 - Decorative Concrete Unit Masonry.
 - .7 Section 05 12 00 - Structural Steel Framing: steel lintels and bearing plates.
 - .8 Section 05 50 00 - Metal Fabrications: fabricated metal items.
- 1.3 REFERENCES
 - .1 ASTM A82/A82M-07: Standard Specification for Steel Wire, Plain, For Concrete Reinforcement.
 - .2 ASTM A123/A123M-02: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A153/A153M-01a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - .4 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .5 ASTM A580/A580M-06: Standard Specification for Stainless Steel Wire.
 - .6 ASTM A641/A641M-98: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .7 ASTM A1011/A1011M-07: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra-High Strength.
 - .8 CAN/CGSB-1.40-M89: Primer, Structural Steel, Oil Alkyd Type.
 - .9 CSA A370-04 (R2009): Connectors for Masonry.
 - .10 CSA A371-04 (R2009): Masonry Construction for Buildings.
 - .11 CSA G30.18-M92 (R2002): Billet-Steel Bars for Concrete Reinforcement.
 - .12 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).
- 1.4 QUALITY ASSURANCE
 - .1 Single-Source Responsibility: Provide each type of Product from a single manufacturer.
- 1.5 MOCK-UPS
 - .1 Supply Product for construction of mock-up panel as specified in Section 04 05 00.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of horizontal joint reinforcement and anchors having Product considered acceptable for use:
 - .1 Blok-Lok.
 - .2 Dur-O-Wal.
- .2 Manufacturers of masonry veneer ties having Product considered acceptable for use:
 - .1 Blok-Lok.
 - .2 Fero.
- .3 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Exterior Wall, Single-Wythe Horizontal Joint Reinforcement: Truss type, 4.8 mm side rods with 4.8 mm cross ties; to ASTM A82/A82M; hot-dipped galvanized; eg. Dur-O- Wal DA3100.
- .2 Interior Wall, Single-Wythe Horizontal Joint Reinforcement: Ladder type, 3.7 mm side rods with 3.7 mm cross ties; to ASTM A82/A82M; regular mill galvanized; eg. Dur-O- Wal DA3200.
- .3 Masonry Veneer Wall Tie (CMU Back-up): adjustable, dual component slotted design; eg. Fero Slotted BlockTie (Type I), comprised of:
 - .1 Slotted Block Plate: 1.61 mm thick stainless steel plate, to ASTM A167, Type 304; length to suit air space and CMU width dimension, less 6 mm.
 - .2 V-Tie: 4.76 mm diameter stainless steel wire, to ASTM A580, Type 304; length to provide placement of tie legs at centerline of veneer.
 - .3 Insulation Retaining Clip: purpose-made plastic, as recommended by tie manufacturer.
- .4 Masonry Veneer Wall Tie (Concrete Back-up): adjustable, dual component slotted design; eg. Fero Slotted Rap-Tie, comprised of:
 - .1 Slotted L-Plate: 1.61 mm thick stainless steel plate, to ASTM A167, Type 304; length to suit air space dimension.
 - .2 V-Tie: 4.76 mm diameter stainless steel wire, to ASTM A580, Type 304; length to provide placement of tie legs at centerline of veneer.
 - .3 Fastener: 6 mm OD Tapcon screws; minimum 2 screws per tie.
 - .4 Insulation Retaining Clip: purpose-made plastic, as recommended by tie manufacturer.
- .5 Reinforcing Steel: to CSA G30.18, as specified in Section 03 20 00; sizes as indicated on Drawings.
- .6 Strap Anchors: 4.76 mm thick steel plate, hot dipped galvanized; U-shaped and Z-shaped to suit application; eg. BLT11 by Blok-Lok.
- .7 Fasteners: purpose made for substrate; stainless steel finish for exterior walls, mill galvanized for interior walls, to CSA A370.

2.3 SHOP FINISHING

- .1 Mill Galvanizing: to ASTM A641, Regular; minimum 30 g/m² zinc coating.
- .2 Hot Dip Galvanizing:
 - .1 Horizontal Joint Reinforcement Wire: to ASTM A153/A153M, Class B2, minimum 458 g/m² zinc coating.
 - .2 Strap Anchors: to ASTM A123/A123M, minimum 503 g/m² zinc coating.

3 Execution

3.1 PREPARATION

- .1 Supply metal anchors to the appropriate trades for placement. Direct correct placement.
- .2 Verify that anchorages embedded in concrete or attached to structural steel members are properly placed. Embed anchorages in every second joint.

3.2 INSTALLATION

- .1 Install masonry connectors and reinforcement to CSA A370.
- .2 Place horizontal joint reinforcement continuous in every second horizontal joint.
- .3 Place horizontal joint reinforcement in first and second horizontal joints above and below openings. Extend 400 mm minimum each side of opening.
- .4 Place horizontal joint reinforcement continuous in first and second joints below top of walls.
- .5 Reinforce joint corners and intersections with strap anchors spaced at 400 mm OC vertically.
- .6 Place reinforcing bars supported and secured against displacement. Maintain minimum clearance of 12 mm from masonry and not less than one bar diameter between bars.
 - .1 Provide 2-15M reinforcing bars grouted vertically into CMU cores both sides of masonry openings.
- .7 Provide clean out openings at the bottom of cores containing vertical reinforcement at each lift or pour.
- .8 Solidly fill block cores containing vertical reinforcement or anchor bolts with grout.
- .9 Secure wall ties to structural back-up for veneer at maximum 400 mm OC vertically and 600 mm OC horizontally.
- .10 Double quantity of wall ties within 200 mm of openings.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Masonry flashing and accessories.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 05 10 - Masonry Mortaring and Grouting.
 - .3 Section 04 05 19 - Masonry Anchorage and Reinforcing.
 - .4 Section 04 21 00 - Clay Unit Masonry.
 - .5 Section 04 22 00 - Concrete Unit Masonry.
 - .6 Section 04 22 26 - Decorative Concrete Unit Masonry.
 - .7 Section 05 12 00 - Structural Steel Framing: steel lintels and bearing plates.
 - .8 Section 05 50 00 - Metal Fabrications: fabricated metal items.
 - .9 Section 07 21 00 - Thermal Insulation.
 - .10 Section 07 27 00 - Air Barriers: air barrier as an integral part of the cavity wall system.
 - .11 Section 07 62 16 - Sheet Metal Flashing and Trim.
 - .12 Section 07 92 00 - Joint Sealants: rod and sealant at control and expansion joints.
- 1.3 REFERENCES
 - .1 ASTM A153/A153M-01a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - .2 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .3 ASTM A653/A653M-09: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 CSA A371-04 (R2009): Masonry Construction for Buildings.
- 1.4 MOCK-UPS
 - .1 Supply Product for construction of mock-up as specified in Section 04 05 00.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of mortar dropping control devices and cell vents having Products considered acceptable for use:
 - .1 Masonry Technology Inc.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 MATERIALS
 - .1 Flexible Flashing: 1.0 mm thick self-adhering SBS rubberized asphalt membrane with a cross-laminated HPDE top surface, sheet width to suit application; eg. Blueskin TWF by Bakor.

- .2 Sheet Metal Flashing: 0.61 mm thick steel; flat sheet stock to ASTM A653/A653M, Grade 230, hot dipped galvanized.
- .3 Cavity Firestops: minimum 1.2 mm thick stainless steel sheet, to ASTM A167, Type 304.
- .4 Movement Joint Filler: closed cell polyurethane or polyethylene oversized by 50 percent; self-expanding.
- .5 Building Paper: No. 15 asphalt saturated felt.
- .6 Mortar Dropping Control Device: 0.6 mm thick high impact polystyrene sheets. They are formed with corrugations and a spunbond polypropylene fabric on one side with a 102 mm skirt on one edge; Sure Cavity SC5016 by Masonry Technology Inc.
- .7 Cavity Vent, Type CV-1: 57 mm wide weep legs spaced at 241 mm OC, 25 mm wide continuous belt; 152 mm total width; CV5010 by Masonry Technology Inc.
- .8 Cavity Vent, Type CV-2: 0.6 mm thick acetac, 9.5 mm wide, 9.5 mm high, 114.3 mm long; HJW 3845 by Masonry Technology Inc.
- .9 Cavity Wall Filler: compressible closed cell foam.
- .10 Nailing Inserts: 0.6 mm thick purpose made galvanized steel inserts for setting in mortar joints.
- .11 Primer: as recommended by sheet membrane manufacturer.

2.3 SHOP FINISHES

- .1 Galvanizing: to ASTM A153/A153M, Class B2.
- .2 Prefinished Coating: baked ceramic pigmentation coating, applied to a minimum 0.025 mm dry film thickness and having a specular gloss of 30 (plus or minus 5) gloss units when measured with a Gardner 60 degree gloss meter; eg. Colorite HMP by Valspar, colour as selected by Consultant from manufacturer's extended colour range.

3 Execution

3.1 PREPARATION

- .1 Apply primer to porous surfaces scheduled to receive self-adhering sheet membranes.

3.2 INSTALLATION

- .1 Provide vertical cavity wall fillers at external corners to prevent wind driven moisture from crossing the cavity. Bond filler to outer wythe using approved adhesive.
- .2 Provide nailing inserts in mortar joints at 400 mm OC each way, for attachment of wall strapping.
- .3 Provide vertical cavity firestops at a maximum spacing of 9.0 metres OC.
- .4 Provide horizontal cavity firestops at every floor slab.
- .5 Provide mortar dropping control devices at the base of wall cavities, in accordance with manufacturer's installation guidelines.
- .6 Provide Cavity Vent Type CV-1 immediately over flashings at brick ledges and top-of-foundation walls, spaced at maximum 800 mm OC.
- .7 Provide Cavity Vent Type CV-2 immediately over flashings at wall opening heads, in head joints spaced at maximum 800 mm OC.

- .8 Provide Cavity Vent Type CV-2 along the top of wall cavities, in head joints spaced at maximum 800 mm OC.

3.3 FLASHING

- .1 Provide flashings in masonry to CSA A371.
- .2 Install flashings under exterior masonry walls bearing on foundation walls or slabs; shelf angles, and steel lintel angles at wall openings, and as indicated on Drawings.
- .3 In double wythe walls and veneered walls, carry flashings from front edge of masonry, under outer wythes, then up backing not less than 150 mm, and as follows:
 - .1 Masonry Backing: embed flashing 25 mm in joint.
 - .2 Concrete Backing: insert flashing into reglets and seal joint.
 - .3 Sheathed Backing: secure flashing to sheathing behind air barrier.
- .4 Lap joints 150 mm and seal watertight.
- .5 Provide end dam flashing at both jambs of openings, to prevent water from travelling horizontally past the flashing ends.
- .6 Return horizontal base flashing a minimum of 100 mm around corner to overlap abutting flashing. Seal watertight.

3.4 MOVEMENT JOINTS

- .1 Provide vertical and horizontal movement control joints in accordance with the BIA Technical Note on Brick Construction 18A - Accommodating Expansion of Brickwork.
- .2 Do not continue horizontal joint reinforcing across movement control joints.
- .3 Construct movement joints as follows:
 - .1 Concrete Masonry Units: Form movement control joint by use of sheet building paper bond breaker one side fitted to hollow contour of block unit end. Fill created core with grout fill. Rake joint at exposed faces for rod and sealant.
 - .2 Clay Brick and Calcium Silicate Manufactured Stone Masonry: leave head joints between stacked units void of mortar and other firm obstructions, ready for application of bond breaker and joint sealant.
- .4 Size joint for sealant performance as specified in Section 07 92 00.

3.5 PROTECTION

- .1 Protect flashings from mortar droppings.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Clay brick masonry veneer.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 05 10 - Masonry Mortaring and Grouting.
 - .3 Section 04 05 19 - Masonry Anchorage and Reinforcing: wall ties.
 - .4 Section 04 05 23 - Masonry Accessories: flashing, weep vents, mortar dropping control devices, movement joint fillers.
 - .5 Section 04 22 00 - Concrete Unit Masonry.
 - .6 Section 04 22 26 - Decorative Concrete Unit Masonry.
 - .7 Section 05 12 00 - Structural Steel Framing: steel lintels and bearing plates.
 - .8 Section 05 50 00 - Metal Fabrications: fabricated metal items.
 - .9 Section 07 21 00 - Thermal Insulation: cavity wall insulation.
 - .10 Section 07 27 00 - Air Barriers: air/vapour barrier as an integral part of the cavity wall system.
 - .11 Section 07 62 16 - Sheet Metal Flashing and Trim.
 - .12 Section 07 92 00 - Joint Sealants: rod and sealant at control and expansion joints.
 - .13 Section 08 11 13 - Hollow Metal Frames.
 - .14 Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
 - .15 Section 08 44 13 - Glazed Aluminum Curtain Wall.
 - .16 Section 08 51 13 - Aluminum Windows: window frames.
- 1.3 REFERENCES
 - .1 CAN/CSA-A82.1-M87 (R2003): Burned Clay Brick (Solid Masonry Units Made from Clay or Shale).
 - .2 CSA A371-04 (R2009): Masonry Construction for Buildings.
 - .3 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).
- 1.4 MOCK-UPS
 - .1 Supply Product for construction of mock-up panel as specified in Section 04 05 00.
- 1.5 PROJECT CONDITIONS
 - .1 Environmental Requirements: as specified in Section 04 05 00.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 04 05 00.

2 Products

2.1 MATERIALS

- .1 Face Brick (B-1): burned clay brick, to CAN/CSA A82.1-M, Type FBS, Grade SW; 90 mm high, 290 mm long, 90 mm bed depth; Sundance Matt by Hanson.
- .2 Veneer Mortar: as specified in Section 04 05 10.
- .3 Reinforcement and Anchorages: as specified in Section 04 05 19.
- .4 Accessories: flashings, movement joint filler, mortar dropping control device, cavity vents, nailing inserts and cavity wall filler as specified in Section 04 05 23.

2.2 SOURCE QUALITY CONTROL

- .1 Perform shop inspection and testing of unit masonry as specified in Section 01 40 00.
- .2 Submit samples for laboratory testing and test data as specified in Section 01 40 00 and to CSA S304.1.
- .3 Test brick to CAN3-A82.2-M78 (R2003).

3 Execution

3.1 INSTALLATION

- .1 Place masonry veneer to lines and levels indicated, as specified in Section 04 05 00.
- .2 Lay brick in running bond, unless indicated otherwise on Drawings.
- .3 Cut brick to accommodate brick patterns.
- .4 Maintain 10 mm wide mortar joints in both directions.
- .5 Install cavity wall insulation over air/vapour barrier as specified in Section 07 21 00. Secure with approved fasteners.
- .6 Install masonry accessories as specified in Section 04 05 23.
- .7 Secure wall ties to structural back-up for veneer as specified in Section 04 05 19.
- .8 Install masonry flashing as specified in Section 04 05 23.
- .9 Install loose steel lintels as scheduled and as specified in Section 04 05 00.
- .10 Provide vertical and horizontal movement control joints as specified in Section 04 05 23 and as indicated on Drawings.

3.2 TOLERANCES

- .1 Variation from Unit to Adjacent Unit: 1.5 mm maximum.
- .2 Variation of Joint Thickness: 3 mm per metre maximum.

3.3 FIELD QUALITY CONTROL

- .1 Consultant will inspect installed masonry and reject masonry that is chipped, cracked, or blemished (streaked, stained or otherwise damaged), as described below.
- .2 Masonry will be inspected to be free of chips, cracks or other blemishes on the finished face or front edges of the masonry units exceeding 10 mm or that can be seen from a distance of

3.0 metres. Masonry units supplied with a rusticated face will be inspected for cracks and blemishes only.

.3 Make Good rejected masonry as directed by Consultant.

3.4 CLEANING

.1 Clean masonry as specified in Section 04 05 00.

3.5 PROTECTION

.1 Protect clay brick from damage resulting from subsequent construction operations. Refer to Section 04 05 00.

.2 Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Concrete unit masonry.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 05 10 - Masonry Mortaring and Grouting.
 - .3 Section 04 05 19 - Masonry Anchorage and Reinforcing.
 - .4 Section 04 05 23 - Masonry Accessories.
 - .5 Section 04 21 00 - Clay Unit Masonry.
 - .6 Section 04 22 26 - Decorative Concrete Unit Masonry.
 - .7 Section 05 12 00 - Structural Steel Framing: steel lintels, and bearing plates.
 - .8 Section 05 50 00 - Metal Fabrications: fabricated metal items to be embedded in foundation walls.
 - .9 Section 07 21 00 - Thermal Insulation: cavity wall insulation.
 - .10 Section 07 62 16 - Sheet Metal flashing and Trim.
 - .11 Section 07 92 00 - Joint Sealants: rod and sealant at control and expansion joints.
 - .12 Section 08 11 13 - Hollow Metal Frames.
 - .13 Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
 - .14 Section 08 44 13 - Glazed Aluminum Curtain Wall.
 - .15 Section 08 51 13 - Aluminum Windows.
- 1.3 REFERENCES
 - .1 ASTM C331-05: Standard Specification for Lightweight Aggregates for Concrete Masonry Units.
 - .2 CSA A165 Series-04: CSA Standards on Concrete Masonry Units.
 - .3 CSA A371-04 (R2009): Masonry Construction for Buildings.
 - .4 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).
- 1.4 MOCK-UPS
 - .1 Supply Product for construction of mock-up panel as specified in Section 04 05 00.
- 1.5 PROJECT CONDITIONS
 - .1 Environmental Requirements: as specified in Section 04 05 00.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 04 05 00.

2 Products

2.1 MASONRY UNITS

- .1 Normal Concrete Masonry Unit (CMU): to CSA A165.1, using N aggregate; 190 x 390 mm size, bed depth as indicated on Drawings; solid factory-finished ends with bull nosed corners for use at exposed wall corners, special shapes as required; types as follows:
 - .1 Hollow: Type H/15/A/M.
 - .2 Solid (100 percent): Sc/15/A/M.
 - .3 Solid (75 percent): S/15/A/M.
- .2 Lightweight Concrete Masonry Unit (LCMU): to CSA A165.1, using L₂20S slag aggregate to ASTM C331; 190 x 390 mm size, bed depth as indicated on Drawings; solid factory-finished ends with bull nosed corners for use at exposed wall corners, special shapes as required; types as follows:
 - .1 Hollow: Type H/15/C/M.
 - .2 Solid (100 percent): Sc/15/C/M.
 - .3 Solid (75 percent): S/15/C/M.
- .3 Acoustic Concrete Unit Masonry: to CSA A165.1, using N aggregate, Type H/15/A/M; dual-slotted design, with fibrous sound dampening filler; Acousta-Wall by Day & Campbell Ltd. or Soundblox by Permacon.

2.2 ACCESSORIES

- .1 Mortar and Grout: as specified in Section 04 05 10.
- .2 Horizontal Joint Reinforcement: as specified in Section 04 05 19.
- .3 Reinforcing Steel: as specified in Section 04 05 19.
- .4 Wall Ties: as specified in Section 04 05 19.
- .5 Strap Anchors: as specified in Section 04 05 19.
- .6 Accessories: flexible flashing membranes, sheet metal flashing, movement joint filler, nailing inserts: as specified in Section 04 05 23.
- .7 Parge Coating: two-component, cement-based, polymer modified; eg. SikaTop Seal 107.

2.3 MIXING

- .1 Parge Coating: slowly add powder to liquid component in a clean container, and stir with a slow speed mixer until mix is uniform in colour and is lump free.

2.4 SOURCE QUALITY CONTROL

- .1 Perform testing of unit masonry as specified in Section 01 40 00.
- .2 Submit samples for laboratory testing and test data as specified in Section 01 40 00 and to CSA S304.1.
- .3 Report on the compressive strength and water absorption of concrete masonry units.

3 Execution

3.1 INSTALLATION

- .1 Place masonry to lines and levels indicated, as specified in Section 04 05 00.
- .2 Typically lay concrete masonry units in running bond, unless indicated otherwise.

- .3 Maintain 10 mm wide mortar joints in both directions.
 - .4 Provide purpose made pilaster units, 90 and 45 degree corner return units, bullnose units, bond beam units, lintel units as required.
 - .5 Provide bullnose concrete masonry units at all exposed corners, except at the first course at floor level and at the corresponding course located at the ceiling level.
 - .6 Fully bond intersections, and external corners.
 - .7 Extend and laterally support non-loadbearing partitions to underside of structural deck above. Maintain a minimum deflection space at the top of partitions as follows:
 - .1 Partition parallel to structural assembly: 44 mm.
 - .2 Partition perpendicular to structural member: 19 mm.
 - .3 Structural member penetrates partition: 19 mm.
 - .4 Ducts or piping supported from structural assembly that penetrate the partition: 19 mm.
 - .5 Fill deflection space with mineral fibre sound attenuating insulation.
 - .8 Place horizontal joint reinforcement as specified in Section 04 05 19.
 - .9 Install masonry flashings as specified in Section 04 05 23.
 - .10 Install loose steel lintels as specified in Section 04 05 00.
 - .11 Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled. Construct lintels using grout fill and reinforcing. Maintain minimum 200 mm bearing on each side of opening.
 - .12 Reinforce bond beams and pilasters as indicated on Drawings. Place and consolidate grout fill without disturbing reinforcing.
 - .13 At bearing points, fill masonry cores with grout minimum 300 mm from opening.
 - .14 Provide vertical and horizontal movement control joints as specified in Section 04 05 23.
- 3.2 PARGE COAT
- .1 Prepare substrate in accordance with manufacturer's printed instructions.
 - .2 Apply 2 coats of parging over concrete masonry units on inside surface of lift hoistway.
 - .3 Apply parge coating using notched trowel.
 - .4 Allow first coat to harden (approximately 2 to 6 hours), then apply second coat.
 - .5 Total Thickness: minimum 12 mm.
 - .6 Finish second coat by rubbing down with a soft, dry sponge.
- 3.3 TOLERANCES
- .1 Variation from Unit to Adjacent Unit: 1.5 mm maximum.
 - .2 Variation of Joint Thickness: 3 mm per metre maximum.
- 3.4 CLEANING
- .1 Clean masonry as specified in Section 04 05 00.
- 3.5 PROTECTION
- .1 Protect concrete masonry units from damage resulting from subsequent construction operations. Refer to Section 04 05 00.

- .2 Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Decorative concrete masonry trim and sills.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 05 10 - Masonry Mortaring and Grouting.
 - .3 Section 04 05 19 - Masonry Anchorage and Reinforcing: wall ties.
 - .4 Section 04 05 23 - Masonry Accessories: flashing, weep vents, mortar dropping control devices, cavity firestops, movement joint fillers.
 - .5 Section 04 21 00 - Clay Unit Masonry.
 - .6 Section 04 22 00 - Concrete Unit Masonry.
 - .7 Section 05 12 00 - Structural Steel Framing: steel lintels and bearing plates.
 - .8 Section 05 50 00 - Metal Fabrications: fabricated metal items.
 - .9 Section 07 62 16 - Sheet Metal Flashing and Trim.
 - .10 Section 07 92 00 - Joint Sealants: rod and sealant at control and expansion joints.
 - .11 Section 08 11 13 - Hollow Metal Frames.
 - .12 Section 08 44 13 - Glazed Aluminum Curtain Wall.
 - .13 Section 08 51 13 - Aluminum Windows.
 - .14 Section 08 90 00 - Louvers and Vents.
- 1.3 REFERENCES
 - .1 CSA A165 Series-04: CSA Standards on Concrete Masonry Units.
 - .2 CSA A371-04 (R2009): Masonry Construction for Buildings.
 - .3 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).
- 1.4 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: duplicate 100 x 100 mm size samples, illustrating colour range and texture.
- 1.5 MOCK-UPS
 - .1 Supply Product for construction of mock-up panel as specified in Section 04 05 00.
- 1.6 PROJECT CONDITIONS
 - .1 Environmental Requirements: as specified in Section 04 05 00.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 04 05 00.
 - .2 Deliver Products in approved protective film. Prevent damage to units.

- .3 Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.
- .4 Store Products in a manner designed to prevent damage and staining of units.
- .5 Stack masonry units on timbers or platforms at least 75 mm above grade.
- .6 Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time.
- .7 Cover stored units with protective enclosure if exposed to weather.
- .8 Do not use salt or calcium-chloride to remove ice from stone surfaces.

2 Products

2.1 MATERIALS

- .1 Decorative Concrete Masonry Units (DCMU-1): concrete masonry units to CSA A165.1, Type H/15/A/M, using N aggregate, 190 x 390 mm size, bed depth as indicated on Drawings; factory-finished ends for use at exposed wall corners; c/w integral water repellent; Smooth face; colour as selected by Consultant.
- .2 Mortar: as specified in Section 04 05 10.
- .3 Reinforcement and Anchorages: as specified in Section 04 05 19.
- .4 Accessories: flashings, movement joint filler, mortar dropping control device, cavity vents, nailing inserts and cavity wall filler as specified in Section 04 05 23.

3 Execution

3.1 PREPARATION

- .1 Cut units with wet-saw.
- .2 Pre-soak units using clean water prior to cutting.
- .3 Clean cut units using a stiff fibre brush and clean water.
- .4 Allow units to surface dry prior to placement.

3.2 COURSING

- .1 Place masonry to lines and levels indicated.
- .2 Maintain uniform mortar joint thickness in all directions.
- .3 Tool joints to a raked finish when mortar is thumbprint hard.

3.3 PLACING AND BONDING

- .1 Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- .2 Fully bond intersections, and external corners.
- .3 Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- .4 Do not adjust masonry units after laying. Where resetting of masonry is required, remove, clean units and reset in new mortar.

- .5 Install masonry accessories as specified in Section 04 05 23.
 - .6 Secure wall ties to structural back-up for veneer as specified in Section 04 05 19.
 - .7 Install masonry flashing as specified in Section 04 05 23.
 - .8 Install loose steel lintels as scheduled.
 - .9 Provide vertical and horizontal movement control joints as specified in Section 04 05 00.
- 3.4 TOLERANCES
- .1 Variation in Alignment from Unit to Adjacent Unit: 1.5 mm maximum.
 - .2 Variation of Mortar Joint Thickness: 3 mm every metre.
- 3.5 CLEANING
- .1 Clean masonry as installation progresses.
 - .2 Allow mortar droppings on stone masonry to partially dry then remove by means of brushing with a stiff fibre brush.
 - .3 Post-Construction: Clean masonry as specified in Section 04 05 00.
- 3.6 PROTECTION
- .1 Refer to Section 01 76 00.
 - .2 Protect completed installation from damage resulting from subsequent construction operations.
 - .3 Use protection materials and methods which will not stain or damage masonry units.
 - .4 Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Supply and install the following:

- structural steel;
- Loose lintels;
- temporary bracing required;
- other work specified herein or as indicated on the drawings.

.2 In addition to requirements specified above, provide other work and perform other services, whether or not specifically required by Contract Documents, necessary for completion of work of the Section.

1.2 RELATED SECTIONS

.1 Section 03 30 00 – Cast-in-Place Concrete.

.2 Section 04 05 00 – Common Work Results For Masonry.

.3 Section 05 21 00 – Steel Joist Framing.

.4 Section 05 30 00 – Metal Decking.

1.3 QUALITY ASSURANCE

.1 Reference Standards

- .1 Conform to CAN/CSA-S16.1-01, CAN/CSA-S136-01 and CISC Code of Standard Practice, except as specified otherwise or otherwise indicated on Structural Drawings. The term “structural steelwork” includes steel work indicated on Structural Drawings.

.2 Source Quality Control:

- .1 Submit four certified copies of Mill Test Certificates including the results of Mechanical and Chemical Test on samples representative of the steel used in this work.

1.4 SUBMITTALS

.1 Submit shop and erection drawings as described in Section 01 33 00.

.2 Submit design calculations of all connections, signed and sealed by Professional Engineer of Ontario.

.3 Submit field work details with complete information for modifying fabricated members in the shop or on the job site.

.4 Clearly indicate shop and erection details including cuts, copes, connections, holes, threaded fasteners, welds and cambers. Indicate welds by CSA Standard welding symbols.

.5 Submit drawings indicate method of erection that will be utilizing existing structural framing. Drawings shall be signed and sealed by Professional Engineer of Ontario.

.6 The fabricator shall provide an affidavit stating that the materials and products that have been used in fabrication conform to the applicable material or product standards.

- .7 Provide final record prints of shop and erection drawings after all corrections are done.

1.5 HANDLING AND STORAGE

- .1 Store material on site for as short a time as possible and such that members do not acquire permanent camber or deflection.

1.6 INSPECTION AND TESTING

- .1 An independent inspection and testing company will be appointed and as described in Section 01 40 00.
- .2 The inspection shall cover shop work and field erection work to ensure compliance with the CAN/CSA-S16.1.
- .3 The inspection shall cover the progress of steel work and ascertain that the work is plumb, aligned and level, and all members are in the proper location; bolts torqued, welds examined and the work meets the requirements of the Contract Documents.

2 Products

2.1 MATERIALS

- .1 Rolled Shapes: CAN/CSA-G40.21-04, grade as follows:
 - .1 Angles, Channels, Plates, etc.: Grade 300W
 - .2 W-Shapes: Grade 350W
 - .3 HSS Structural Sections: Grade 350W, Class H
- .2 Welding: CSA W59-03.
- .3 High Strength Bolts: ASTM A325M-07, including suitable nuts and plain hardened washers.
- .4 Machine Bolts: ASTM A307-07a, externally and internally threaded standard fasteners.
- .5 Anchor Bolts and Tie Rods: ASTM A307-07a and A325M-07.
- .6 Headed Studs: ASTM A108-07 and Nelson Stud System by TRW Canada Ltd. or approved equal.
- .7 Paint:
 - .1 Shop coat: CISC/CPMA Standard 1-73a, a Quick-Dry one-coat paint in grey colour for use on Structural Steel.
 - .2 Prime: CISC/CPMA Standard 2-75 on Structural Steel, a Quick-Drying primer where a top finish of paint will be applied.
 - .3 Zinc rich paint: CGSB 1-GP-181M.
 - .4 Ferrous Metal Primer: CGSB-1.40.
- .8 Galvanizing: CSA-G164-M, hot dipped method, minimum 380g/m² zinc coating.

3 Execution

3.1 EXAMINATION

- .1 Examine surfaces and conditions upon which work of this Section depends and do not proceed with erection unless satisfied that surfaces and conditions are satisfactory.
- .2 Commencement of work will denote acceptance of conditions and surfaces.
- .3 Make all field measurements required for fabrication.

3.2 INSTALLATION

- .1 Fabricate, supply and erect structural steel work shown on drawings and specified. Supply angles, channels, plates and bolts and other detail fitting needed to complete structural steel work. Include applicable items listed in CSA Code of Standards Practice for Structural Steel for buildings. Include steel trusses and accessories, bridging and bracing, wall and beam anchors at ends of beams and other items required as listed in this code.
- .2 Supply necessary information for setting items of steelwork, supplied under this section, to be built into work of other sections concerned.
- .3 Supply loose steel lintels, shelf angles and other structural shapes which are not connected to structural steel and for installation under other sections of work, unless otherwise noted on drawings.
- .4 Supply embedding anchors into masonry walls, casting anchors into concrete, anchor bolts which are connected to structural steel and for installation under other sections of work, unless otherwise noted on drawings.
(Except lateral braces at top of interior non-load bearing masonry to be supplied and installed by miscellaneous steel).
- .5 Supply and install epoxy and expansion anchors which are connections of structural steel with concrete, p.c. slab and masonry, unless otherwise noted on drawings.
- .6 Design and execute connections of steel members not to interfere with architectural clearance line of finishes.
- .7 Make provisions for necessary connections for work of other trades where indicated. Ensure that number and placement of holes in steel members will not cause appreciable reduction in strength of steel members.
- .8 Do not field cut members without approval.
- .9 Set loose beam and joists bearing plates and column base plates true and level at proper elevations by steel shims, ready for grouting.
- .10 Grind welds smooth on steel that is exposed to view.
- .11 Painting
 - .1 Paint steel in shop, under cover. Keep painted members under cover until paint has dried.
 - .2 Except where no painting or another type of coating is specified, give surfaces of steel one coat of shop coat paint.
 - .3 Give surfaces to receive finish top coat of paint one coat of prime.
 - .4 Clean and prepare surfaces in accordance with CISC/CPMA Standard 1-73a.

- .5 use power tool cleaning to SSPC-SP3 where required on steel exposed to view.
- .6 Provide touch-up coat of zinc rich paint after erection to connections and damaged surface areas.

.12 DO NOT SHOP PAINT

- .1 Surfaces and edges to field welded.
- .2 Contact surfaces of friction type connections assembled by high strength bolts.
- .3 Surfaces encased in or in contact with concrete.

.13 Spray Fireproofing Application.

- .1 Do not paint Steel surfaces.
- .2 Apply power tool cleaning to SSPC-SP3.
- .3 Store steel material on site in a clean and dry environment.
- .4 After steel erection, the cleanness of the steel surfaces to receive fireproofing shall be the responsibility of the General Trade.
- .5 The steel shall be free of dirt, oil, grease, rolling compounds or lubricants, loose mill scale and excess rust

.14 Galvanizing:

Galvanized members that are so indicated on drawings and exposed to weather, and only after shop welding has been completed. Do not weld galvanized section.

3.3 CLEAN UP

- .1 Remove from the site excess and waste materials and debris resulting from work of this Section.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Supply and install the following:

- steel joists;
- bridging;
- temporary bracing required;
- other work specified herein or as indicated on the drawings.

.2 In addition to requirements specified above, provide other work and perform other services, whether or not specifically required by Contract Documents, necessary for completion of work of this Section.

1.2 RELATED SECTIONS

.1 Section 03 30 00 – Cast-in-Place Concrete.

.2 Section 04 05 00 – Common Work Results For Masonry.

.3 Section 05 12 00 – Structural Steel Framing.

.4 Section 05 31 00 – Metal Decking.

1.3 QUALITY ASSURANCE

.1 Design, fabricate and erect steel joists in accordance with CSA Standard CAN/CSA-S16.1-01, CAN/CSA-S136-07 and CISC Code of Standard Practice.

.2 Fabricators shall be fully approved by Canadian Welding Bureau, and conform to CSA W47.1-03.

.3 Submit four certified copies of mill reports covering chemical and physical properties of steel used in this work.

1.4 SUBMITTALS

.1 Submit shop and erection drawings.

.2 Show material, size, spacing, camber and location of joists, connections, bridging, reinforcing and anchorages. Include necessary plans, elevations and details. Indicated size and type of fastenings. For welded connections use CSA standard welding symbols and indicate clearly net weld lengths and sizes.

.3 Submit for review, design calculations and drawings, signed and sealed by Ontario Licensed Professional Engineer responsible for design and fabrication.

.4 Accuracy of shop drawings and adequacy of joists is full responsibility of fabricator and is not lessened by Consultant's review.

.5 Provide final record prints of shop and erection drawings after all corrections are made.

1.5 HANDLING AND STORAGE

- .1 Store material on site for as short a time as possible and such that members do not acquire permanent camber or deflection.

1.6 INSPECTION AND TESTING

- .1 An independent inspection and testing company will be appointed and paid by cash allowance.
- .2 The inspection shall cover shop work and field erection work to ensure compliance with the CAN/CSA-S16.1.
- .3 The inspection shall cover the progress of steel work and ensure that the work is plumb, aligned and level, and all members are in the proper location; bolts torqued, welds examined and the work meets the requirements of the drawings and specifications.

2 Products

2.1 MATERIALS

- .1 Hot Rolled Shapes, Plates and Rods: CAN/CSA-G40.21-04, grade 300W.
- .2 Cold Roll-Formed Components: CAN/CSA S136-07.
- .3 Welding: CSA W59-03.
- .4 Paint:
 - .1 Shop coat: CISC/CPMA Standard 1-73a, a Quick-Dry one-coat paint in grey colour for use on Structural Steel.
 - .2 Prime: CISC/CPMA Standard 2-75 , a Quick-Drying primer where a top finish of paint will be applied.
 - .3 Zinc Rich Paint: CGSB 1-GP-181M.

2.2 FABRICATION

- .1 Comply with CAN/CSA-S16.1-01.
- .2 Comply with CSA W55.3-08 for resistance welding.
- .3 Use only new, clean, straight material.
- .4 Fabricate joists of straight members arranged to form a triangulated truss type structure without joists eccentricities. Splicing of chord members is not permitted. Use angles only for joists chords.
- .5 Extend bottom chords of joists where required.
- .6 Provide ceiling extension pieces for top chord bearing joist where joists are not to be exposed.
- .7 Provide openings for mechanical services running within joist depth.

2.3 FINISHING

- .1 After fabrication clean, scrape and remove rust, mill scale, grease and other extraneous material.
- .2 Paint steel in shop, under cover. Keep painted members under cover until paint has dried.
- .3 Except where no painting or another type of coating is specified, give surfaces of steel one coat of shop coat paint.
- .4 Give surfaces that receive finish top coat of paint, one coat of prime.
- .5 Clean and prepare surfaces in accordance with CISC/CPMA Standard 1-73a.
- .6 Use power tool cleaning to SPPC-SP3 where required on steel exposed to view.
- .7 Provide touch-up coat of Zinc-Rich Paint after erection to connections and damaged surface areas.
- .8 Do not shop paint:
 - .1 Surfaces and edges to be field welded;
 - .2 Contact surfaces of friction type connections assembled by high strength bolts;
 - .3 Surfaces encased in or in contact with concrete.
- .9 Spray Fireproofing Application.
 - .1 Do not paint Steel surfaces.
 - .2 Apply power tool cleaning to SSPC-SP3.
 - .3 Store steel material on site in a clean and dry environment.
 - .4 After steel erection, the cleanness of the steel surfaces to receive fireproofing shall be the responsibility of the General Trade.
 - .5 The steel shall be free of dirt, oil, grease, rolling compounds or lubricants, loose mill scale and excess rust.
- .10 Deliver items to site with paint undamaged.

3 Execution

3.1 EXAMINATION

- .1 Examine surfaces and conditions upon which work of this Section depends and do not proceed with erection unless those surfaces and conditions are satisfactory.
- .2 Commencement of work will denote acceptance of conditions and surfaces.
- .3 Make all field measurements required for fabrication.

3.2 ERECTION

- .1 Space and erect joists as specified and noted on drawings. Ensure that joists remain level and true during adjustment of steel deck and all subsequent work.

- .2 Ensure that joist locations do not interfere with location of roof drainage systems and ducts.
- .3 Bearing and Anchorage:
 - .1 Provide minimum 65mm bearing for joists supported on steel beams and 100mm bearing for joists supported on masonry or concrete.
 - .2 Carry joists to centre line of beams.
 - .3 Weld joists to supporting steel in accordance with requirements of CAN/CSA-S16.1 and local authority. If the requirements are at variance, the more severe shall govern.
- .4 Joist Bridging:
 - .1 Use diagonal or parallel bridging.
 - .2 Anchor each line of bridging to walls and other adjoining structures. If such bridging is not practicable, provide diagonal and horizontal bridging in combination at end of bridging run.
 - .3 Design bridging in accordance with CAN/CSA-S16.1 or as indicated on drawings.
- .5 The attachments for mechanical, electrical and other services shall be made by using approved clamping devices or U-bolt-type connectors and no drilling or cutting shall be done unless approved by Consultants.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Supply and install the following:

- .1 Steel deck where shown on drawings.
- .2 Closure Plates.

.2 In addition to requirements specified above, provide other work and perform other services whether or not specifically required by Contract Documents, necessary for completion of work of this section.

1.2 RELATED SECTIONS

.1 Section 05 12 00 – Structural Steel Framing.

.2 Section 05 21 00 – Steel Joist Framing.

1.3 QUALITY ASSURANCE

.1 Design steel deck and steel deck forms in accordance with requirements of CAN/CSA-S136-01 and Canadian Sheet Steel Building Institute standard for composite steel deck and steel roof deck.

.2 Fabricators shall be fully approved by Canadian Welding Bureau, and conform to CSA W47.1-03

.3 Welding: Conform to the requirements of CSA W59-03.

1.4 SUBMITTALS

.1 Shop Drawings

.1 Submit shop and erection drawings as described in Section 01 33 00.

.2 Amongst other items, show the following:

- .1 Type of deck and location.
- .2 Design loads.
- .3 Openings and their reinforcement.
- .4 Gauge of steel deck.
- .5 Surface protective coating.
- .6 Flashing and closure plates.
- .7 Welding and mechanical fastening details.
- .8 Sufficient detail sections showing deck orientation to support members to facilitate erection of deck.

.3 Shop drawings must be stamped , signed and sealed by the fabricator's design engineer.

1.5 HANDLING AND STORAGE

.1 Commence delivery of decking when work has progressed to such a point that erection of decking can begin.

.2 Stack bundles of decking on wood blocking clear of ground and tilted slightly to ensure that no water lies on material.

.3 Use special care in unloading, handling and erecting the decking to avoid bending, twisting or otherwise distorting the panels.

1.6 INSPECTION AND TESTING

- .1 Independent Inspection and Testing company will be appointed as described in Section 01 40 00.
- .2 The inspector shall cover the progress of the work and ascertain that the work meets the requirements of the drawings Contract Documents.

2 Products

2.1 MATERIALS

- .1 Manufacture steel deck from sheets of zinc coated structural quality steel having a yield strength of not less than 230 MPa conforming to CSSB1 101-M Grade A having a minimum base steel core nominal thickness as shown on the drawings.
- .2 Steel roof deck: RD-938 Roof Deck by VicWest Steel Inc. or approved equal.
- .3 Composite steel deck: HB-938 Hi-Bond Steel Floor Deck by VicWest Steel Inc. or approved equal.
- .4 Provide sections with interlocking type side joints with minimum lap 50mm.
- .5 Metal cover plates, cell closures, web stiffeners, edge strips and flashing shall conform to material and finish as specified for deck and have a minimum steel core nominal thickness of 1.22mm
- .6 Include all fasteners and accessories shown on drawings or as required to complete the work of this trade.
- .7 Galvanizing: Zinc coating designation Z275 (ZF75 for HB30V).
- .8 Zinc rich paint: Conforming to CGSB 1-GP-181M.

2.2 DESIGN REQUIREMENTS

- .1 Steel Roof:
 - .1 To ensure that the roof deck is capable of supporting dead and live loads together, including concentrated loads in accordance with requirements of jurisdictional authorities, without exceeding the allowable stresses.
 - .2 To ensure that the deflection under dead and live loads together, including construction loads, does not exceed 1/240 of the span.
 - .3 To ensure that deflection under live load only, does not exceed 1/360 of the span.
 - .4 To provide anchorage of roof deck to the structure to resist minimum gross uplift of 1.5 kPa and additionally, 2.0 kPa for eave overhang, monitor roofs, where they occur. The dead load of the roof construction may be deducted from the foregoing uplift force.
- .2 Composite Steel Deck:
 - .1 To ensure that the composite steel deck is capable of supporting dead and live loads together, including construction loads in accordance with requirements of jurisdictional authorities, without exceeding the allowable stresses.

- .2 To ensure that steel deck as a form is capable of resisting the effects of the combined loads due to wet concrete, deck and the following minimum construction live loads applied separately:
 - .1 1.0 kPa uniform load, or
 - .2 2.0 kN per meter (300mm wide) transverse line load at the centre of the span.
- .3 To ensure that the deflection under wet concrete and steel deck, does not exceed 1/180 of the span or 20mm which ever is smaller.
- .4 To ensure that the deflection under live load only, does not exceed 1/360 of the span.
- .5 Steel deck fabricator to specify shoring for steel deck form, if required.
- .6 Make steel deck sections continuous over 3 spans or increase thickness to material to give the equivalent stiffness and strength of a 3 span deck.

3 Execution

3.1 EXAMINATION

- .1 Examine surface and conditions upon which work of this Section depends and do not proceed with erection unless satisfied that surfaces and conditions are satisfactory.
- .2 Commencement of work will denote acceptance of conditions and surfaces.
- .3 Make all field measurements required for fabrication.

3.2 INSTALLATION

- .1 General:
 - .1 Ensure that construction loads caused by erection of deck will not load structural members in excess of their design loads.
 - .2 Erected deck shall be free of dirt, scale, foreign matter, dents or deformations.
 - .3 Lap ends of units a minimum of 50mm and only over supporting members.
 - .4 When deck units are adjusted to final position, anchor to supports and to members parallel to deck span to safely resist uplift forces and lateral forces, but with not less than 20mm diameter fusion welds at average spacing of 300mm OC.
 - .5 Provide a minimum of 50mm of end bearing on supports. Fasten side joints of deck units between supports by clinching at 600mm intervals. Secure structural flashings and the like to deck with sheet metal screws or welding.
 - .6 Make fusion welds of deck to supporting members well within bearing width of supporting member.
 - .7 Weld gauge metal to obtain satisfactory fusion between the deck and supports without damage to the deck or its supports.
 - .8 Install 150mm minimum wide sheet steel cover plates, of same thickness as decking where deck changes direction. Fusion weld at 300mm OC maximum.
 - .9 Install wet concrete stops at floor deck edge, upturned to top surface of slab. Provide stops of sufficient strength to remain stationary without distortion during concrete pours.
- .2 Closures:

Install closures and angle flashings to close openings between deck and walls, columns, and openings, as described below:

- .1 When fluted end of metal decking rests on exterior masonry walls, fill web spaces with closed cell neoprene or polyvinyl chloride closures as recommended by manufacturer.
 - .2 Where deck flutes are perpendicular to exterior walls, and decking exposed on underside extends beyond these walls, caulk interlocking side laps of decking for 400mm immediately over walls. Install interior and exterior closures. Caulk exterior closures to prevent air infiltration and interior closures to prevent water vapour exfiltration. Provide sufficient quantity of closures to close off topside flutes directly over face of wall.
 - .3 Where flutes run perpendicular to interior partitions, install double run of steel closures as recommended by manufacturer.
 - .4 Where flutes are parallel to interior partitions, install steel closure flashings to provide neat juncture between two materials, as recommended by manufacturer.
 - .5 Closures are not required between interior partitions and underside of decking in areas designated to receive suspended ceiling.
- .3 Openings:
- .1 Cut openings and reinforce edges as required. Indicate openings and reinforcement for openings on fabrication and erection drawings. The maximum size of an unreinforced opening is 150mm square or 150mm in diameter. Reinforce openings having a dimension over 150mm but not exceeding 450mm as required. Location of holes through decking shall be approved by Consultant.
 - .2 Frame openings 450mm x 450mm square and larger in roof deck and 400mm x 400mm and larger in floor deck under Section 05120.
 - .3 Obtain actual opening and holing information before proceeding with the work. Co-operate with other trades as necessary.

3.3 ADJUSTMENT AND CLEANING

- .1 Touch up adjacent primed surfaces burned, scratched or otherwise damaged during erection with prime paint to match shop coat, when erection is completed.
- .2 Paint over bare areas on galvanized surfaces and welds with zinc rich paint.
- .3 Replace dented or punctured deck where exposed to view.
- .4 Remove from the site excess and waste materials and debris resulting from work of this Section.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Axial Load Bearing Studs.

1.2 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-In-Place Concrete.
- .2 Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .3 Section 05 12 00 - Structural Steel Framing.
- .4 Other Sections related to Architectural components.

1.3 REFERENCES

- .1 CAN/CGSB-1-GP-181-99: Ready-Mixed Organic Zinc-Rich Coating.
- .2 CAN/CGSB-7.1-98: Cold-Formed Steel Framing Components.
- .3 CAN/CSA-S16-01: Limit States Design of Steel Structures.
- .4 CSA-S136-01: Cold Formed Steel Structural Members.
- .5 CSA W47.1-03: Certification of Companies for Fusion Welding of Steel Structures.
- .6 CSA W59-03: Welded Steel Construction (Metal Arc Welding).
- .7 CAN/ULC-S101: Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .8 ANSI/AWS D1.3 Structural Welding Code – Sheet Steel.
- .9 ASTM A653/A653M-07: Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .10 ASTM A792/A792M-99: Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

1.4 SYSTEM DESCRIPTION

- .1 Axial Load Bearing Studs: comprised of the following elements:
 - .1 Wall studs subjected to lateral and axial loads.
 - .2 Steel bridging.
 - .3 Top and bottom track.
 - .4 Lintel, sill and jamb members for wall openings.
 - .5 Cross-bracing.
 - .6 Connectors including anchor clip angles, through-bolts and epoxy bolts.

1.5 DESIGN REQUIREMENTS

- .1 Base design on Limit States Design principles using factored loads and resistances.
- .2 Loads and load factors shall be in accordance with the applicable code.

- .5 Determine resistances and resistance factors in accordance with the applicable code and CSA-S136.
 - .6 Conform to the requirements of fire rated assemblies which have been tested in accordance with CAN/ULC-S101 and provide a fire resistance rating as indicated on the Drawings.
 - .7 Stud depths are shown on the Drawings. Adjust stud material thickness and spacing, as required by the design criteria. Use greater or lesser stud depths only if approved by the Consultant.
 - .8 Space wall studs as indicated on Drawings, but not greater than 600 mm OC. Use lesser stud spacing if required by the design criteria.
 - .9 For studs conform to the minimum design thickness of 1.22mm. Use greater stud design thickness if required by the design criteria.
 - .10 The minimum design thickness for bridging channel shall be 1.22 mm for studs. Use greater bridging channel design thickness if required by the design criteria.
 - .11 The minimum design thickness for clip angles shall be 1.52 mm for studs. Use greater clip angle thickness if required by the design criteria.
 - .12 Design components and assemblies to accommodate specified erection tolerances of the structure.
 - .13 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on collateral sheathing to help restrain member rotation and translation perpendicular to the minor axis.
 - .14 Provide bridging at 1200 mm OC maximum for axial load bearing studs Closer spacing may be required to satisfy structural requirements.
 - .15 Design anchorage and splice details for bridging.
 - .16 Design for local loading due to anchorage of cladding and interior wall mounted fixtures where shown.
 - .17 Connections between light steel framing members shall be by bolts, welding or sheet metal screws.
 - .18 Allow for appropriate end eccentricities in the design of axial load bearing members.
 - .19 Design interior axial load bearing walls with a nominal lateral wind load of 0.24kPa in combination with the required loads.
 - .20 For stud walls, provide lintel, sill and jamb members and connections to frame openings
 - .21 For stud walls anchor top and bottom track to the structure at a maximum spacing of 800 mm OC. Closer spacing may be required to satisfy structural requirements.
- 1.6 QUALITY ASSURANCE
- .1 Retain a Professional Engineer registered in Ontario to design the Lightweight Steel Framing System; to prepare, seal and sign all shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.

- .2 Installers: company specializing in installing lightweight steel framing systems, with minimum of ten years experience and a member in good standing of the Interior Systems Contractors Association of Ontario (ISCA).
- .3 Welders: Companies certified by the Canadian Welding Bureau to CSA W47.1, and having welders qualified for the base material types and thickness that are to be welded.

1.7 SUBMITTALS

- .1 Submit Shop Drawings, Product data and test reports as specified in Section 01 33 00.
- .2 Shop Drawings
 - .1 Each Shop Drawing submitted shall bear the stamp and signature of a qualified Professional Engineer registered in Ontario.
 - .2 Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thickness exclusive of coating, coatings, and material types.
 - .3 Include connection details for attaching framing to itself and for attachment to the structure. Show splice details where permitted.
 - .4 Indicate dimensions, openings, requirements of related work and critical installation procedures. Show temporary bracing required for erection purposes.
 - .5 Indicate design loads.
- .3 Submit certified copies of mill reports covering chemical and mechanical properties, and coating designation of steel.
- .4 Product Data: illustrating mechanical fasteners, indicating sizes, load capacities and type of corrosion protection.
- .5 Upon request, submit representative pieces of all framing component parts including mechanical fasteners if used.
- .6 Submit copies of engineering calculations or data verifying the capacity of the members, including masonry connectors if specified, and the ability of the assemblies to meet the design requirements.
- .7 Do not fabricate or construct until submittals other than field review reports are reviewed and approved.
- .8 Submit copies of field review reports.

1.8 DELIVERY STORAGE AND HANDLING

- .1 Store Products protected from conditions that may cause physical damage or corrosion.
- .2 Handle and lift prefabricated panels carefully to avoid permanent distortion to any member or collateral material.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of lightweight steel framing and accessories having Products considered acceptable for use:
 - .1 Bailey Metal Products.
 - .2 MiTek Canada Inc.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 LIGHTWEIGHT STEEL FRAMING MATERIALS

- .1 Steel: to CSA S136; identified on the shop drawings as to specification, grade, mechanical properties and coating type and thickness.
- .2 Finish: to ASTM A653/A653M, Z275 or ASTM A792/A792M, AZM150.

2.3 ACCESSORIES

- .1 Bolts and Nuts: to ASTM A307 or ASTM A325; hot-dipped galvanized, c/w washers.
- .2 Screws: Sheet metal type, minimum zinc coating of .008 mm. Other coatings providing equal or better corrosion protection may be used.
- .3 Welding Materials: to CSA W59.
- .4 Welding Electrodes: 480 MPa minimum tensile strength series; e.g. E480XX or ER480S-X.
- .5 Touch-up Paint: Zinc rich paint for touching up welds and damaged metallic coatings, to CAN/CGSB-1.181.
- .6 Concrete Anchors: minimum coating thickness of .008 mm of zinc. Other coatings providing equal or better corrosion protection may be used.
- .7 Powder actuated/low velocity fasteners shall have a minimum coating thickness of .008 mm of zinc. Other coatings providing equal or better corrosion protection may be used.

2.4 FABRICATION

- .1 Except as noted herein, fabricate wall framing components to CAN/CGSB-7.1 and in accordance with approved Shop Drawings.
- .2 Where specified, provide cut-outs centered in the webs of members to accommodate services and through-the-knockout style bridging. Unreinforced cut-outs shall be limited to the following dimensions. Limit the distance from the centre line of the last unreinforced cut-out to the end of the member to be not less than 300 mm. The effect of cut-outs on the strength and stiffness of the member shall be considered.
 - .1 92 mm and 102 mm Deep Members
 - .1 Perpendicular to the Length of the Member: 40 mm.
 - .2 Parallel to the Length of the Member: 105 mm.
 - .3 Centre to Centre Spacing: 600 mm.
 - .2 152 mm Deep Members
 - .1 Perpendicular to the Length of the Member: 65 mm.
 - .2 Parallel to the Length of the Member: 115 mm.
 - .3 Centre to Centre Spacing: 600 mm.
- .3 Length tolerances for members:
 - .1 Tracks: none.
 - .2 Axial Load Bearing Studs: plus or minus 1.5mm.
- .4 Cross sectional geometry tolerances for members shall conform to the following:
 - .1 Member Depth: minus 1 mm, plus 2 mm.
 - .2 Flange depth: minus 1 mm, plus 2 mm; minimum 31 mm width.
 - .3 Lip Length: plus 4 mm.
 - .4 Thickness: to CSA S136.
 - .5 Corner Angles: plus or minus 3 degrees.

- .5 Mark the steel thickness, exclusive of coating, on each member by embossing, stamping with indelible ink or by colour coding.

3 Execution

3.1 FASTENERS AND WELDS

- .1 Ensure that connected parts are in contact. Provide clamping before welding or installing screws as required.
- .2 Welds: to CSA S136, CSA W59 and ANSI/AWS D1.3, as applicable.
- .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 Sheet metal screws shall be of the minimum diameter indicated on the shop drawings but not less than a #8.
- .5 Penetration of Sheet Metal Screws Beyond Joined Materials: not less than 3 exposed threads.
- .6 Sheet metal screw thread types, drilling capability and installation shall conform to the manufacturer's recommendations.
- .7 Provide sheet metal screws with low profile heads where covered by sheathing materials.
- .8 Install concrete anchors in accordance with manufacturer's recommendations.

3.2 STEEL FRAME 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 Erect lightweight steel framing true and plumb within the specified tolerances.
- .3 Employ temporary bracing wherever necessary to withstand all loads to which the structure may be subject during erection and subsequent construction. Leave temporary bracing in place as long as required for the safety and integrity of the structure. During construction, ensure that a margin of safety consistent with the requirements of the applicable code and CSA-S136 exists in the uncompleted structure.
- .4 Seat studs into top and bottom tracks. Do not allow gap between the end of the stud and the web of the track to exceed 1.5 mm for axial load bearing studs or 4 mm for wind bearing studs.
- .5 Align adjacent or abutting members in the same plane to within plus or minus 0.5 mm maximum.
- .6 Space studs within 3 mm either direction of the design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.
- .7 Align web cut-outs in studs and joists as required for the installation of through-the-knockout style bridging and services.
- .8 Make all field measurements necessary to insure the proper fit of all members.

- .9 Use either saws or shears to cut members. Do not torch cut material.
- .10 Reinforce cut-outs when the distance from the centre line of the cut-out to the end of the member is less than 300 mm. Submit reinforcing detail to Consultant for approval.
- .11 Vertically align axially loaded members to allow for full transfer of the loads down to the foundation. Maintain vertical alignment at roof-to-wall and floor-to-wall intersections.
- .12 Maintain complete bearing under tracks to provide for load transfer in axially loaded assemblies. Notify Consultant of any discrepancies.
- .13 Field cut holes into lightweight steel framing members as described above.
- .14 Replace members with localized damage.
- .15 Unless a closer spacing is shown on the shop drawings, anchor top and bottom tracks securely to structure at 800 mm OC maximum. Place one additional anchor within 100 mm of the end of each piece of track and additionally as required by the shop drawings.
- .16 Install additional studs at abutting walls, openings, terminations against other materials and on each side at corners unless explicitly detailed otherwise on the shop drawings.
- .17 Do not splice axial load bearing members.
- .18 Insulate jamb and header assemblies that may become inaccessible after installation. Use self-expanding foam sealant as specified in related Section.

3.3 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 bearing 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.

3.4 FIELD QUALITY CONTROL

- .1 The shop drawing engineer will undertake periodic field review during construction and shall submit reports as described above.
- .2 Include review of mill tests reports, welded and screwed connections, connections to the main structure, member sizes, location and material thickness, coating thickness, erection tolerances, and all field cutting.
- .3 Additional field inspection and testing will be conducted by a qualified Independent Inspection Agency, as specified in Section 01 45 00.
- .4 Independent inspection and testing will 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 Contract Documents.
 - .4 Checking fabricated members against specified member geometries.
 - .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 Consultant, the Contractor and the authorities having jurisdiction covering the work inspected with details of deficiencies discovered.

3.5 ADJUSTING AND CLEANING

- .1 Touch-up welds and coatings damaged by welding with zinc rich paint.
- .2 Prior to touch-ups, prepare surface in accordance with paint manufacturer's recommendations.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Shop fabricated metal items.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-in-Place Concrete: placement of metal anchors in concrete.
 - .2 Section 04 22 00 - Concrete Unit Masonry: placement of metal fabrications in concrete unit masonry.
 - .3 Section 05 12 00 - Structural Steel Framing: Bearing plates, angles and channels.
 - .4 Section 07 84 00 - Firestopping.
 - .5 Section 09 90 00 - Painting and Coating: site finishes.
- 1.3 REFERENCES
 - .1 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A269-07: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-07b: Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .4 ASTM A325M-07: Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength (Metric).
 - .5 ASTM B36/B36M-06: Standard Specification for Brass Plate, Sheet, Strip, and Rolled Bar.
 - .6 ASTM B103/B103M-07: Standard Specification for Phosphor Bronze Plate, Sheet, Strip, and Rolled Bar.
 - .7 ASTM B139/B139M-07: Standard Specification for Phosphor Bronze Rod, Bar and Shapes.
 - .8 ASTM B209M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .9 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .10 CSA G40.20-04: General Requirements for Rolled or Welded Structural Quality Steel.
 - .11 CSA G40.21-04: Structural Quality Steels.
 - .12 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .13 CAN/CSA-S136-01: North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .14 CSA W47.1-03: Certification of Companies for Fusion Welding of Steel Structures.
 - .15 CSA W55.3-1965 (R2003): Resistance Welding Qualification Code for Fabricators of Structural Members Used In Buildings.
 - .16 CSA W59-03: Welded Steel Construction (Metal Arc Welding).
 - .17 CGSB 85-GP-10M: Shop Painting Structural Steel.

.18 CGSB 85-GP-16M: Painting Galvanized Steel.

1.4 SUBMITTALS

- .1 Submit Shop Drawings as specified in Section 01 33 00.
- .2 Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
- .3 Shop drawings for guards and railings must be stamped, signed and dated by the fabricator's design engineer.

1.5 QUALITY ASSURANCE

- .1 Fabricator's Design Engineer: a professional structural engineer, experienced in design of steel guards and railings, and licensed in the Place of the Work.
- .2 Fabricator: company specializing in welded structural building components with three years documented experience and approved under CSA W47.1 and CSA W55.3.

1.6 PROJECT CONDITIONS

- .1 Prior to fabrication, verify existing conditions and take field measurements to ensure perfect fit of fabricated items.
- .2 Report deficiencies and misalignments to Consultant.

2 Products

2.1 MATERIALS

- .1 Sheet Steel: to CSA G40.20.
- .2 Steel Sections and Plates: to CSA G40.21.
- .3 Stainless Steel: to ASTM A167, Type 304.
- .4 Stainless Steel Tubing: to ASTM A269, Type 304 or Type 316.
- .5 Extruded Aluminum: to ASTM B221M, 6063 alloy, T6 temper.
- .6 Sheet Aluminum: to ASTM B209M, 5005 alloy, H14 temper.
- .7 Brass: to ASTM B36/B36M.
- .8 Bronze Plate, Strip and Sheet: phosphor type, to ASTM B103/B103M.
- .9 Cast Bronze: phosphor type, to ASTM B139/B139M.
- .10 Machine Bolts: to ASTM A307, externally and internally threaded standard fasteners.
- .11 High Strength Bolts: to ASTM A325M, including suitable nuts and plain hardened washers; hot dipped galvanized for exterior members.
- .12 Checkerplate: 6 mm thick sheet steel, to CSA G40.20; 1.27 mm raised checker pattern.
- .13 Welded Metal Grating: 4.8 mm twisted steel cross bars welded at 102 mm OC to flat steel bearing bars spaced at 30 mm OC; width and length as indicated on Drawings; eg. Borden Type W/B.
- .14 Expanded Metal Grating: 1.9 mm thick galvanized steel, 50 mm deep channel; up to 610 mm wide; diamond shaped openings with serrated edges; eg. Deck Span by Fisher & Ludlow.

- .15 Debossed Metal Grating: 2.28 mm thick pre-galvanized steel, 38 mm deep channel; 305 mm wide planks; debossed holes each surrounded by 6 perforated buttons; eg. Shur Grip by Fisher & Ludlow.
- .16 Perforated Metal Sheet: 1.9 mm thick sheet aluminum; 1 200 x 2 400 mm size sheets; 6 mm OD round perforations spaced at 10 mm OC with a staggered line pattern; by Unalloy IWRC.
- .17 Welding Materials: to CSA W59.
- .18 Metal Primer: to CGSB 85-GP-10M, red oxide type.
- .19 Galvanized Metal Primer: zinc rich type, to CGSB 85-GP-16M.

2.2 FABRICATION

- .1 Fabricate components to CAN/CSA-S136.
- .2 Fit and shop assemble components in largest practical sections to accommodate delivery to the Place of the Work.
- .3 Continuously seal joined pieces by continuous welds.
- .4 Grind exposed joints flush and smooth with adjacent finish surface.
- .5 Make exposed joints butt tight, flush and hairline.
- .6 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; except where specifically noted otherwise.
- .7 Supply components required for anchorage of fabrications.

2.3 FINISHES

- .1 Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .3 Prime paint items with two coats.
- .4 Galvanizing: to CAN/CSA-G164-M, hot dipped method, minimum 275 g/m² zinc coating.
- .5 Stainless Steel: No. 4 - Brushed.
- .6 Brass: No. 8 - Polished.
- .7 Aluminum: Natural mill finish.
- .8 Powder Coating: electrostatic spray-applied polymer powder coating, minimum 0.05 mm dry film thickness; colour as selected by Consultant.
- .9 Shop Painted Finish: silicone modified polyester coating, applied to a minimum 0.025 mm dry film thickness; eg. WeatherX by Valspar, colour as selected by Consultant from standard range of colours.

3 Execution

3.1 PREPARATION

- .1 Make provision for erection loads with temporary bracing.
- .2 Clean and strip primed steel items to bare metal where site welding is required.

- .3 Supply items required to be cast into concrete and or embedded in masonry with setting templates, to appropriate Sections.

3.2 INSTALLATION

- .1 Install components plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide fasteners and anchors necessary to secure components rigidly in place.
- .3 Field weld components to CSA W59.
- .4 Field bolt and weld to match shop bolting and welding.
- .5 Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush.
- .6 After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.3 SCHEDULE

- .1 The following schedule is a list of principal items only. Refer to Drawings for items not specifically scheduled.
 - .1 Sleeves and Openings: including templates and required information, supplied to appropriate Sections.
 - .2 Attachments: anchor bolts, washers, nuts, lag screws, expansion shields, toggles, straps, sleeves, brackets, etc. as required and secured with sufficient self-tapping "shake-proof" screws with flat countersunk heads.
 - .3 Miscellaneous Brackets: mild steel plate, sizes and configurations as required to support shelving, seats, benches, valances, coat hooks, etc.; pre-drilled for fastening of other components.
 - .4 Steel Pipe Bollards: 150 mm OD galvanized steel pipe, sufficient length to be 1 000 mm above finished grade; set in 450 mm OD concrete pier set minimum 1,200 mm deep. Fill steel pipe solid with concrete and finish with rounded top.
 - .5 Lateral Support of Masonry Partitions: 75 x 75 mm steel angles, 6 mm thick, as follows:
 - .1 Concealed Conditions: 200 mm long and spaced at 3,000 mm OC; minimum 2 anchors each.
 - .2 Exposed Conditions: continuous lengths, anchored at 1,000 mm OC.
 - .6 Metal Guard Rails and Balustrades: Designed to resist a uniform load of 0.75 kN/m and a lateral force of 1.0 kN at any point without damage or permanent set; shop primed for interior applications and hot dipped galvanized to Z275 finish for exterior applications.
 - .7 Access Ladders: conforming to guidelines of authorities having jurisdiction, and as follows:
 - .1 Stringers: 10 x 65 mm steel bars, spaced 400 mm apart.
 - .2 Rungs: 20 mm OD steel bars, welded to stringers; spaced 300 mm OC
 - .3 Brackets: 6 mm thick steel angles, welded to stringers, for bolted connection using expansion-type fasteners to wall substrate.
 - .4 Mounting: 100 mm clear of wall surface.
 - .5 Finishes: shop primed for interior applications and hot dipped galvanized to Z275 finish for exterior applications.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Steel stair frame of structural sections, with closed risers.
- .2 Pan to receive concrete fill stair treads and landings; with balustrades and stainless steel railings.

1.2 RELATED SECTIONS

- .1 Section 03 20 00 - Concrete Reinforcing: reinforcing rods and welded wire mesh.
- .2 Section 03 30 00 - Cast-in-Place Concrete: placement of metal anchors in concrete; concrete fill in stair pans and landings.
- .3 Section 04 22 00 - Concrete Unit Masonry: placement of metal anchors in concrete unit masonry.
- .4 Section 05 12 00 - Structural Steel Framing: Bearing plates, angles and channels for metal stairs, including anchorage.
- .5 Section 05 30 00 - Steel Decking.
- .6 Section 08 80 00 - Glazing.
- .7 Section 09 30 00 - Tiling.
- .8 Section 09 90 00 - Painting and Coating.

1.3 REFERENCES

- .1 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A269-07: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A325M-07: Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength (Metric).
- .4 CSA G40.20-04: General Requirements for Rolled or Welded Structural Quality Steel.
- .5 CSA G40.21-04: Structural Quality Steels.
- .6 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 CSA W47.1-03: Certification of Companies for Fusion Welding of Steel Structures.
- .8 CSA W55.3-1965 (R2003): Resistance Welding Qualification Code for Fabricators of Structural Members Used In Buildings.
- .9 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding).
- .10 CGSB 85-GP-10M: Shop Painting Structural Steel.
- .11 CGSB 85-GP-16M: Painting Galvanized Steel.

1.4 SUBMITTALS

- .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
- .2 Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

- .3 Shop Drawings must be stamped, signed and dated by the fabricator's design engineer.

1.5 QUALITY ASSURANCE

- .1 Fabricator's Design Engineer: a professional structural engineer, experienced in design of steel stairs, guards and railings, and licensed in the Place of the Work.
- .2 Welding: to CSA W47.1, CSA W55.3 and CSA W59.

2 Products

2.1 SYSTEM DESCRIPTION

- .1 Design stair assembly to support live load of 4.8 KPa with deflection of stringer or landing framing not to exceed 1/240 of span.
- .2 Design railing assemblies, wall rails, and attachments to resist lateral force of 333 N at any point without damage or permanent set.

2.2 MATERIALS

- .1 Steel Sections: to CSA G40.20 and CSA G40.21.
- .2 High Strength Bolts: to ASTM A325M, including suitable nuts and plain hardened washers; hot dipped galvanized for exterior members.
- .3 Sheet Steel: structural quality, galvanized.
- .4 Stainless Steel: roll formed, to ASTM A167 and ASTM A269, Types 302 and 304 (18-8).
- .5 Steel Deck: as specified in Section 05 30 00.
- .6 Stair Tread and Landing Pans for Concrete Fill: metal pan; 38 mm deep; smooth surface; square edge.
- .7 Reinforcing Rods and Welded Wire Mesh: as specified in Section 03 20 00.
- .8 Concrete for Treads and Landings: as specified in Section 03 30 00.
- .9 Shop and Touch-Up Primer: red oxide type.

2.3 FABRICATION - GENERAL

- .1 Fit and shop assemble components in largest practical sections to accommodate delivery to the Place of the Work.
- .2 Continuously seal joined pieces by continuous welds.
- .3 Grind exposed joints flush and smooth. Ease exposed edges to small uniform radius.
- .4 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; except where specifically noted otherwise.
- .5 Supply components required for anchorage of fabrications.

2.4 FABRICATION - PAN STAIRS AND LANDINGS

- .1 Fabricate stairs and landings with closed risers and treads of metal pan construction, ready to receive concrete.
- .2 Provide reinforcing rods and mesh in stair treads and landings designated to receive porcelain tile finish specified in Section 09 30 00.

- .3 Secure reinforced tread pans to stringers with clip angles; welded in place.
- .4 Form stringers with rolled steel sections. Weld fascia plates to channels.
- .5 Form landings with steel decking, as specified in Section 05 30 00. Reinforce underside with metal L or T profiles.
- .6 Form balustrades with 40 mm OD steel sections, welded to stringers.
- .7 Form handrails with 40 mm OD stainless steel sections, welded to balustrades and handrail brackets.
- .8 Prime paint steel components.

2.5 FINISHES

- .1 Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .3 Prime paint items with two coats.
- .4 Stainless Steel: to ASTM A167 and ASTM A269, No. 4 - Brushed, unless noted otherwise on Drawings.

3 Execution

3.1 PREPARATION

- .1 Clean and strip primed steel items to bare metal where site welding is required.
- .2 Supply items required to be cast into concrete and or embedded in masonry with setting templates, to appropriate Sections.

3.2 INSTALLATION

- .1 Install components plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide anchors, required for connecting stairs to structure.
- .3 Allow for erection loads, and for sufficient temporary bracing until completion of erection and installation of permanent attachments.
- .4 Field weld components to CSA W59.
- .5 Field bolt and weld to match shop bolting and welding.
- .6 Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush.
- .7 After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
- .8 Install concrete fillas specified in Section 03 30 00.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-In-Place Concrete: setting anchors in concrete.
- .2 Section 05 50 00 - Metal Fabrications: wood blocking for attachment of metal fabrications.
- .3 Section 07 21 00 - Thermal Insulation.
- .4 Section 07 26 00 - Vapour Retarders.
- .5 Section 07 27 00 - Air Barriers.
- .6 Section 07 50 16 - Wood Blocking for Roofing.
- .7 Section 07 92 00 - Joint Sealants.
- .8 Section 08 44 13 - Glazed Aluminum Curtain Wall: wood blocking required for attachment of aluminum framing.
- .9 Section 08 51 13 - Aluminum Windows: wood blocking required for attachment of aluminum framing.
- .10 Section 10 28 13 - Toilet Accessories: wood blocking required for attachment of toilet accessories.
- .11 Section 10 51 13 - Metal Lockers: wood blocking required for attachment of metal lockers.

1.2 REFERENCES

- .1 CSA B111-1974 (R2003): Wire Nails, Spikes and Staples.
- .2 CSA O80 Series-08: Wood Preservation.
- .3 CAN/CSA-O86-01: Engineering Design in Wood.
- .4 CSA O141-05: Softwood Lumber.
- .5 CSA O151-04: Canadian Softwood Plywood.
- .6 National Lumber Grades Authority: Standard Grading Rules for Canadian Lumber.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver and store Products under waterproof cover.
- .3 Prevent damage to Products, existing properties and to the Work.
- .4 Store Products where it does not hinder the progress of the Work.

2 Products

2.1 MATERIALS

- .1 Lumber: to CSA O141, S4S; 19 percent maximum moisture content (S-Dry);SPF species; Light Framing Classification, Standard and Better Common Grade Mix.
- .2 Plywood Sheathing: CSP to CSA O151, SHG grade; veneer core, butt edge, unsanded faces.
- .3 Nails: to CSA B111, Type 304 or 316 stainless steel, common wire type for general use and spiral type for structural connections.

- .4 Anchors: toggle bolt type for anchorage to hollow masonry, expansion shield and lag bolt type for anchorage to solid masonry or concrete, or bolts or ballistic fasteners for anchorages to steel.
- .5 Screws: bugle head, drywall type, steel, power driven type, length as required.

2.2 WOOD TREATMENT

- .1 Wood Preservative Pressure Treatment: to CSA O80; using alkaline copper quaternary (ACQ) preservative.
- .2 Wood Preservative Surface Application: to CSA O80, brush-applied.

3 Execution

3.1 SITE APPLIED WOOD TREATMENT

- .1 When wood in contact with cementitious materials, roofing and related metal flashings has not been previously pressure treated, brush apply two coats of surface applied preservative treatment on wood.
- .2 Apply 2 coats of surface applied preservative treatment to sawn ends of pressure treated material.
- .3 Apply preservative treatment to CSA O80 and in accordance with the manufacturer's instructions.

3.2 INSTALLATION

- .1 Erect wood framing members level and plumb.
- .2 Place horizontal members laid flat, crown side up.
- .3 Construct framing members full length without splices.
- .4 Secure plywood perpendicular to framing members with ends staggered. Secure sheet edges over firm bearing.
- .5 Provide wood blocking required for attachment of fitments and equipment by other Sections.
- .6 Provide a 19 mm thick plywood backer board on wood blocking for mounting electrical equipment where indicated on Drawings.
- .7 Construct curb and cant members of single pieces per location.
- .8 Curb roof openings except where prefabricated curbs are provided.
- .9 Form corners by lapping side members alternately.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Gypsum sheathing board.
- 1.2 RELATED SECTIONS
 - .1 Section 06 10 00 - Rough Carpentry.
 - .2 Section 07 21 00 - Thermal Insulation.
 - .3 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.
 - .4 Section 07 27 00 - Air Barriers.
 - .5 Section 07 92 00 - Joint Sealants.
- 1.3 REFERENCES
 - .1 ASTM C954-07: Standard 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.
 - .2 ASTM C1177/C1177M-08: Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .3 ASTM C1280-07: Standard Specification for Application of Gypsum Sheathing.
 - .4 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .5 CGC Inc., Gypsum Construction Handbook.
 - .6 CAN/CGSB-71.25-M88: Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
 - .7 Underwriters Laboratories of Canada: List of Equipment and Materials.
- 1.4 LEED REQUIREMENTS
 - .1 Submit completed copies of LEED schedules as specified in Section 01 60 13.
 - .2 Target Recycled Content: minimum post-consumer and pre-consumer recycled content as specified in Section 01 60 13.
 - .3 Products shall be extracted or recovered and manufactured locally, as specified in Section 01 60 13.
 - .4 Adhesives and sealants to have VOC content less than those specified in Section 01 60 13.
- 1.5 QUALITY ASSURANCE
 - .1 Applicators: company specializing in applying the work of this Section with a minimum of five years documented experience.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of gypsum sheathing board having Product considered acceptable for use:
 - .1 CertainTeed Gypsum, Canada Inc.
 - .2 G-P Gypsum Corporation.

- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Gypsum Sheathing Board: 12.7 mm thick; square edges; to ASTM C1177/C1177M; silicone treated gypsum core, glass fiber mesh facers both sides; DensGlass Gold by G-P Gypsum Corporation or GlasRoc by CertainTeed Gypsum, Canada Inc.
- .2 Steel Drill Screws: galvanized steel; to ASTM C954.
- .3 Adhesive: to CAN/CGSB-71.25-M.
- .4 Joint Sealant: as specified in Section 07 92 00.

3 Execution

3.1 INSTALLATION

- .1 Install sheathing Products to ASTM C1280, and in accordance with manufacturer's instructions.
- .2 Install gypsum sheathing board perpendicular to supports with ends staggered.
- .3 Secure sheet edges over firm bearing.
- .4 Screw fasten boards to furring or framing.
- .5 Finished work shall be plane and free from depressions.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Finish carpentry items.
- .2 Fixing hardware and attachment accessories.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 - Rough Carpentry: wood blocking and curbing.
- .2 Section 06 24 00 - Laminated Plastics: plastic laminate surfaces.
- .3 Section 06 40 00 - Architectural Woodwork: shop fabricated casework and millwork.
- .4 Section 07 92 00 - Joint Sealants.
- .5 Section 08 14 00 - Wood Doors: wood doors.
- .6 Section 08 71 00 - Door Hardware.
- .7 Section 09 90 00 - Painting and Coating: site finishing.

1.3 REFERENCES

- .1 ANSI A135.4-2004: Basic Hardboard.
- .2 ANSI A208.1-2009: Particleboard.
- .3 ANSI A208.2-2009: Medium Density Fiberboard (MDF) for Interior Applications.
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Architectural Woodwork Standards.
- .5 CSA O80 Series-08: Wood Preservation.
- .6 CSA O115-M1982 (R2001): Hardwood and Decorative Plywood.
- .7 CSA O141-05: Softwood Lumber.
- .8 CSA O151-04: Canadian Softwood Plywood.
- .9 National Lumber Grades Authority (NLGA): Standard Grading Rules for Canadian Lumber.

1.4 QUALITY ASSURANCE

- .1 Fabricator: company specializing in custom carpentry work with three years documented experience.
- .2 Perform finish carpentry to AWMAC Quality Standards, Custom grade.

2 Products

2.1 MATERIALS

- .1 Softwood Lumber: to CSA O141, AWMAC Custom Grade; maximum moisture content of 7 percent, SPF species, with mixed grain, of quality capable of opaque finish.

- .2 Hardwood Lumber: AWMAC Custom Grade; maximum moisture content of 7 percent, Maple species, with vertical grain, of quality capable of transparent finish.
- .3 Softwood Plywood: CSP, to CSA O151; AWMAC Custom Grade, SEL TF appearance; veneer core materials; rotary cut; of clear grain capable of receiving high quality opaque finish; thicknesses as indicated.
- .4 Hardwood Plywood: to CSA O115-M, AWMAC Custom Grade, Architectural G1S appearance, lumber core material; flat cut; Maple species, of clear grain capable of receiving transparent finish; thicknesses as indicated.
- .5 Wood Particle Board: 100 percent post-industrial wood fibres; to ANSI A208.1, Grade M-2, minimum 635 kg/m³ density; 6 percent maximum moisture content; thicknesses as indicated; no added urea formaldehyde; certified EPP by Composite Panel Association; eg. Nu Green by Uniboard Canada.
- .6 Medium Density Fiberboard: to ANSI A208.2, Grade MD, minimum 740 kg/m³ density; 4.5 - 8.0 percent maximum moisture content; thicknesses as indicated.
- .7 Hardboard: inter-felted ligno-cellulosic fibers consolidated under heat and pressure; to ANSI A135.4, Class 3 - Service-Tempered; S1S surface finish; minimum 500 kg/m³ density; thicknesses as indicated.

2.2 ACCESSORIES

- .1 Coat Hooks: magnetic safety release type, fabricated from high strength polycarbonate; release weight of 11.8 kg; Safety Release Coat Hook by HenkelHook, colours as selected by Consultant.
- .2 Plastic Laminate: standard decorative laminate, as specified in Section 06 24 00.
- .3 Contact Adhesives: solvent release type.
- .4 Wall Adhesive: solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.
- .5 Nails: Size and type to suit application, plain finish.
- .6 Bolts, Nuts, Washers, Blind fasteners, Lags, and Screws: Size and type to suit application; plain finish.
- .7 Lumber for Shimming, Blocking, and Strapping: softwood lumber, to CSA O141, NLGA No. 2 SPF species.
- .8 Primer: alkyd primer sealer type.
- .9 Wood Filler: Solvent base, tinted to match surface finish colour.

3 Execution

3.1 INSTALLATION

- .1 Install Products to AWMAC Custom Grade.
- .2 Set and secure materials and components in place, plumb and level.
- .3 Install components and trim with nails, screws, or bolts with blind fasteners at 400 mm OC; or wall adhesive by gun application as required by specific installation requirements.
- .4 Cover exposed edges of shelving and site made casework with 10 mm thick hardwood edging. Width of edging to match shelving.

- .5 Apply laminated plastic to wood surfaces as specified in Section 06 24 00.
- .6 Install wood doors as specified in Section 08 14 00.
- .7 Install finish hardware as specified in Section 08 71 00.
- .8 Seal gaps between walls and counter tops as specified in Section 07 92 00.

3.2 ADJUSTING AND CLEANING

- .1 Set exposed fasteners.
- .2 Apply wood filler in exposed fastener indentations.
- .3 Site Finishing: refer to Section 09 90 00.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Laminated plastic.
- 1.2 RELATED SECTIONS
 - .1 Section 06 20 00 - Finish Carpentry: site fabricated casework and millwork.
 - .2 Section 06 40 00 - Architectural Woodwork: shop fabricated custom casework and millwork.
 - .3 Section 08 14 00 - Wood Doors.
- 1.3 REFERENCES
 - .1 ANSI/NEMA LD 3-2005: High Pressure Decorative Laminates.
 - .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Architectural Woodwork Standards.
 - .3 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .4 CAN/CGSB-71.20-M88: Adhesive, Contact, Brushable.
- 1.4 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Selection Samples: duplicate chains of laminate samples, illustrating available colours and surface textures.
- 1.5 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver laminated plastic finished surfaces with heavy kraft paper protection and store in cartons during shipping.
 - .3 Protect laminated plastic surfaces during fabrication and installation stages; do not remove protective covering until final clean-up prior to final inspection.
 - .4 Do not store or install Products in areas where relative humidity is less than 25 percent or greater than 60 percent at 22 degrees Celsius.
- 1.6 WARRANTY
 - .1 Submit an extended system warranty in accordance with the General Conditions of the Contract.
 - .2 Extended System Warranty: 2 year extended warranty including coverage against warping, splitting, or delamination, subject to normal usage excluding excessive moisture or heat.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of laminated plastic having Product considered acceptable for use:
 - .1 Arborite.
 - .2 Formica.
 - .3 Nevamar.
 - .4 Pionite.
 - .5 Wilsonart.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Standard Decorative Laminate: high pressure decorative laminate consisting of decorative surface papers impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins; colours and patterns as selected by Consultant; to ANSI/NEMA LD 3, Types, Grades and thicknesses as follows:
 - .1 General Purpose Type: Grade HGS; 1.2 mm thick.
 - .2 Vertical Surface Type: Grade VGS; 0.7 mm thick.
 - .3 Postforming Type: Grade HGP; 1.0 mm thick.
 - .4 Vertical Postforming Type: Grade VGP; 0.7 mm thick.
 - .5 Backer Type: Grade BKL; 0.5 mm thick.

2.3 ACCESSORIES

- .1 Cores: medium density fibreboard, softwood plywood or particleboard; as indicated on Drawings and specified in Section 06 20 00.
- .2 Sealer: water resistant, acceptable to laminated plastic manufacturer.
- .3 Draw Bolts and Splines: for new core bases, acceptable to fabricator.
- .4 Adhesive: contact adhesive, to CAN/CGSB-71.20-M, as recommended by laminated plastic manufacturer.

3 Execution

3.1 INSTALLATION

- .1 Comply with ANSI/NEMA LD 3, Annex A and AWMAC Quality Standards.
- .2 Install work plumb, true and square, neatly scribed and fitted to adjoining surfaces. Gaps at corners or between trim and back-up materials will be rejected by Consultant.
- .3 Use draw bolts and splines to form tight, flush hairline joints in core materials.
- .4 Ensure cutouts are prepared for faucets and sinks. Round internal corners, chamfer edges and seal exposed core edges.
- .5 Ensure adjacent laminate sheets match in colour and pattern.
- .6 Apply plastic facing sheets to base material as recommended by laminate and adhesive manufacturers.
- .7 Ensure laminate and core profiles coincide to provide full continuous support and bond over entire surface.
- .8 Use continuous lengths to minimize joints; maintain joints a minimum of 600 mm from sink cutouts. Offset joints in plastic facing from core joints.

- .9 Provide postformed counter tops with 180 degrees front roll or D-Wrap and 65 mm rolled backsplash.
- .10 Apply laminate to exposed edges of core material for straight self-edging strips or flat work. Chamfer exposed edges uniformly at 20 degrees; do not mitre laminate edges.
- .11 Apply backing sheets in accordance with manufacturer's directions, where required to conceal core material.

3.2 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Remove kraft paper protective coating.
- .3 Visually inspect each installed item.
- .4 Wash and thoroughly polish surfaces.

3.3 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect completed installation from being defaced.
- .3 Provide protective covering over surfaces and maintain in place until Substantial Performance of the Work.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Shop-fabricated custom casework and millwork.
- 1.2 RELATED SECTIONS
 - .1 Section 06 10 00 - Rough Carpentry.
 - .2 Section 06 20 00 - Finish Carpentry: site-fabricated millwork.
 - .3 Section 06 24 00 - Laminated Plastics: plastic laminate finishes.
 - .4 Section 07 92 00 - Joint Sealants.
 - .5 Section 08 14 00 - Wood Doors: closet doors.
 - .6 Section 08 71 00 - Door Hardware: closet door locks.
- 1.3 REFERENCES
 - .1 ANSI A208.1-2009: Particleboard.
 - .2 ANSI A208.2-2009: Medium Density Fiberboard (MDF) for Interior Applications.
 - .3 ANSI/NEMA LD 3-2005: High Pressure Decorative Laminates.
 - .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Architectural Woodwork Standards.
 - .5 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .6 ASTM A269-07: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .7 ASTM B456-03: Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .8 CSA O112 Series-M1977 (R2006): CSA Standards for Wood Adhesives.
 - .9 CSA O141-05: Softwood Lumber.
 - .10 CSA O151-04: Canadian Softwood Plywood.
 - .11 National Lumber Grades Authority (NLGA): Standard Grading Rules for Canadian Lumber.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, finishes, accessories, locations of outlets, anchorage, and hardware to a minimum scale of 1:10.
 - .3 Incorporate plans, elevations, sections and details for all architectural woodwork included in this Section.
- 1.5 QUALITY ASSURANCE
 - .1 Fabricator: company specializing in custom carpentry work with three years documented experience.

- .2 Perform work to AWMAC Quality Standards, Custom Grade.
- 1.6 MOCKUPS
- .1 Construct mockup as specified in Section 01 40 00.
 - .2 Mockup: full size sample of custom casework, including materials, finishes and hardware specified.
 - .3 The accepted mockup will be used as a standard for acceptance of the Work.
 - .4 Remove mockup from the Place of the Work upon final acceptance of the Work.
- 1.7 DELIVERY, STORAGE AND HANDLING
- .1 Refer to Section 01 60 00.
 - .2 Store Products under waterproof cover both in transit and at the Place of the Work in a manner to prevent damage to Products, to any existing building or property or to the Work.
 - .3 Store completed Products in a dry, clean area where it does not hinder the progress of the Work.
 - .4 Do not store or install Products in the Work until the building is dry and heated.
- 1.8 PROJECT CONDITIONS
- .1 Prior to fabrication, verify existing conditions which may affect the Work of this section and take any field measurements necessary to ensure a perfect fit of all cabinet work.
 - .2 Report all deficiencies and misalignments to Consultant for correction.
- 1.9 WARRANTY
- .1 Submit a 24 month AWMAC warranty or a 24 month 100 percent maintenance bond in accordance with the General Conditions of the Contract.
 - .2 Warranty: Architectural Woodwork Manufacturer's Association of Canada standard Certificate of Guarantee, certifying that the work of this Section has been manufactured and installed in accordance with the specified standards incorporated in the AWMAC Quality Standards Manual.
- 2 Products
- 2.1 MATERIALS
- .1 Particle Board (PB): 100 percent post-industrial wood fibres; to ANSI A208.1, Grade M-2, minimum 635 kg/m³ density; 6 percent maximum moisture content; no added urea formaldehyde; certified EPP by Composite Panel Association; eg. Nu Green by Uniboard Canada.
 - .2 Melamine Composite Panel (MCP): NEMA LD 3, Grade VGL decorative laminate thermo-fused to both sides of particle board; Premium quality; minimum 2 colours as selected by Consultant from manufacturer's complete woodgrain line.
 - .3 Medium Density Fibreboard (MDF): to ANSI A208.2, Grade MD, minimum density of 770 kg/m³; 4.5 - 8.0 percent maximum moisture content.
 - .4 Concealed Plywood: CSP, to CSA O151; AWMAC Custom grade, SEL TF appearance; veneer core materials; rotary cut.

- .5 Concealed Lumber: to CSA O141, S4S, SPF species; NLGA Light Framing category, Standard and Better grade; 19 percent maximum moisture content (S-Dry).
- .6 Stainless Steel Tubing: to ASTM A269, Type 304; 1.2 mm thick; diameters and lengths as noted on Drawings.
- .7 Steel Sections, Plates and Rods: to CSA G40.21; chrome plated.
- .8 Stainless Steel Sheet: 1.2 mm thick, to ASTM A167, Type 304.
- .9 Tackable Surface: 6 mm thick Krommenie cork mounted to a 6 mm thick particleboard or hardboard backer; size as indicated on Drawings, colour as selected by Consultant; eg. Forbo Tackable Wall Surface.

2.2 ACCESSORIES

- .1 Plastic Edgebanding: 3 mm thick PVC edgebanding, colour and pattern to match cabinet exterior and door face unless noted otherwise.
- .2 Adhesive: to CSA O112.5, Type I for site applications, and Type II for shop applications, waterproof type.
- .3 Fasteners: size and type to suit application, stainless steel for prepressure treated wood and plain finish for non-treated wood.
- .4 Eggcrate Panel: 13 mm thick, acrylic, with reflective metallic coating.
- .5 Plastic Laminate: as specified in Section 06 24 00.
- .6 Joint Sealants: as specified in Section 07 92 00.

2.3 HARDWARE

- .1 Door Hinges: full overlay 170 degree opening, concealed type, self-closing; eg. Blum Model 71.658 c/w 3-way adjustable Blum Hinge Plate Model 174H7100.
- .2 Metal Pulls: Richelieu Model 33205, 170 S/S, chrome plated.
- .3 Drawer Slides: four part metal with epoxy coated finish and nylon rollers, minimum weight rating of 25 kg; fully adjustable; eg. Blum Metabox.
- .4 Locks: 5-pin disc tumbler cam locks with offset cam; exposed face chrome plated; complete with spring actuated elbow catches and strike plates for locks occurring in hinged double door units.
- .5 Slide Bolt For Inactive Leaf: 60 mm long barrel bolt, nickel plated; Hafele Model 252.70.722.
- .6 Elbow Catch: Ives 2A15, C15 finish.
- .7 Door Bumper: Richelieu Model MP303-11.
- .8 Shelf Supports for Drilled Gables: Richelieu 34.0040-11, 30.5 mm OD pin, metal construction.
- .9 Pilaster and Clips: Knappe & Vogt Model KV 255 and KV 256, chrome plated.
- .10 Coat Hooks: safety release type, as specified in Section 06 20 00.
- .11 Closet Rod and Flanges: 32 mm OD, 2 mm thick stainless steel tube, C32D satin finish; c/w matching closet rod flange; CBH 762 with CBH 742 and 752 closed end flanges.
- .12 Levellers: Hafele Model 637.30.941 with protective cap Model 637.02.090.
- .13 Cable Grommets: plastic counter top fitting for computer / telephone / power cables; two-part cable set with spring closure top, 60 mm OD; by Hafele; colours as selected by Consultant.

- .14 Keyboard Slides: length to suit; eg. Knape & Vogt Model KV 8100, or similar by Richelieu.
- .15 Magnetic Catch: 52 x 25 mm size, 3 kg pull strength; Model 918 ALUM by Knape & Vogt.
- .16 Flap Stay: one left- and one right-handed per set, White colour; Model BP360-760-30 by Richelieu.

2.4 FABRICATION

- .1 Fabricate custom casework and millwork to AWMAC Custom grade.
- .2 Face exposed edges of hardwood components with 20 mm solid hardwood nosings, glued and nailed.
- .3 Finish exposed edges of melamine- or laminate-faced components with plastic edgebanding, applied by an Edge-Bander using hot melt adhesive.
- .4 House fixed shelves into gables and divisions. Maximum unsupported span for shelves not to exceed 1 000 mm.
- .5 All joints are to be a good fit, fully glued and rigid in final construction.
- .6 Factory install hinges, runners and hardware, firmly anchoring components in position for long life under hard use. Use 2 hinges on doors up to 1 metre height, 3 hinges to 1.5 metres in height and 4 hinges for doors greater than 1.5 metres in height.
- .7 Equally space banks of drawers with a minimum depth of 75 mm.
- .8 Notwithstanding locks indicated on the Drawings, Provide locks on all cabinet doors and drawers except for cabinet doors located below sinks.
- .9 Install neoprene or rubber bumpers at top and bottom of cabinet doors and drawers.
- .10 Adjust doors and drawers to proper operation prior to and after installation.

2.5 FINISHES

- .1 Chrome/Nickel Plating: to ASTM B456, Type SC 2; Satin.
- .2 Stainless Steel: to ASTM A167, No. 4 - Brushed.

2.6 SOURCE QUALITY CONTROL

- .1 Arrange for an AWMAC appointed inspector to inspect the work of this Section at the plant.
- .2 Pay costs of AWMAC inspection.
- .3 Make Good rejected Products and workmanship.

3 Execution

3.1 INSTALLATION

- .1 Where practical, assemble finished wood work at the mill and deliver ready for installation.
- .2 Accurately fit joints and miters and set nail heads ready for finishing.
- .3 After delivery to the Place of the Work, protect exposed and finished wood work against damage during the progress of the Work.
- .4 Set and secure materials and components in place, rigid, square and plumb.

- .5 Provide wood blocking, framing or furring shown on Drawings as part of the millwork fabrication or erection.
- .6 Install closet doors specified in Section 08 14 00 to closet assemblies.
- .7 Provide closers and filler strips in matching finish as required to ensure a neat and complete finished assembly.
- .8 Seal gaps and joints in wet areas with mildew-resistant joint sealer. Seal gaps and joints in non-wet areas with general purpose interior sealant. Conform to Section 07 92 00.

3.2 FIELD QUALITY CONTROL

- .1 Arrange for an AWMAC appointed inspector to inspect the work of this Section after installation.
- .2 Pay costs of AWMAC inspection.
- .3 Make Good rejected Products and workmanship.

3.3 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect completed installation from damage.
- .3 Provide covering necessary to protect installed Products until Substantial Performance of the Work.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Rigid and semi-rigid board insulation.
- .2 Batt and blanket insulation.

1.2 RELATED SECTIONS

- .1 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders.
- .2 Section 07 52 00 - Modified Bituminous Membrane Roofing: roofing insulation.
- .3 Section 07 55 00 - Protected Membrane Roofing: roofing insulation.
- .4 Section 07 81 00 - Applied Fireproofing.
- .5 Section 07 84 00 - Firestopping.
- .6 Section 08 80 00 - Glazing: insulation as an integral part of glazed spandrel panels.
- .7 Section 09 21 16 - Gypsum Board Assemblies: gypsum board attachment.
- .8 Section 09 81 00 - Acoustic Insulation.
- .9 Section 31 20 00 - Earth Moving: backfill around perimeter insulation.
- .10 Section 32 11 23 - Aggregate Base Courses: below-slab aggregate base.

1.3 REFERENCES

- .1 CGSB 71-GP-24M: Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.
- .2 CAN/ULC-S701-05: Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .3 CAN/ULC-S702-09: Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .4 CAN/ULC-S702.2-03: Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines.

1.4 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for combustibility, flame and smoke performance requirements of polystyrene insulations.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

- .1 Target Recycled Content for Fiberglass Insulation: minimum 60 percent post-consumer and 0 percent post-industrial.
- .2 Target Recycled Content for Mineral Fibre Insulation: minimum 0 percent post-consumer and 40 percent post-industrial.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Store, handle and protect Products as specified in Section 01 60 00.
- .2 Minimize time plastic-type insulation Products are stored or exposed to sunlight at project site.
- .3 Store Products away from construction activity and sources of ignition.
- .4 Protect Products from damage during handling, installation and at point of installation.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Apply insulation only when surfaces and ambient temperatures are within manufacturer's prescribed limits.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of non-rigid mineral fibre batt insulation having Product considered acceptable for use:
 - .1 Fibrex Insulations Inc.
 - .2 Knauf Insulation.
 - .3 Ottawa Fibre Inc.
 - .4 Owens-Corning Canada Inc.
 - .5 Roxul Inc.
- .2 Manufacturers of rigid extruded polystyrene insulation for use in below grade applications having Product considered acceptable for use:
 - .1 The Dow Chemical Company.
 - .2 Owens Corning Canada Inc.
- .3 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Insulation Type INS-2: Extruded Polystyrene Board Insulation to CAN/ULC-S701, Type 4, rigid, closed cell type, with integral high density skin.
 - .1 Thermal Resistance : 5 year aged RSI value of 0.87/25mm.
 - .2 Board Size: As indicated.
 - .3 Compressive Strength: Minimum 210 kPa.
 - .5 Water Absorption: to ASTM D2842, 0.7% by volume maximum.
 - .6 Edges: Shiplap.
 - .7 Water Vapour Permeance: to ASTM E96, 50 ng/Pa•s•m².
 - .8 Manufacturer and Product Name: eg. Styrofoam SM by The Dow Chemical Company.
- .2 Insulation Type INS-3: Mineral fibre thermal batt insulation; to CAN/ULC-S702, Type 1; non-rigid, friction fit type, manufactured from glass, rock or slag:
 - .1 Aged Thermal Resistance: RSI 0.68 per 25 mm of thickness.
 - .2 Facing: Unfaced.
 - .3 Density: 32 kg/m³.
 - .4 Combustibility: Noncombustible to CAN/ULC-S114.
 - .5 Thickness: as indicated on Drawings.
 - .6 Manufacturer and Product Name: eg. Roxul Flexibatt by Roxul Inc.
- .3 Insulation Type INS-4: mineral fibre semi-rigid board insulation to CAN/ULC-S702, Type 1; manufactured from rock or slag:
 - .1 Aged Thermal Resistance: RSI 0.75 per 25 mm of thickness.
 - .2 Facing: Unfaced.
 - .3 Board Size: 610 x 1,220 mm.
 - .4 Density (ASTM C303): 56 kg/m³.
 - .5 Combustibility: Noncombustible to CAN/ULC-S114.
 - .6 Surface Burning Characteristics: to CAN/ULC-S102, maximum flame spread of 0, smoke developed of 0.
 - .7 Thickness: as indicated on Drawings.
 - .8 Manufacturer and Product Name: eg. Roxul CurtainRock by Roxul Inc.

2.3 ACCESSORIES

- .1 Mechanical Fasteners: stainless steel screw type fastener, c/w moulded plastic disc washer, minimum 75 mm diameter.
- .2 Adhesive (for Polystyrene): to CGSB 71-GP-24M, Type 1.
- .3 Adhesive: mastic type, synthetic rubber base, fungi resistant, gun or trowel application, application temperature 12 degrees C to 50 degrees C.
- .4 Tape: polyester self-adhering type; translucent; 50 mm wide.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Ensure that air seals and vapour retarders are in place.

3.2 RIGID AND SEMI-RIGID BOARD INSULATION

- .1 Unless specified otherwise, secure rigid board insulation with an approved adhesive.
- .2 Apply adhesive in three continuous beads per board length.
- .3 Install insulation boards on wall surface either horizontally or vertically as required. Place membrane surface of insulation solidly against substrate and securely fasten.
- .4 Install mineral fibre semi-rigid boards to CAN/ULC-S702.2.
- .5 Do not crush insulation face when fastening with mechanical fasteners.
- .6 Stagger side and end joints. Butt edges and ends tight to adjacent board and to protrusions.

3.3 BATT AND BLANKET INSULATION

- .1 Install mineral fibre batts and blankets to CAN/ULC-S702.2.
- .2 Install batt insulation in spaces without gaps and voids.
- .3 Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- .4 Place vapour retarder on warm side of insulation as specified in Section 07 26 00.

3.4 FIELD QUALITY CONTROL

- .1 Notify Consultant to inspect insulation before, during and upon completion of installation.

3.5 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect insulation edges at the end of each Working Day.
- .3 Protect insulation in areas where welding will be carried out.
- .4 Replace insulation damaged by others.

- .5 Protect insulation requiring a thermal barrier to requirements of local and provincial legislation.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Sprayed polyurethane foam insulation.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry.
 - .2 Section 06 10 00 - Rough Carpentry.
 - .3 Section 06 16 43 - Gypsum Sheathing.
 - .4 Section 07 21 00 - Thermal Insulation.
 - .5 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders.
- 1.3 REFERENCES
 - .1 ASTM D2842-06: Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - .2 CAN/ULC-S705.1-01: Standard for Thermal Insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
 - .3 CAN/ULC-S705.2-1998: Standard for Thermal Insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities - Specification.
 - .4 Canadian Urethane Foam Contractors Association (CUFCA): Manual for Installers of Spray Polyurethane Foam Thermal Insulation.
- 1.4 SYSTEM DESCRIPTION
 - .1 Materials of this Section shall provide continuity of building enclosure thermal and air barriers:
 - .1 In conjunction with materials described under other Sections.
 - .2 To seal gaps between building enclosure components and wall and roof opening frames.
- 1.5 CERTIFICATES
 - .1 Submit certificates as specified in Section 01 40 00.
 - .2 Submit a copy of foam contractor's license under a third-party quality assurance program.
 - .3 Submit a copy of applicator certification issued by third-party.
- 1.6 TEST REPORTS
 - .1 Submit independent test reports as specified in Section 01 40 00.
 - .2 Test Reports: verifying qualities of insulation meet or exceed specified requirements. Include results of CCMC air barrier system tests.
- 1.7 MOCK-UP
 - .1 Construct mock-up as specified in Section 01 40 00.
 - .2 Mock-Up: 10 square metre size, illustrating typical conditions, including window corner condition, door corner condition, inside corner and outside corner.
 - .3 Conduct the following tests on the mock-up panel and report results for the following criteria:
 - .1 Core density,
 - .2 Adhesion between transition sheet membrane and substrate, and
 - .3 Cohesion or adhesion between sprayed insulation and substrate.

- .4 Verify results comply with inspector's daily report.
- .5 Mock-up may be remain as part of finished work.

1.8 QUALITY ASSURANCE

- .1 Applicator: licensed or certified to perform work of this Section by CUFCA or the National Energy Conservation Association (NECA).
 - .1 Applicators must be able to immediately produce upon request a valid certification card, including a certified air barrier system application number.
- .2 Independent Inspection Agency: urethane foam insulation and air barrier system inspector appointed by CUFCA or another third-party acceptable to Owner.

1.9 PRE-INSTALLATION MEETINGS

- .1 Conduct pre-installation meeting as specified in Section 01 31 00.
- .2 Prior to commencement of installation, review and document methods and procedures related to foamed-in-place insulation application.
- .3 Participants: authorized representatives of the Contractor, Owner, Consultant, applicator and manufacturer.

1.10 DELIVERY STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver and store Product in original packaging, bearing manufacturer's name, quantity, expiry date, CCMC numbers, and other appropriate technical indicators and references.
- .3 Cold Weather Storage: store materials during cold weather in heated storage area.

1.11 PROJECT CONDITIONS

- .1 Ventilate area as specified in Section 01 50 00.
- .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 workers as recommended by insulation manufacturer.
- .5 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .6 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Apply Product when surface and ambient air temperatures are within manufacturer's prescribed limits.

1.13 WARRANTY

- .1 Submit a standard Consumer Warranty for Rigid Insulation from the Energy Conservation Contractors Warranty Corporation.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of sprayed polyurethane foam insulation having Product considered acceptable for use:
 - .1 BASF.
 - .2 Polyurethane Foam Systems Inc.
- .2 Substitutions: Refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Sprayed Polyurethane Foam Insulation, Type INS-1: two-component, closed cell polyurethane cellular plastic foam, to CAN/ULC-S705.1, Type 2; and meeting the following properties:
 - .1 Density (ASTM D1622): 34-37 kg/m³.
 - .2 Long-Term Thermal Resistance (CAN/ULC-S770): RSI 1.02 per 25 mm of thickness.
 - .3 Air Leakage (CCMC 07273): maximum 0.00004 L/s•m² at 75 Pa.
 - .4 Flame Spread (CAN/ULC-S102): 32.
 - .5 Compressive Strength (ASTM D1621, 10% parallel to rise): 195 kPa.
 - .6 Tensile Strength (ASTM D1623): 355 kPa.
 - .7 Water Vapour Permeance (ASTM E96): 58 ng/Pa.s.m².
 - .8 Product and Manufacturer Name: eg. Polarfoam PF-7300 SOYA by Polyurethane Foam Systems Inc.
- .2 Primers: as recommended for specific substrate by CUFCA Manual for Installers of Spray Polyurethane Foam Thermal Insulation.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Ensure surfaces are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious material that would impair bond.
- .3 Ensure that items required to penetrate sprayed insulation are placed before installation of insulation.

3.2 PREPARATION

- .1 Mask and cover adjacent areas to protect from overspray.
- .2 Apply primers for special conditions as recommended by manufacturer.
- .3 Cover wide joints with transition sheet membrane as specified in Section 07 27 00.
- .4 Clean area of work prior to application of sprayed insulation.

3.3 APPLICATION - SPAYED POLYURETHANE FOAM

- .1 Spray apply Product to CAN/ULC-S705.2, and in accordance with CUFCA Manual for Installers of Spray Polyurethane Foam Thermal Insulation and manufacturer's installation guidelines.
- .2 Apply sprayed foam insulation in consecutive layers of not less than 12 mm and not more than 30 mm thick each, to a total thickness as indicated on Drawings.
- .3 Avoid formation of sub-layer air pockets.
- .4 Apply Product in overlapping layers, so as to obtain a smooth, uniform surface.

- .5 Maintain 75 mm clearance around heating vents, steam pipes, recessed lighting fixtures and other heat sources.
- .6 Do not apply Product to inside of exit openings or electrical junction boxes.

3.4 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Service: arrange for manufacturer's technical representative to regularly inspect the application (minimum twice per week) and confirm that the insulation and air barrier system is in strict accordance with CUFGA requirements.
- .2 Conduct field inspection and testing in accordance with a recognized third-party quality assurance program.
- .3 Test completed application daily for core density and cohesion/adhesion to substrate. Record results in daily report forms.
- .4 After Product has properly cured, conduct test to verify adhesion between the membrane and the substrate using recommended equipment.
 - .1 Conduct adhesion tests on all corners and building angles, at wall-to-slab junctions, and at wall-to-roof junctions.
 - .2 Perform one test for every wall less than 30 metres in length. Perform two tests for every wall greater than 30 metres and less than 60 metres in length, with an additional test conducted for every additional 30 metres, or part thereof, in wall length.
 - .3 Where adhesion is lower than 110 kPa, adjust membrane mechanically and re-test.
- .5 Verify adhesion of transition sheet membranes at perimeters of openings. Conduct adhesion tests randomly on 15 percent of wall openings, and at every tenth column or beam.

3.5 SITE TOLERANCES

- .1 Maximum Variation in Applied Thickness: plus or minus 6 mm.

3.6 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Remove overspray from non-prescribed surfaces without causing damage to surfaces.
- .3 Remove protective covers from adjacent surfaces.

3.7 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect completed installation from damage.
- .3 Make Good damage.

END OF SECTION

PART 1 – GENERAL

1.1 General

- .1 The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division One General Requirements shall be read in conjunction with and govern this section.
- .2 The Specification shall be read as a whole by all parties concerned. Each section may contain more or less than the complete work of any trade. The Contractor is solely responsible to make clear to the Sub-Contractors the extent of their work.

1.2 Related Sections

- .1 Section 04 20 00 – Unit Masonry
- .2 Section 07 21 00 – Thermal Insulation
- .3 Section 07 26 16 – Below-Grade Vapour Retarders
- .4 Section 07 27 00 – Air Barriers
- .5 Section 07 46 00 – Siding
- .6 Section 07 51 00 – Built-Up Bituminous Roofing
- .7 Section 07 92 00 – Joint Sealants

1.3 References

- .1 ASTM E96/E96M-05: Standard Test Methods for Water Vapour Transmission of Materials.

1.4 System Description

- .1 Supply labour, materials, plant, tools and equipment to complete the work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps to provide continuity of the building envelope:
 - .1 Connections of the walls to the roof air barriers.
 - .2 Connections of the walls to the foundations.
 - .3 Seismic and expansion joints.
 - .4 Openings and penetrations of window and door frames, curtain wall.
 - .5 Piping, conduit, duct and similar penetrations
 - .6 Masonry ties, screws, bolts and similar penetrations.
 - .7 All other air leakage pathways in the building envelope.
- .2 Materials and installation methods of the primary air/vapour & rain barrier membrane system.
- .3 Materials and installation methods of dampproof coursing and through-wall flashing membranes.
- .4 Materials and installation methods for the adhesion of rigid and semi-rigid insulating materials.

1.5 Submittals

- .1 Submit Product Data and Manufacturer's Installation Instructions as specified in Section 01 33 00.
- .2 Product Data: including material characteristics, performance criteria, and limitations.
- .3 Manufacturer's Installation Instructions: indicate preparation and installation requirements, and/or techniques.
- .4 Prior to commencing the work submit Manufacturers' complete set of standard Details for

the air/vapour barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

1.6 Quality Assurance

- .1 Perform work to Sealant and Waterproofer's Institute – Sealant and Caulking Guide Specification.
- .2 Submit in writing, a document stating that the applicator of the primary air/vapour barrier membranes specified in this section is recognized by the Manufacturer as suitable for the execution of the work.
- .3 Perform work in accordance with the Manufacturer's written instructions of the air/vapour barrier membrane and this specification.
- .4 Maintain one copy of Manufacturer's written instructions on site.
- .5 At the beginning of the work and at all times during the execution of the work, allow access to work site by the air/vapour barrier membrane Manufacturers' representative.
- .6 Components used in this section shall be sourced from one Manufacturer, including sheet membrane, air/vapour barrier sealants, primers, mastics and adhesives.

1.7 Scheduling

- .1 Sequence work to permit installation of materials in conjunction with other barrier materials and seals.

1.8 Product Handling

- .1 Handle and store membrane materials to prevent tearing, puncturing and other damage.
- .2 Store roll goods in upright position and protected from the weather.
- .3 Deliver materials to the job site in undamaged and original packaging indicating the name of the Manufacturer and product.
- .4 Store role materials on end in original packaging.
- .5 Store adhesives and primers at temperatures of 5°C (40°F) and above to facilitate handling.
- .6 Keep solvent away from open flame or excessive heat.
- .7 Protect rolls from direct sunlight until ready for use.

1.9 Job Conditions

- .1 Apply membrane during dry weather and to dry substrates only.
- .2 Apply materials only within acceptable application temperature range determined by Manufacturer. Use product from single Manufacturer throughout entire project.

1.10 Mock-Up

- .1 Construct mock-up in accordance with Section 01300 - Shop Drawings, Product Data, Samples and Mock-ups.
- .2 Where directed construct typical exterior wall panel, 2 m (6'-6") long by 2 m (6'-6") wide, incorporating substrate, window frame, attachment of insulation, and showing air/vapour barrier membrane application Details.
- .3 Allow 24 hours for inspection of mock-up before proceeding with air/vapour barrier work. Mock-up may remain as part of the work.

1.11 Warranty

- .1 Provide Manufacturer's standard 5-year material warranty.

PART 2 – PRODUCTS

2.1 Materials

- .1 Air/vapour barrier membrane components and accessories must be obtained as a single-source from the membrane Manufacturer to ensure total system compatibility and integrity.
- .2 Air/vapour Barrier Membrane: Self-adhesive, modified bitumen membrane 450 mm (18") wide; one of the following; use the same product for entire project:
 - .1 Blueskin SA by Bakor
 - .2 Perm-A-Barrier by W.R. Grace
 - .3 Sopraseal STICK-1100 by Soprema
 - .4 Sealtight Airshield by W.R. Meadows
 - .5 Exo Air 110 by Tremco
- .3 Through-Wall Flashing: reinforced self-adhering membrane by Manufacturer of air vapour barrier membrane.
- .4 Primer for Self-Adhesive Membrane: as recommended by membrane Manufacturer.
- .5 Adhesives, Mastics, Joint Backing: as recommended by membrane Manufacturer.
- .6 Roof vapour retarders as specified in Section 07 51 00.
- .7 Seal around masonry ties and other penetrations with liquid adhesive/mastic by membrane Manufacturer.
- .8 Adhesive: compatible with sheet barrier and substrate, permanently non-curing.
- .9 Termination Sealants: as recommended by membrane Manufacturer.
- .10 Joint Sealant: as specified in Section 07 92 00.

PART 3 – EXECUTION

3.1 Examination

- .1 Verify that surfaces and conditions are ready to accept the work of this section. Notify Architect in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.
- .2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.
- .3 New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.
- .4 Where curing compounds are used they must be clear resin based without oil, wax or pigments.

3.2 Primer for Transition and Through-Wall Flashing Membrane

- .1 Apply primer at rate recommended by Manufacturer.
- .2 Apply primer to all areas to receive transition sheet and/or through-wall flashing membrane, as indicated on Drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering transition membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

3.3 Transition Membrane

- .1 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2") overlap at all end and side laps.

- .2 Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in Drawings.
- .3 Promptly roll all laps and membrane with a counter top roller to affect seal.
- .4 Ensure all preparatory work is complete prior to applying liquid applied air vapour barrier membrane.

3.4 Through-Wall Flashing Membrane

- .1 Apply through-wall flashing and dampproof coursing membrane in accordance with CSA A371-94 Masonry Construction for Buildings; along the base of masonry veneer walls, over windows, doors and other wall openings required to be protected.
- .2 Applications shall form a continuous flashing membrane and shall extend up a minimum of 200 mm (8") up the back-up wall and as shown on Drawings. Where shown on Drawings install pre-finished metal drip sandwiched between two (2) layers of membrane.
- .3 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel-apply a feathered edge to seal termination and shed water.
- .4 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. At locations where flashing terminates or intersects wall openings including door frames, "end dam" flashing to protect openings and redirect water out. Trim off excess as directed by the Consultant.
- .5 Align and position the leading edge of self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls, self angles and other substrates to be protected, partially remove protective film and roll membrane over surface and up vertically.
- .6 Press firmly into place. Ensure minimum 50 mm (2") overlap at all end and side laps. Promptly roll all laps and membrane to affect the seal.
- .7 Ensure all preparatory work is complete prior to applying self-adhering through-wall flashing membrane.
- .8 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the Consultant.

3.5 Air/Vapour Barrier Membrane

- .1 Apply self-adhering membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with Manufacturer's recommendations and written instructions. Stagger all vertical joints.
- .2 Align and position self-adhering membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2") overlap at all end and side laps. Promptly roll all laps and membrane with a counter top roller to affect the seal.
- .3 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel-apply a feathered edge to seal termination and shed water.
- .4 Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in Drawings. Refer to Manufacturers' standard Details.
- .5 Ensure all projections, including wall ties, are properly sealed with a caulk application of liquid air seal mastic.
- .6 Mechanically fasten membrane through securement bars to all window, door, louvers and curtain wall sections as recommended by membrane Manufacturer where proper adhesion and bonding cannot be maintained.
- .7 Membrane applied to the underside of substrate surfaces shall receive special attention on application to ensure maximum surface area adhesion is obtained.

3.6 Installation of Insulation

- .1 Co-ordinate with Thermal Insulation Section 07 21 00 for insulating materials.
- .2 Upon the completion of the air/vapour barrier membrane system apply the liquid air seal mastic and insulation adhesive in a serpentine pattern over completed air/vapour barrier membrane system.
- .3 Immediately embed insulation into the adhesive and press firmly into place to ensure full contact. Apply additional adhesive if allowed to skin over.
- .4 Fully butter all joints of insulation panels with adhesive during installation, except at expansion joints.

3.7 Inspection

- .1 Notify Architect when sections of work are complete so as to allow for review prior to installing insulation.

3.8 Protection of Finished Work

- .1 Membranes are not designed for permanent exposure. Product designed to withstand reasonable job site exposure, however good practice calls for covering as soon as possible.
- .2 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.
- .3 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Drying time varies depending on temperature and relative humidity. At a temperature of 20°C (70°F) and 50% RH, protect air barrier work against wet weather conditions for a minimum of 24 hours.
- .4 Membranes are not designed for permanent exposure. Good practice calls for covering as soon as possible.

END OF SECTION 07 26 00

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Horizontal vapour retarder below concrete slabs-on-fill.
- 1.2 RELATED SECTIONS
 - .1 Section 32 11 23 - Aggregate Base Courses: granular base below concrete slab-on-fill.
- 1.3 REFERENCES
 - .1 ASTM E96/E96M-05: Standard Test Methods for Water Vapor Transmission of Materials.
 - .2 ASTM E1643-98 (2005): Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
 - .3 ASTM E1745-97(2004): Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- 1.4 SYSTEM DESCRIPTION
 - .1 Vapour Seal System: prevent moisture migration through concrete floor slabs to interior.
- 1.5 SUBMITTALS
 - .1 Submit Product data as specified in Section 01 33 00.
 - .2 Product Data: indicating properties of and characteristics of sheet; flashings, control and expansion joints, sealing at openings, projections, reglets, holes, slots, sleeves and special details.
- 1.6 QUALITY ASSURANCE
 - .1 Applicators: company or individual specializing in applying the work of this Section, with minimum five years documented experience.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Protect Products from rain and damage.
 - .3 Store membrane cartons on pallets and cover if left outside.
- 1.8 PROJECT CONDITIONS
 - .1 Do not proceed with application during rainy or inclement weather.
- 1.9 WARRANTY
 - .1 Submit extended warranties in accordance with the General Conditions of the Contract.
 - .2 Extended System Warranty: coverage for a period of three years, protecting against penetration of moisture resulting in buckling, blistering, cracking or delamination of flooring products.

2 Products

2.1 MATERIALS

- .1 Vapour Seal Membrane: 0.38 mm thick resin-based single-ply sheet membrane, to ASTM E1745; 3.66 metre wide rolls; maximum water vapour transmission of 0.018 perms when tested to ASTM E96/E96M; Perminator 15 by W. R. Meadows of Canada Ltd.
- .2 Lapping Tape: 100 mm wide, as recommended by vapour seal membrane manufacturer.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Ensure surfaces are unfrozen, clean, dry, smooth and free of voids.

3.2 PREPARATION

- .1 Level, tamp or roll granular fill base course.

3.3 APPLICATION

- .1 Apply membrane to ASTM E1643 and in accordance with manufacturer's instructions.
- .2 Provide a permanent, monolithic vapour seal without voids or open seams, and completely covering the pour area.
- .3 Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.
- .4 Lap joints minimum 150 mm and continuously seal with lapping tape.
- .5 Place membrane collar around protrusions through concrete slab, including sewer pipes, water pipes, and utility inlets to create a positive seal between protrusions and membrane. Seal in place with lapping tape.
- .6 Seal membrane to vertical surfaces with lapping tape.

3.4 FIELD QUALITY CONTROL

- .1 Advise Consultant prior to application and again on completion.
- .2 Do not allow concrete pour to commence until vapour seal has been reviewed and accepted by Consultant.

3.5 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect finished installation and adjacent work.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Preformed and prefinished metal cladding.
- 1.2 RELATED SECTIONS
 - .1 Section 05 12 00 - Structural Steel Framing.
 - .2 Section 07 21 00 - Thermal Insulation.
 - .3 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders.
 - .4 Section 07 42 16 - Aluminum Wall Panel Assemblies.
 - .5 Section 07 62 16 - Sheet Metal Flashing and Trim.
 - .6 Section 07 92 00 - Joint Sealants.
 - .7 Section 08 11 13 - Hollow Metal Frames.
 - .8 Section 08 44 13 - Glazed Aluminum Curtain Walls.
 - .9 Section 08 51 13 - Aluminum Windows.
 - .10 Section 08 90 00 - Louvres and Vents.
- 1.3 REFERENCES
 - .1 ASTM A653/A653M-09: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 CAN/CSA-G40.21-04: Structural Quality Steels.
 - .3 CAN/CSA-S136-01: North American Specification for the Design of Cold-Formed Steel Structural Members.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate dimensions, profiles, attachment methods, schedule of elevations, trim and closure pieces, soffits, fascia and related work.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Selection Samples: duplicate samples of prefinished material for colour selection.
- 1.6 QUALITY ASSURANCE
 - .1 Fabricator and Erector: company specializing in the work of this Section with five years documented experience, and a recognized member of the Canadian Sheet Steel Building Institute (CSSBI).
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver and store Products in original wrappings, cartons or containers clearly marked as to type, colour and manufacturer.

- .3 Stack bundles on wood blocking, clear of the ground, and tilted sufficiently to ensure that no water remains on the material.
- .4 Open bundles on the underside to allow drainage from leaks or condensation.

1.8 WARRANTY

- .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
- .2 Extended Warranty: for a period of two years, covering damage to building and contents resulting from failure to resist penetration of water.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of metal wall panels having Product considered acceptable for use:
 - .1 Agway Metals Inc.
 - .2 Flynn Canada Limited
 - .3 VicWest Steel Inc.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Metal Wall Panel: 0.76 mm base thickness, prefinished, hot dipped galvanized sheet steel; to ASTM A653/A653M, Grade 230; 38 mm deep profile with ribs spaced at 134 mm OC; eg. CL7040 by Vicwest Steel Inc.
- .2 Trim and Flashings: 0.61 mm base thickness, prefinished, hot dipped galvanized sheet steel; to ASTM A653/A653M, Grade 230; colour to match roofing and cladding.
- .3 Subgirts: 1.22 mm thick hot dipped galvanized steel shapes; Z-, J-, and Hat-shaped profiles, sizes as required to suit application.
- .4 Fasteners: self-tapping and self-drilling types as required; hardened carbon steel shanks with heavy cadmium plating and a chromate finish; lengths to suit application; coloured nylon heads.
- .5 Closure Strips: preformed rubber on neoprene. Closures where materials are in continuous contact will be butyl pressure sensitive tape.
- .6 Thermal Breaks: butyl tape or neoprene on steel girt at installation of liner panel.
- .7 Insulation: as specified in Section 07 21 00.
- .8 Vapour Retarder: as specified in Section 07 26 00.
- .9 Sealants: as specified in Section 07 92 00.

2.3 FABRICATION

- .1 Shop fabricate material as far as possible.
- .2 Layout cutting, punching and forming at shop drawing stage so as to minimize site operations.

2.4 SHOP FINISHES

- .1 Galvanizing: zinc coating, hot dip process, minimum Z275 coating.

- .2 Shop Painted Finish: silicone modified polyester coating, applied to a minimum 0.025 mm dry film thickness; eg. WeatherX by Valspar, colour as selected by Consultant from standard range of colours.
- 3 Execution
- 3.1 PREPARATION
- .1 Maintain uniform temperature in work area, adequate for work being performed, as recommended by materials manufacturer.
- 3.2 INSTALLATION
- .1 Install panel system to requirements of accepted shop drawings.
 - .2 Layout panels in continuous lengths with no horizontal joints.
 - .3 Mechanically seam panels with a field-operated machine.
 - .4 Provide proper weatherproof seals at junctions and laps of materials.
 - .5 Install and seal flashings and closures.
 - .6 Cut and flash openings in cladding surfaces.
 - .7 Provide collars, miscellaneous trim or flat areas as required for recessed or surface light fixtures and grille openings.
 - .8 Reinforce openings and support areas to sufficiently strengthen for lights, grilles, etc.
- 3.3 ADJUSTING
- .1 Touch up marks and abrasions as installation proceeds.
 - .2 Discard dented panels.
 - .3 Defective materials or workmanship whenever found at any time prior to final acceptance of the work will be rejected regardless of previous acceptance.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Aluminum wall panels.
- 1.2 RELATED SECTIONS
 - .1 Section 05 12 00 - Structural Steel Framing.
 - .2 Section 05 40 00 - Cold-Formed Metal Framing.
 - .3 Section 06 16 43 - Gypsum Sheathing.
 - .4 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.
 - .5 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders.
 - .6 Section 07 62 00 - Sheet Metal Flashing and Trim.
 - .7 Section 07 92 00 - Joint Sealants.
- 1.3 REFERENCES
 - .1 AAMA 2605-08: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels.
 - .2 ASTM B209M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .3 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate design calculations, thickness and dimension of parts; fastening and anchorage methods; detail and location of joints and gaskets, including joints necessary to accommodate thermal movement.
 - .3 Design Calculations: stamped, signed and dated by the fabricator's design engineer.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Selection Samples: duplicate 150 x 150 mm size, illustrating prefinished material for colour selection.
 - .3 Verification Samples: duplicate 300 x 300 mm size samples for each panel type, illustrating proposed finish, fabrication, and anchorage method.
- 1.6 QUALITY ASSURANCE
 - .1 Fabricator's Design Engineer: a professional structural engineer, experienced in design of aluminum panel systems, and licensed in the Place of the Work.
 - .2 Fabricator and Erector: company specializing in the work of this Section with five years documented experience.
- 1.7 MOCK-UP
 - .1 Construct a mock-up panel as specified in Section 01 40 00.

- .2 Mock-up Panel: 1,220 x 1,220 mm size, illustrating panels, support systems, anchorage methods, air barrier membrane, insulation, panel joints and gaskets, etc.
- .3 Accepted mock-up panel may remain as part of the Work.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver and store Products in original wrappings, cartons or containers clearly marked as to type, colour and manufacturer.
- .3 Stack on wood blocking, clear of the ground, and tilted sufficiently to ensure that no water remains on the material.
- .4 Open bundles on the underside to allow drainage from leaks or condensation.

1.9 WARRANTY

- .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
- .2 Extended Warranty: 2 year extended warranty, covering against damage to building and contents resulting from failure to resist penetration of water.
- .3 Manufacturer's Warranty: 10 year manufacturer's warranty of the shop finish on the aluminum panels, covering against deterioration, fading, peeling, blistering or other manufacturing defects.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of aluminum wall panels having Product considered acceptable for use:
 - .1 Flynn.
 - .2 Kanalco Ltd.
 - .3 Ontario Panelization.
 - .4 SpandrelTech Limited.
 - .5 Vicwest Steel Inc.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 DESIGN REQUIREMENTS

- .1 Design aluminum wall panel assembly to resist wind loads and structural and thermal movements.
- .2 Design aluminum wall panel assembly using the rain screen principle, complete with a pressure-equalized air space and drainage cavity.

2.3 MATERIALS

- .1 Sheet Aluminum: 3.2 mm thick aluminum, to ASTM B209M, Type 3003 alloy, H14 temper.
- .2 Extruded Aluminum: to ASTM B221M, 6063 alloy, T5 temper.

2.4 COMPONENTS

- .1 Wall Panel System: dry-joint, rain screen wall system, progressive type; prefinished sheet aluminum panels; Alumitex Aluminum Plate Panels by Ontario Panelization, Sovereign System by Vicwest Steel Inc., Kanalco RainScreen Cladding, Alumaspan by SpandrelTech Limited, or Axiom Plus by Flynn.

- .2 Panel Stiffeners: structurally fastened at ends and secured to rear face of panel to maintain panel flatness.
- .3 Isolation Coating: bond breaker tape.
- .4 Trim and Flashing: 3.2 mm thick aluminum, finish to match panels.
- .5 Subgirts: back-to-back galvanized steel angles, designed to accommodate expansion and contraction, dynamic movements and design load requirements.
- .6 Fasteners and Anchors: stainless steel; concealed type; as recommended by panel manufacturer.
- .7 Thermal Breaks: butyl tape or neoprene.

2.5 FABRICATION

- .1 Shop fabricate material as far as possible.
- .2 Layout cutting, punching and forming at shop drawing stage so as to minimize cutting at the Place of the Work.
- .3 Form panels using a continuous process. Do not use glues or adhesives between dissimilar materials.
- .4 Fabricate system with straight lines, square corners or smooth bends, free from twists or warps, kinks, dents and other imperfections which may affect the appearance or serviceability of the installed system.
- .5 Panel lines, breaks, and angles to be sharp, true, and surfaces free from warp or buckle.
- .6 Fabricate system to have a flush appearance from the exterior, with no surface attachments or other irregularities, and with no reveal other than the module joint width.
- .7 Align panels with no lap or reveal other than joint width to permit expansion and contraction.
- .8 Use metal of sufficient thickness, configured to adequate detail and sufficiently supported to provide adequate strength and stiffness to resist distortion of finished surfaces.
- .9 Dress exposed edges and ends smooth and free of sharp edges.
- .10 Fabricate panels with flanges on all sides, framed with aluminum extrusions. Include uniformly radiused corners with factory welded connections. Grind smooth.
- .11 Accommodate panel drainage at the base of each panel.
- .12 Coordinate and provide any openings for protrusions required by other Sections. Reinforce openings greater than 300 mm square.

2.6 FABRICATION TOLERANCE

- .1 Panel Flatness: maximum deviation in any direction of 0.2 percent.

2.7 SHOP FINISHING

- .1 Aluminum: Painted to AAMA 2605, three-coat thermosetting fluoropolymer coating, 0.04 mm thick; eg. PPG Duranar XL; colour as selected by Consultant.
- .2 Galvanizing: zinc coating, hot dip process, minimum Z275 coating.

- 3 Execution
- 3.1 EXAMINATION
 - .1 Refer to Section 01 71 00.
 - .2 Verify dimensions, tolerances and method of attachment with adjacent surfaces.
- 3.2 INSTALLATION
 - .1 Install Products to internal subgirts with concealed mechanical fasteners. Conform to Shop Drawings, and panel manufacturer's instructions.
 - .2 Provide alignment bars, brackets, clips, inserts, shims as required to securely fasten system to structural supports.
 - .3 Erect Products square, plumb, straight and true, accurately fitted with tight joints and intersections.
 - .4 Maintain uniform temperature in work area, adequate for work being performed, as recommended by materials manufacturer.
 - .5 Isolate dissimilar metals with a bituminous coating to prevent electrolytic action.
 - .6 Install flashings to divert moisture to exterior.
 - .7 Provide proper weatherproof seals at perimeter junctions. Refer to Section 07 92 00.
- 3.3 ERECTION TOLERANCES
 - .1 Overall Alignment: no deviation greater than 1:1000.
- 3.4 ADJUSTING AND CLEANING
 - .1 Discard dented panels.
 - .2 Field modification of panels is not allowed. Panels that have been cut or otherwise modified on-site will be rejected by the Consultant.
 - .3 Clean panels free of smears, grime and dirt.
 - .4 Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
 - .5 Defective materials or workmanship whenever found at any time prior to final acceptance of the work will be rejected regardless of previous acceptance.
- 3.5 PROTECTION
 - .1 Protect finished installation as specified in Section 01 76 00.
 - .2 Remove protective film upon Substantial Performance of the Work.

END OF SECTION

PART 1 – GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for the coordination of roofing work. Additional requirements are specified in individual sections of the Specification.
- .2 Complete all work to the Specifications, Drawings, and in accordance with, but not limited to, the following:
 - .1 the latest edition of the Ontario Building Code (OBC);
 - .2 the latest edition of the National Fire Code of Canada;
 - .3 the Contract Documents;
 - .4 specified standards, codes and reference documents; and,
 - .5 printed instructions from the Manufacturer for materials being installed.
- .3 In any case of conflict or discrepancy, the more stringent requirements shall apply.
- .4 Work “as described” is held to include all incidental items that by implication, good trade practices, or customary usage are required to complete the work, even though they may not be specifically mentioned or shown.

1.2 Roofing Work Specified Herein

- .1 Roofing Specifications are comprised of the following:
 - .1 Section 07 50 16 – Wood Blocking for Roofing
 - .2 Section 07 50 19 – Sealants for Roofing
 - .3 Section 07 51 00 – Built-Up Bituminous Roofing
 - .4 Section 07 62 13 – Sheet Metal for Built-Up Roofing
 - .5 Sections 22 00 00 & 23 00 00 – Mechanical
 - .6 Section 26 00 00 – Electrical
- .2 Roofing work includes the supply and installation of materials to provide a complete and watertight roof system.

1.3 Roofing Warranties

- .1 The Roofing Contractor shall accept full and complete responsibility for maintaining the Roofing Warranties specified in Section 07 51 00. In conjunction with Section 07 51 00 examine existing conditions and examine underside of deck, the commencement of roofing work is proof that the Roofing Contractor has accepted surfaces as satisfactory and accepts responsibility for the performance of the completed work. Defective work resulting from application of material on unsatisfactory surfaces will be the responsibility of the Roofing Contractor.

1.4 Provisions for Prime and Sub-Contractors

- .1 The General Trades shall obtain all permits prior to commencement of roofing work.
- .2 The General Trades shall co-ordinate the work of all Sub-Contractors to maintain the water-tightness and proper protection of the building at all times.
- .3 Roofing, Rough Carpentry, Roof Deck, Masonry, Sheet Metal, Joint Sealer, Mechanical and Electrical trades shall co-ordinate and co-operate with each other at all times to complete the work.
- .4 Roofing work may include the installation of components supplied by other trades and installed by the Roofing Sub-Contractor. A general list of items and associated responsibilities are comprised, but not limited to, the following:

BREAKDOWN OF RESPONSIBILITY BY TRADES				
SPECIFIED IN SECTION	ITEM OF WORK	SUPPLY BY	INSTALLATION BY	FLASHINGS BY
	ROOF DECK			
05 31 00	Steel Deck	Others	Others	N / A
07 84 00	Fire Stopping at Roof Penetrations when specified	General Trades	General Trades	N / A
07 50 13	Correcting Deck Slopes to Drains with Fills, Membrane or Insulation, if required	Roofer	Roofer	N / A
07 51 00	Openings for Drains Through Deck	N / A	General Trades	N / A
	Openings for Scuppers Through Walls	N / A	General Trades	N / A
	Openings for Mechanical, Electrical & Miscellaneous Services	N / A	General Trades	N / A
	Reinforcing Openings	N / A	General Trades	N / A
	Connection of Drains to Drainage System	Mech	Mech	N / A
	Through-Wall Flashings (Masonry, Metal Siding, Curtain Wall)	Masonry, Siding, Curtain Wall	Masonry, Siding, Curtain Wall	N / A
	Sleeves for M & E Pipe & Conduit Penetrations	Mech/Elec	Roofer	Roofer
	Concrete Pavers on Insulation Pads for Gas Lines, Pipes & Other Rooftop Equipment	Mech	Mech	N / A
	Cutting, Chasing & Making Good Roof	N / A	General Trades	N / A
	Protection of Finished Roofing Work	All Trades	All Trades	N / A
07 50 16	ROUGH CARPENTRY ASSOCIATED WITH BUILT-UP ROOFING			
	Plywood & Boards	General Trades	General Trades	Roofer
	Wood Blocking, Framing & Fastening	General Trades	General Trades	Roofer
	Wood Cants & Fastening	General Trades	General Trades	Roofer
	Built-Up Wood Equipment Curbs	General Trades	General Trades	Roofer
	Built-Up Wood Equipment Sleeper Supports	General Trades	General Trades	Roofer
	Wood Sleepers on Pavers for Gas Lines, Pipes & Other Rooftop Equipment	M & E	M & E	N / A
	Wood Preservative for Field Treatment as required	General Trades or Mech.	General Trades or Mech.	N / A
	Rough Carpentry Accessories			
	Air Seals: Under Carpentry & Wood Blocking at Roof Perimeter & Openings	General Trades	General Trades	Roofer
	Sealing Air Seals to Metal Curbs at Verticals	Roofer	Roofer	N / A
	Expansion Joint Bellows	General Trades	General Trades	Roofer
	Flexible Air Seals	General Trades	General Trades	Roofer
	Spray Foam Insulation under Carpentry & Blocking at Roof Perimeter & Openings	General Trades	General Trades	N / A
	Batt Insulation for Built-Up Wood Curbs	General Trades	General Trades	N / A
07 51 00	BUILT-UP, MODIFIED BITUMINOUS, PROTECTED MEMBRANE & METAL ROOFING			
	Primers for Underlay, Roofing & Miscellaneous Fixtures	Roofer	Roofer	N / A
	Vapour Barrier & Attachment	Roofer	Roofer	Roofer
	Air Seals at Drains	Roofer	Roofer	Roofer
	Air Seals at Roof Penetrations & Openings	Roofer	Roofer	Roofer
	Roof Insulation			
	Base Insulation & Fastening	Roofer	Roofer	Roofer
	Tapered Insulation for Drain Sump & Fastening	Roofer	Roofer	Roofer
	Tapered Insulation, Crickets & Fastening	Roofer	Roofer	Roofer
	Separation Sheet & Coverboard	Roofer	Roofer	Roofer
	Fibre Cants	Roofer	Roofer	Roofer
	Built-up Roof Membrane & Membrane Fasteners	Roofer	Roofer	Roofer
	Membrane Flashings & Membrane Fasteners	Roofer	Roofer	Roofer
	Miscellaneous Fixtures			

	Galvanized Metal Sleeve Inserts (if required)	M & E	M & E	Roofer
	Sanitary Vent Stack Flashings c/w Rain Collars	Mech	Roofer	Roofer
	Vandal Resistant Vent Caps for Sanitary Vent Stacks	Mech	Roofer	N / A
	Multiple Refrigerant Pipe Sleeves	Roofer	Roofer	Roofer
	Other Pipe & Conduit Penetration Sleeves	M & E	Roofer	Roofer
	Rain Collars	Roofer	Roofer	N / A
	Underdeck Sheet Metal Closure for Chimney Sleeves	Mech	Mech	N / A
	Roof Drains	Mech	Roofer	Roofer
	Overflow Through-Wall Scuppers	Roofer	Roofer	Roofer
	Pre-manufactured Metal Roof Equipment Curbs	Mech	Mech	Roofer
	Wood Pipe Supports: Pipes up to 100 mm	Mech	Mech	N / A
	Roof Hatch	Roofer	General Trades	Roofer
	Exposed Pressure Treated Wood Sleepers for Equipment	Mech	Mech	N / A
	Miscellaneous Clamps (for Air Seals at Penetrations)	Roofer	Roofer	N / A
	Batt or Foam Insulation for Sanitary Vent Pipe Sleeves	Roofer	Roofer	N / A
	Batt or Foam Insulation for All Other Sleeves	Roofer	Roofer	N / A
	Drain Connection to Drainage System	Mech	Mech	N / A
	Re-pour Low Points in Finished Roof Surface	Roofer	Roofer	N / A
	Bitumen & Aggregate Surfacing	Roofer	Roofer	N / A
	Concrete Pavers on Insulation Pads at Roof Access Points, Walkways & Patios	Roofer	Roofer	N / A
	Concrete Pavers on Insulation Pads around Rooftop Units	Roofer	Roofer	N / A
	Concrete Pavers on Insulation Pads for Gas Lines, Pipes & Other Rooftop Equipment	Mech	Mech	N / A
07 62 13	SHEET METAL FLASHING & TRIM ASSOCIATED WITH BUILT-UP ROOFING			
	Metal Flashings at Walls, Parapets, Joints, Roof Openings & Other Areas to Protect Membrane Flashings	Roofer	Roofer	N / A
	Custom-Fabricated Copper Multiple Service Box	Roofer	Roofer	Roofer
	Custom-Fabricated Scuppers	Roofer	Roofer	Roofer
	Sheet Metal Accessories associated with Roofing			
	Cleats, Hook Strips & Fasteners	Roofer	Roofer	N / A
	Joint Sealers within Sheet Metal Joints associated with Roofing	Roofer	Roofer	N / A
	Underlay Sheet Metal Installed over Wood or Masonry	Roofer	Roofer	N / A
	Self-Adhering Membrane under Sheet Metal on Surfaces not Covered by Membrane Flashings	Roofer	Roofer	N / A
	Caulk Open Sheet Metal Joints	Roofer	Roofer	N / A
	New Wall Reglets & Wedges	Roofer	Roofer	N / A
07 50 19	JOINT SEALERS ASSOCIATED WITH BUILT-UP ROOFING			
	Sealant at Reglet Joints	Roofer	Roofer	N / A
	Sealant for Metal Flashings	Roofer	Roofer	N / A
	Sealant at top of Sanitary Vent Stack Flashings	Roofer	Roofer	N / A
	Sealant at top of Metal Sleeves	Roofer	Roofer	N / A
	Sealant at Rain Collars	Roofer	Roofer	N / A
	Sealant at Through-Wall Scuppers, Fastening Bars, Conduits, & All Other Locations to Complete the Work.	Roofer	Roofer	N / A

1.5 Related Work Specified Elsewhere

- .1 Related work specified elsewhere include, but are not limited to, the following:
 - .1 Section 04 05 00 – Common Work Results for Masonry
 - .2 Section 04 21 13 – Brick Masonry
 - .3 Section 05 31 00 – Steel Deck
 - .4 Section 06 10 00 – Rough Carpentry

- .5 Section 07 51 00 – Built-Up Bituminous Roofing
- .6 Section 07 62 13 – Sheet Metal for Roofing
- .7 Section 07 84 00 – Fire Stopping
- .8 Sections 22 00 00 & 23 00 00 – Mechanical
- .9 Section 26 00 00 – Electrical

1.6 Drains and Drainage Plane (By General Trades)

- .1 Verify that proposed drain and scupper locations will not interfere with rooftop equipment, structural elements and mechanical and electrical services located below the deck.
- .2 Prior to the application of roofing, check roof slopes to ensure positive roof drainage will be achieved and that drains are at low points. Pay particular attention where openings in the roof may block water flow.
- .3 Verify that proposed scupper locations are properly located in conformance with requirements of Building Code and Mechanical or Structural Engineer. Verify that location will not conflict with existing facilities or entranceways.
- .4 Cutting of drain holes through roof deck is by other trades:
 - .1 Unless otherwise specified by the Mechanical Engineer, roof drains and overflow roof drains shall be 75 mm (3").
 - .2 Cut neat hole through roof deck 63 mm (2.5") larger than specified drain size.
 - .3 Verify the thickness of deck to ensure that rain water leaders are of sufficient length to allow plumbing alterations and connection of drains below the deck.
- .5 Openings for scuppers through walls is by other trades:
 - .1 Unless otherwise specified by the Mechanical Engineer, install overflow scuppers on every roof area constructed with only one roof drain. Scuppers shall be 100 mm (4"), unless otherwise specified.
 - .2 The minimum height of overflow scuppers shall be 100 mm (4") above the finished roof level, unless otherwise specified by the Mechanical Engineer.
 - .3 Make neat opening through walls 13 mm (0.5") larger than specified scupper size.
 - .4 Verify thickness of walls to ensure that rain water leaders are of sufficient length to allow for plumbing or connections.
- .6 Obtain a ruling from the Consultant on the acceptability of surfaces and on corrective measures to be undertaken.
- .7 Confirm with the Consultant locations and quantities of roof area which pond more than 13 mm (0.5") of water. For costing purposes, corrective measures at low points shall include the installation of slope corrective fill as directed by Consultant. Inspect and mark areas with spray paint, and correct levels with slope corrective fill. The cost for the supply and installation of sloped correcting fill shall be borne by the Prime Contractor.
- .8 Do not proceed until unsound conditions have been corrected.
- .9 When such conditions result in a delay of roofing work, the Roofing Contractor will receive an extension of time until the work is corrected, but will not be entitled to additional compensation due to the delay.
- .10 The commencement of work is proof that the Roofing Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.
- .11 Defective work resulting from application of material on unsatisfactory surfaces will be the responsibility of the Roofing Contractor.
- .12 For costing and practical purposes, the proposed locations of drains and scuppers shown on the Drawings are to be considered +/- 3 m (10'-0"). Adjust locations with Consultant's approval as required to facilitate installation without additional cost.
- .13 Coordinate all work with Sections 22 00 00 and 23 00 00 – Mechanical. Mechanical Trade to extend services as required to connect to roof drains.

1.7 New Openings in Deck or Load Bearing Walls (By General Trades)

- .1 Provide openings in roof deck or walls to facilitate the installation of drains, through-wall scuppers, and electrical or mechanical equipment and services.
- .2 Inspect proposed drain and scupper locations and verify that locations will allow for positive drainage and will not interfere with rooftop equipment.
- .3 Verify that proposed scupper locations are properly located in conformance with requirements of Building Code and Mechanical or Structural Engineer.
- .4 Verify that proposed scupper locations will not conflict with existing facilities or entranceways.
- .5 Verify the thickness of decks and walls to ensure that drains, scuppers and rain water leaders are of sufficient length to allow for plumbing connections.
- .6 Verify that drainage from overflows can be adequately accommodated without problems, without doing damage to the building or landscaping, and without presenting a safety problem to vehicle or pedestrian traffic.
- .7 Retain the services of a licensed Professional Engineer to inspect the site and provide fully detailed and dimensioned Engineered Shop Drawings clearly showing the construction, size, layout, stiffeners, anchorage, designation of materials and all other relevant information for the following:
 - .1 To verify the size of openings;
 - .2 To verify that proposed drain and scupper locations are correct and will not interfere with structural elements or mechanical and electrical services located within decks or walls;
 - .3 To determine the installation height of overflow scuppers (if an Engineer is not retained for this purpose, install overflow scuppers 100 mm (4") above the finished roof level);
 - .4 To reinforce all openings through deck greater than 150 mm (6");
 - .5 To install pipe, equipment and other roof supports built into the roof; and,
 - .6 To reinforce all openings through walls when plumbing lines are required to pass through a structural or masonry wall, firewall, structural member or ductwork.
- .8 The Contractor is responsible to remove and **make good** all surfaces required to access the work. Examine and protect interior finishes from damage during all operations.
- .9 Cutting of drain holes through roof deck (By General Trades):
 - .1 Unless otherwise specified by the Mechanical Engineer, roof drains and overflow roof drains shall be 75 mm (3").
 - .2 Cut neat hole through roof deck 63 mm (2.5") larger than specified drain size to facilitate drain and plumbing installation.
- .10 Openings for scuppers through walls (By General Trades):
 - .1 Unless otherwise specified by the Mechanical Engineer, install overflow scuppers on every roof area constructed with only one roof drain. Scuppers shall be 200 mm (8"), unless otherwise specified.
 - .2 Make neat opening through walls 25 mm (1") larger than specified scupper size to facilitate installation.
- .11 Ensure that the structure is properly reinforced or strengthened, that fire protection and sound control is maintained and that work complies with relevant codes. Complete work to the requirements of the Shop Drawings and Engineer's instructions. Have the Engineer inspect and certify that the work has been completed in accordance with the Shop Drawings and requirements of the OBC. Submit report and final acceptance to Consultant for review.

- .12 For costing and practical purposes, the proposed locations of drains and scuppers shown on the Drawings are to be considered +/- 3 m (10'-0"). Adjust locations with Consultant's approval as required to facilitate installation without additional cost.

1.8 Advise Consultant (By General Trades and Roofing Trade)

- .1 Before proceeding with roofing work, provide notice to the Consultant of:
 - .1 Deteriorated or unsound conditions.
 - .2 Incorrect roof levels that will result in ponding of water on the finished roof surface.
 - .3 Any other conditions that would adversely affect the work.
- .2 Obtain a ruling from the Consultant on the acceptability of surfaces and if corrective measures are to be undertaken.
- .3 Do not proceed until unsound conditions have been corrected.
- .4 When such conditions result in a delay of roofing work, the Roofing Contractor will receive an extension of time until the work is corrected, but will not be entitled to additional compensation due to the delay.
- .5 The commencement of roofing work is proof that the Roofing Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.
- .6 Damage or defective work resulting from application of material on unsatisfactory surfaces will be the responsibility of the Roofing Contractor.
- .7 The Roofing Contractor will be responsible to **make good** such damage or defective work and pay all cost and fees required to correct such damage or defective work.

1.9 Through-Wall Flashings (by Wall System Trade)

- .1 Locate through-wall flashings minimum 450 mm (18") above roof deck level.
- .2 Construct flashings from prefinished metal with self-adhering membrane on back side.
- .3 Extend metal flashing horizontally at bottom of walls. Ensure a positive outward slope.
- .4 Turn metal flashing up minimum 100 mm (4") and secure to back-up wall.
- .5 Install self-adhering membrane over metal flashing and turn up minimum 150 mm (6"). Seal termination to back-up with full wide bead of modified sealant.
- .6 At ends turn up metal 25 mm (1") to create dam to direct water out from wall cavity.
- .7 Lap all end joints in sheet metal and membrane minimum 100 mm (4") and seal watertight.
- .8 Turn flashing, fold, and seal at corners, bends, and interruptions.
- .9 Build outer wythe to permit installation of cavity insulation and air/vapour barrier adhesive.
- .10 Install weeps in veneer at 600 mm (24") o.c. horizontally above through-wall flashing.
- .11 Provide masonry nets and do not permit mortar to drop or accumulate into cavity air space or to plug weepers.

1.10 Mechanical and Electrical Pipe and Conduit Penetrations (by Roofing, Mech. and Elec. Trades)

- .1 The Roofing Contractor is responsible for installing the air seal around pipes and conduits and tying the vapour retarder into the air seal. Mechanical and Electrical Trades are responsible for supplying all pre-fabricated metal flashing sleeves and accessories for all mechanical and electrical pipe and conduit penetrations to be installed and flashed by the Roofing Contractor into the finished roof membrane.
- .2 If mechanical and electrical pipes and conduits have not been installed through the roof deck prior to the commencement of the roofing work, the Mechanical and Electrical Trades shall be responsible for supplying and installing pre-fabricated galvanized metal sleeve inserts at these locations before the commencement of the roofing. The Roofing Contractor will install the air seal around the metal sleeve inserts and tie the vapour barrier into the air seal as part of their work. Size the diameter of the inserts slightly larger than

the pipe or conduit, and approximately 150 mm (6") high above the deck. The Mechanical and Electrical Trades will be responsible for installing pipes and conduits through the sleeves after the Roofing Contractor has finished all roofing work.

- .3 Coordinate all roofing work with Sections 22 00 00, 23 00 00 – Mechanical and 26 00 00 Electrical.

1.11 Gas Lines, Pipe Supports and Other Rooftop Loads (by Mechanical, Electrical and Misc. Trades)

- .1 Do not load any part of the finished roof that will impair its function or result in permanent deformation. Pay attention to temporary loads caused by storage of materials or debris.
- .2 Install pipe, equipment and other roof supports as specified and/or shown on the Drawings.
- .3 Elevate pipes on supports to minimum 300 mm (12") above finished roof surface or higher as required to allow pipes to clear expansion and control joints by 25 mm (1").
- .4 Elevate equipment and other roof supports to minimum 450 mm (18") above finished roof surface, unless shown on the Drawings to be higher.
- .5 Install pipe, equipment and other roof supports at spacings that will not cause excessive deflection, and that safeguard the roof from damage due to excessive point loading. Maximum permitted load on the finished roof surface is 254 kg/m² (50 psf).
- .6 Where pipe, equipment and other roof loads are less than 254 kg/m² (50 psf), install supports on the roof surface set on precast concrete pavers on 50 mm (2") thick extruded polystyrene insulation. Underscore insulation in both directions, top and bottom, at 150 mm (6") o.c. for drainage and venting. Cut insulation 50 mm (2") smaller than paver on all sides to protect insulation from direct sunlight. Cut and shape pavers to fit neatly at all points of termination and roof openings.
- .7 Where pipe, equipment and other roof loads exceed the maximum allowable roof load, they shall be installed on supports fixed directly to the roof deck and flashed into the finished roofing. Install supports and reinforce deck to the requirements of 1.8 - New Openings in Deck or Load Bearing Walls (By General Trades).
- .8 Ensure that the structure is properly reinforced or strengthened, that fire protection and sound control is maintained and that work complies with relevant codes.
- .9 Retain the services of a licensed Professional Engineer to inspect the site and provide fully detailed and dimensioned Engineered Shop Drawings clearly showing the construction, size, layout, stiffeners, anchorage, designation of materials and all other relevant information.
- .10 Complete work to the requirements of the Shop Drawings and the Engineer's instructions. Have the Engineer inspect and certify that the work has been completed in accordance with the Shop Drawings and the OBC. Submit final acceptance to Consultant for review.
- .11 Locate supports over joists, beams or other structural members wherever possible.
- .12 When bolting wood or equipment to pavers, pre-drill holes through paver and install bolt from underside through to the top and secure with washers and nuts.
- .13 Install pipe supports where specified as follows:
 - 1. Wood Pipe Supports: For pipes up to 100 mm (4"), secure wood sleepers to concrete paver with two stainless steel bolts. Pre-drill holes through paver. Insert washer and bolt from bottom and fasten on top with washer and nut countersunk flush with wood. Tighten for positive securement. Saw-cut underside of wood with 6 mm x 6 mm (0.25" x 0.25") grooves at bolt locations for drainage. Secure second wood block to first with minimum two pre-drilled wood screws set flush with surface.
- .14 Maximum spacing between pipe supports to be 5 metres (16'-0"). Increase frequency of supports where pipes will be subject to snow loading. Double supports where pipes change direction, at roof elevation changes and at roof control or expansion joints. Refer to Manufacturer's Drawings.

- .15 At the completion of work, clean all pipes, equipment and other items free of bitumen and other contaminants as specified in Section 07 51 00, Final Cleaning.

1.12 Cutting and Chasing and Making Good (General Trades)

- .1 Do not endanger any supporting or load-bearing members by cutting, chasing, drilling or by any other work operation.
- .2 The Prime Contractor and all trades shall co-ordinate cutting, chasing, fitting, recesses, furred spaces, slots, openings, and similar items and patching indicated or required to accommodate work and produce neat and workmanlike results.
- .3 Do not cut or alter the finished roofing work except with the written consent of and under the direction of the Project Engineer retained for this purpose.
- .4 Where cutting, chasing, fitting, recesses, furred spaces, slots, openings, and similar items and patching through the completed roof is indicated or required in other sections of the Specification to complete the work, the Roofing Contractor shall perform and **make good** the roofing work to produce neat and quality results.
- .5 The Prime Contractor is responsible for the cost of all cutting, chasing, fitting, recesses, furred spaces, slots, openings, and similar items and patching through the completed roof to accommodate other work and to **make good** the roofing work to produce neat and quality results.

1.13 Protection of Finished Roofing Work (General Trades)

- .1 Protect the building and finished roofing and flashings used as a working platform with plywood sheets installed over work area. Provide tarpaulins and minimum 12.5 mm (0.5") plywood sheets in hoisting, pumping and set-up areas to prevent damage and staining of roof surfaces. Underlay plywood sheets with 6 mil polyethylene when installed directly over bituminous membrane. Remove plywood when not in use, otherwise weigh down to prevent removal by wind.
- .2 Prevent damage to the finished roof by installing minimum 50 mm (2") thick continuous wood planks under heavy materials and equipment.
- .3 Notify the Prime Contractor and Consultant when damage to the finished roof occurs; and obtain a ruling from the Consultant on corrective measures to be undertaken.

END OF SECTION 07 50 13

PART 1 – GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for rough carpentry related to built-up roofing. Additional requirements may be specified in individual sections of the Specification.
- .2 All conditions of the Contract and Division 1 apply to this section.
- .3 Coordinate work of this section with related work specified in other sections to ensure construction schedule and protection of finished work is maintained at all times.
- .4 All rough carpentry work of this section to be completed by the General Trades.

1.2 Description of Work

- .1 Complete all work as specified in the Summary of Work, Specifications and Drawings.
- .2 Work of this section includes the supply and installation of all rough carpentry work associated with roofing, including wood blocking, and wood sleepers for equipment, rooftop units and pipe supports.
- .3 Work of this section also includes the supply and installation of air seals under wood blocking at all locations including, but not limited to, perimeters, curbs, wall/roof transitions and nailers, and as shown on the Drawings.
- .4 Work “as described” is held to include all incidental items that by implication, good trade practices, or customary usage are required to complete the work, even though they may not be specifically mentioned or shown.
- .5 Additional requirements may be specified in individual sections of the Specification and/or shown on the Drawings.

1.3 Related Work Specified Elsewhere

- .1 Section 07 50 13 – Common Work Results for Roofing
- .2 Section 07 50 19 – Sealants for Roofing
- .3 Section 07 51 00 – Built-Up Bituminous Roofing
- .4 Section 07 62 13 – Sheet Metal for Built-Up Roofing
- .5 Sections 22 00 00 & 23 00 00 – Mechanical
- .6 Section 26 00 00 – Electrical

1.4 References

The latest edition of all Standards shall apply if the referenced standards have been superseded.

- | | | |
|-----|--|--|
| .1 | ASTM A153/A153M-05 | Zinc Coating (Hot-Dip) on Iron and Steel Hardware. |
| .2 | ASTM C553-02 | Mineral Fiber Blanket Thermal Insulation |
| .3 | ASME B18.6.1 – 1981
(Supersedes CSA B35.4 - 1972) | Wood Screws (Inch Series). |
| .4 | ASME B18.6.4 – 1999
(Supersedes CSA B35.3 - 1969) | Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws, Inch Series. |
| .5 | CSA B111-1974 (R2003) | Wire Nails, Spikes and Staples. |
| .6 | CAN/CSA-G164-M92 (R2003) | Hot Dip Galvanizing of Irregularly Shaped Articles. |
| .7 | CSA O80.2-97 | Pressure Treatment of Lumber, Timber, Bridge Ties and Mine Ties. |
| .8 | CSA O80.5-97 | Pressure Treatment of Posts. |
| .9 | CSA O80.9 | Pressure Treatment of Plywood. |
| .10 | CSA O121-M1978 (R2003) | Douglas Fir Plywood. |
| .11 | CAN/CSA-O141-05 | Softwood Lumber. |
| .12 | CSA O151-04 | Canadian Softwood Plywood. |

- .13 CAN/CGSB-37.29-M89. Rubber-Asphalt Sealing Compound.
- .14 CAN/ULC-S702-97 Thermal Insulation, Mineral Fibre for Buildings.
- .15 CAN/ULC-S705.1-01 & Thermal Insulation, Spray Applied
CAN/ULC-S705.2-98 Rigid Polyurethane Foam.
- .16 National Lumber Grades Authority (NLGA), Standard Grading Rules for Canadian Lumber, 2004.

1.5 Qualifications

- .1 Employ only experienced and qualified workers that can provide quality results. Replace all work that results from inferior products or installation.

1.6 Examination

- .1 Examine surfaces and report any adverse conditions that could negatively impact the appearance and performance of the work.

1.7 Coordination

- .1 Coordinate work of this section with related work specified in other sections to ensure that the construction schedule, water-tightness, and protection of the building and work is maintained at all times.

1.8 Submittals

- .1 Submit to the Consultant a list of materials intended for use, before they are ordered.
- .2 If applicable submit Pull-Out Test results for fasteners before proceeding with the work.
- .3 Submittals shall be in accordance with Section 07 51 00.
- .4 Additional requirements may be specified in other sections of the Specifications.

1.9 Shop Drawings, Product Data, Samples and Mock-ups

- .1 Construct mock-ups for review before proceeding with the work, including but not limited to the following:
 - .1 Wood blocking system at an inside corner, and
 - .2 Wood blocking system at an outside corner.
- .2 Include in the mock-up air seals for each profile.
- .3 Inspect all intersecting and adjoining elevations to ensure that continuity of roofing and air seals can be achieved. Verify attachment, methods for securing and pullout strengths to ensure that work can resist the anticipated loads and will remain in place against all wind, weather and service conditions without warping or deforming.
- .4 Submittals shall be in accordance with Section 07 51 00.
- .5 Additional requirements may be specified in other sections of the Specifications.

1.10 Delivery, Storage and Handling

- .1 Provide and maintain dry raised weatherproof storage.
- .2 Protect materials from weather at all times.
- .3 Remove only as much material as can be incorporated, covered and made watertight in the same work period.
- .4 Use dry material only. Remove from site any materials that have been exposed to rain, snow or ice.

1.11 Environmental and Safety Requirements

- .1 Ensure at all times protection of the building and any unfinished work that can be damaged by inclement weather.

- .2 If inclement weather is forecast or appears imminent, postpone work that would risk the work or building being damaged by moisture.
- .3 If it becomes apparent that work would threaten the buildings water tightness, the Owner has the right to stop the work. Any additional expenses due to work stoppage or postponement of the work will be at the Contractor's expense.
- .4 Ensure at all times protection of materials and equipment that are sensitive to damage by moisture.
- .5 Install products sensitive to damage by moisture, snow or fog only when weather permits. Observe Manufacturer's printed recommendations regarding temperature and weather conditions.
- .6 As governed by design intent, apply each part of roofing system only when surfaces and weather allow for a successful application and performance of completed work.
- .7 When temperatures are below 5°C (40°F), proceed with work only with the mutual documented agreement between the Contractor and material supplier that, with the materials and method used, the specified installation under the conditions can be successfully achieved.

1.12 Inspection and Testing

- .1 Field review of the work will be completed by Fishburn Building Sciences Group Inc. (Consultant).
- .2 Examination of materials' certificates and test reports shall not be construed as relieving the Contractor of his responsibility for proper completion and guarantee of the work in accordance with the Drawings and Specifications.
- .3 Notify the Architect/Owner/Consultant and material Manufacturer at least 48 hours before roofing operations commence, and arrange for a site meeting for discussion of procedure. Subsequently, give two working days prior notice for the commencement of each phase of work. Notify of delays and re-starts.
- .4 Cooperate with Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to, during their use and during the warranty period. Act immediately on instructions given. Make cut-out for testing purposes when and where required and make good roofing of test areas and of any and all defects of materials and workmanship without additional cost.
- .5 Do not conceal or cover any phase of the work until after it has been inspected and approved.
- .6 Inspection of the Contract Documents as to extent of work, quality of workmanship and materials, methods, etc. is the responsibility of the Architect.

1.13 Non-Compliance with Inspections and Tests

- .1 If the initial inspection and tests required to establish compliance with the Contract Documents indicates non-compliance with the Contract Documents, subsequent tests or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.
- .2 The Contractor shall replace or correct defective work not done in accordance with the Contract. If, in the opinion of the Architect, it is not expedient to correct defective work or work done in accordance with the Contract, the Owner may deduct from the Contract price the difference in value between the work as done and called for by the Contract, the amount of which will be determined by the Architect.
- .3 Replace all work that results from inferior products or workmanship.

1.14 Contractor Quality Control

- .1 The Contractor shall appoint a worker for the purpose of quality control on the construction site (Quality Control Inspector) to ensure that the work is installed in accordance with the Contract, Specifications and Drawings.

- .2 In addition to procedures that may be specified elsewhere, on drawings provided by the Consultant, the Contractor's Quality Control Inspector shall maintain a Roof Plan showing the following record of construction:
 - .1 The progress and limits of each day's work.
- .3 In addition to procedures that may be specified elsewhere, the Contractor's Quality Control Inspector shall maintain written records of the following:
 - .1 A written record of the workers on site.
 - .2 A written record of changes that affect the work (i.e. site instructions, change orders, addenda, etc.).
 - .3 A written record of materials shipped to and incorporated in the work including dates, name of Manufacturer, type of material, lot and serial numbers and compliance standards as written on the labels.
- .4 In addition to procedures that may be specified elsewhere, the Contractor's Quality Control Inspector shall make available on a daily basis the following:
 - .1 Labels showing serial and lot numbers for each type and lot of materials.
 - .2 Samples required by the specifications.
- .5 The Contractor's Quality Control Inspector shall provide a copy of "as built" drawings at the end of the project:
 - .1 On two sets of white prints provided by the Consultant, maintain Project Record Drawings that accurately record deviations from Contract documents, including field changes of dimensions, details and changes made by Change Orders.
 - .2 Record changes on one set of prints in red. At completion of project and prior to final inspection, transfer changes to second set and submit both sets to the Consultant.

1.15 Warranty

- .1 The work of this section shall be included in the warranty as specified in Section 07 51 00.

1.16 Final Cleaning

- .1 Clean the roof and drainage system free of debris at project completion.
- .2 Schedule cleaning operations so that resulting dust, debris and other contaminants do not fall on or damage completed work.
- .3 Leave roof, building and landscape free of debris.
- .4 Removal all surplus materials and equipment from the site.
- .5 **Make good** and pay all costs and fees required to rectify damage caused by the work

PART 2 – PRODUCTS

2.1 Lumber Material

- .1 All lumber sizes are specified and shown as "Surfaced Dry", nominal.
- .2 Sizes, grading requirements and quality control to CSA O121-M1978 (R2003), CAN/CSA-O141-05 and CSA O151-04.
- .3 Grades and Commercial Species Groups to NLGA Standard Grading Rules for Canadian Lumber, 2004.
- .4 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .5 Plywood identification: by grade mark in accordance with applicable CSA Standards.

- .6 Plywood: As specified and/or shown on the Drawings. Douglas Fir Plywood (DFP). To CSA O121-M1978 (R2003). Thickness as specified and/or shown on the Drawings, minimum 15.5 mm (0.625”).
- .7 Blocking and Rough Framing: As specified and/or shown on the Drawings. To CAN/CSA-O141-05. Size as specified and/or shown on the Drawings.
 - 1. Dimension Lumber – 38 mm to 89 mm (2" to 4" nom.) thick and wide: Grade Category: “Light Framing”. Grade: “Construction”.
 - 2. Dimension Lumber – 38 mm to 89 mm (2" to 4" nom.) thick, 114 mm (5" nom.) or more wide: Grade Category: “Structural Joists and Planks”. Grade: “No.2 and Better”.
 - 3. Timber – 140 mm (6" nom.) min. thickness in its smallest dimension: Grade Category: “Posts and Timbers”. Grade: “Standard”.
- .8 Wood Cants: As specified and/or shown on the Drawings. To CAN/CSA-O141-05. Grade Category: “Light Framing”. Grade: “Construction”. Size: 89 mm x 89 mm (4" x 4" nom.), unless otherwise shown on the Drawings.

2.2 Pressure Treatment

- .1 Use pressure treated material for exposed applications and when specified or specifically shown on the Drawings.
- .2 Pressure Treat with Chromated Copper Arsenate (CCA), Alkaline Copper Quaternary (ACQ) or Copper Azole (CA), to CSA 080.2-97, 080.5-97 and 080.9-97.

2.3 Wood Preservative for Field Treatment

- .1 Field treat using the same preservative with which wood was originally pressure treated, to CSA 080.2-97 to obtain wet retention of 64 kg/m³ (4 lbs/ft³) of wood. Colour green.

2.4 Fasteners

- .1 All nails and spikes to meet CSA B111-1974 (R2003)
- .2 All tapping and driving screws to meet ASTM B18.6.4 - 1999.
- .3 All wood screws to meet ASTM B18.6.1 – 1981.
- .4 All galvanizing to meet ASTM A153/A153M-05 and CAN/CSA-G164-M92.
- .5 All fasteners, size and spacing to meet the most stringent requirements of this section, the Drawings, the Ontario Building Code or Factory Mutual requirements.
- .6 Pressure Treated Wood: When pressure treated wood blocking is specified, use minimum No. 304 stainless steel fasteners.
- .7 Plywood Deck and Board Lumber Deck: Galvanized spiral nails or No. 10 flat head screws, 50 mm (2") long.
- .8 Wood to Wood Nails & Spikes: Galvanized spiral to CSA Standard B111-1974, of sufficient lengths so that not less than half the length protrudes completely into the underlying member. Screws: Galvanized, #7 flat head to CSA Standard 1335.4-1972 and ANSI B18.6.1-1981 and of sufficient length to completely penetrate through bases minimum 13 mm (0.5"). Nails and screws shall be a minimum 3.2 mm (0.125") in diameter. Fasteners for plywood sheathing shall be minimum 50 mm (2") in length.
- .9 Wood to Steel Deck: Secure bottom nailer with minimum two rows of #10, 6 mm (0.25") galvanized steel screws at maximum spacing of 600 mm (2'-0"). Screws shall be sufficient length to penetrate top flute of decking a minimum 13 mm (0.5") and a maximum of 19 mm (0.75"). Screws to be factory coated with an additional corrosion protection equivalent to Rawl Perma-Seal or better.
- .10 Wood to Brick or Hollow Masonry: Rawl toggle bolt, Permagrip TL, Zamac Nail-in or Rawlite fasteners as recommended by the Manufacturer. Length to ensure a minimum embedment of 25 mm (1") and maximum 62 mm (2.5") as per Manufacturer's

recommendations. Generally, provide fastener length 2.5 times the thickness of material to be secured.

- .11 Wood to Concrete: Tapgrip, Permagrip, or Rawl Spike 6 mm (0.25") diameter screws. Length to provide a minimum 32 mm (1.25") and maximum 40 mm (1.6") embedment into substrate as required. Drill holes 13 mm (0.5") deeper than depth of fastener penetration. Type to be approved subject to results of pull tests.
- .12 Wood Sleepers: Use galvanized steel bolts with washers, minimum 10 mm (0.375") diameter.
- .13 Washers, Nuts and Bolts: Hot-dipped galvanized or Type 304 stainless steel, to match fastener material.
- .14 Metal to Wood or Masonry: Use #10 cadmium plated hex head screws with neoprene and steel washers by Atlas Bolt or approved equal. Minimum length 38 mm (1.5"). Use lead shields, Rawl or equal as required for anchoring. Colour of screw head to meet approval of Consultant. Provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process.

2.5 Accessories

- .1 Air Seal on Steel Deck: Use 26-gauge galvanized or pre-finished sheet metal to suit profile covered with SOPRAVAP'R by Soprema or approved equal, or SOPRAVAP'R by Soprema or approved equal, as shown on the Drawings.
- .2 Expansion Joint Bellows: Use 26-gauge galvanized sheet metal plate covered with SOPRAVAP'R or Sopraseal Stick 1100, by Soprema, or approved equal, as shown on the Drawings.
- .3 Flexible Air Seals: Use FR-40 PVC membrane by Lexcor Roofing Products or approved equal, as shown on the Drawings.
- .4 Two-Component Spray-in-Place Polyurethane Foam Insulation: to CAN/ULC-S705.1-01 and CAN/ULC-S705.2-98, as required and/or shown on the Drawings.
- .5 Caulk: To Section 07 50 19.
- .6 Rubberized Mastic: One component synthetic rubber – Cold Gold flashing cement by IKO or approved equal.
- .7 Batt Insulation: At Built-Up Wood Curbs and Blocking: Mineral wool fibre, with density 40 kg/m³ (2.5 lb/ft³), to CAN/ULC-S702-97 and ASTM C553-02, ROXUL AFB or approved equal, thickness as specified and/or shown on the Drawings.

PART 3 – EXECUTION

3.1 Examination

- .1 Do not install wood blocking, air seals, vapour barrier or underlay until surface to be covered has been installed and inspected.
- .2 Inspect work and advise the Architect of conditions that would adversely affect the work of this trade.
- .3 Commencement of work is proof that the Contractor has accepted surfaces as satisfactory for intended operations and accepted responsibility for appearances and performances of completed work.
- .4 Defective work resulting from work on unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.
- .5 Repair damaged and inferior work caused by work of this Contract with materials and finish to match the original.

3.2 Preparation

- .1 When pressure treated materials are used, protect all cuts, holes and injuries by liberally applying wood preservative before installation.
- .2 Apply preservative by dipping or brushing, completely saturating and maintaining wet film on the surface for a minimum 3-minute soak on lumber or 1-minute soak on plywood.

3.3 Installation

- .1 Provide carpentry alterations and comply with best practices of the trade.
- .2 Do not install wood blocking, air seals, vapour barrier, or underlay until the surface to be covered has been installed and inspected
- .3 Drawings are in part descriptive; therefore, do not regard blocking, air seals or fastening provisions shown as exact or complete. Provide required provisions for air seal fastening, located and secured to suit site conditions and adequate for intended support.
- .4 Lay out work conforming to Details. Cut and fit accurately. Align, level, square, plumb and secure work permanently in place. Join wood over solid backing. Allow 3 mm (0.125") gap between ends of plywood sheets for expansion purposes.
- .5 Offset joints of adjoining plywood or wood blocking a minimum of 1200 mm (4'-0"). Install sheathing with surface grain perpendicular to vertical framing members.
- .6 Install foam gasket under wood blocking at locations shown on the Drawings.
- .7 Install air seals at the roof perimeter and at all openings to ensure continuity of the roof and building's airtight envelope.
- .8 Provide metal bellows at expansion joints as shown on the Drawings.
- .9 Extend air seals up vertical surfaces a minimum 50 mm (2") above the cant strip and onto the roof deck a minimum 100 mm (4"), or minimum 100 mm (4") beyond insulation stops where insulation stops are provided, unless otherwise shown on the Drawings to be carried further.
- .10 Extend metal air seals up metal curbs a minimum 50 mm (2") and onto the roof deck a minimum 100 mm (4"), or minimum 100 mm (4") beyond insulation stops where insulation stops are provided, unless otherwise shown on the Drawings to be carried further. Seal metal air seals to metal curbs with continuous bead of polyurethane sealant.
- .11 When metal air seals are used, mitre and overlap corners and end joints a minimum of 50 mm (2") and seal all overlaps and corners with modified bitumen sealant. Install additional ply of self-adhering membrane overlapping joints minimum 150 mm (6").
- .12 Where irregular surfaces interfere with the proper installation of the metal air seal, keep metal back and where required install flexible membranes. Overlap flexible membrane onto metal air seal minimum 75 mm (3") and seal solid with modified sealant. Where metal or flexible air seals cannot provide continuity of the building's airtight envelope, install two-component polyurethane foam to ensure continuity and air tightness.
- .13 Install wood cant strips and blocking at locations shown on the Drawings. Back-cut as required to accommodate anchors, slopes, or uneven surfaces. Trim and level to accommodate cambers, slopes, insulation, roofing and flashings In accordance with design intent. Secure permanently to the structure to prevent warping under service conditions.
- .14 Build up wood blocking at all curbs a minimum of 450 mm (18") above the deck, unless shown on the Drawings to be higher.
- .15 Build up wood blocking at all expansion and control joints a minimum of 300 mm (12") above the finished roof surface.
- .16 Notch wood blocking and cants as required around anchor points or irregular surfaces to achieve design intent. Back or face cut wood blocking with 3 mm (0.125") relief cuts as required to ensure blocking conforms to curves or unusual slopes or shapes. Do not impair the wood blocking's structural integrity or service function.
- .17 Offset and countersink all fasteners flush with surface of wood blocking being secured.

- .18 Level the top of curbs and sleepers to compensate for roof slope.
- .19 Slope the top of all wood blocking at the roof perimeter in towards the roof at a minimum of 2:12, unless otherwise shown on the Drawings.
- .20 Remove all sharp edges that could damage materials.
- .21 **Make good** any damage or interior areas necessary as a result of work of this section.

3.4 Securement

- .1 Comply with the most stringent requirements as required by this section, the Drawings, Building Code or Factory Mutual requirements. Increase number and spacing of all fasteners by 50% 2400 mm (8'-0") from the corners of the roof.
- .2 Install fasteners to the design intent to hold all wood blocking permanently in place to prevent warping and deflection and to resist all wind and weather conditions.
- .3 Use specified fasteners.
- .4 The type, length and spacing of fasteners may be subject to pull out test results.
- .5 All fasteners shall be placed minimum 10 mm (0.325") from any edge.
- .6 Install fasteners in two rows in the direction of the grain, with each fastener offset one another in a staggered fashion by approximately 50%.
- .7 Except when bolted in place, install two additional fasteners 75 mm (3") from all joints.
- .8 Stagger fasteners between layers of wood when more than 1 layer of wood is to be installed. Minimum penetration to be 32 mm (1.25"). Secure top nailers to bottom nailers staggered at not less than 450 mm (18") o.c.
- .9 Plywood Deck: Secure with nails or screws. Install fasteners at 150 mm (6") o.c. at edges and 300 mm (12") o.c. in the field of the sheet.
- .10 Wood Cants: Secure with nails or screws. Install fasteners at 450 mm (18") o.c.
- .11 Wood Components to Wood Components and Deck:
 - 1. Install fasteners staggered at not less than 450 mm (18") o.c.
 - 2. Reduce the spacing of fasteners to 300 mm (12") o.c. for a distance of 3000 mm (10'-0") from all inside and outside corners at the roof's perimeter.
- .12 Wood Components to Concrete, Brick or Hollow Masonry:
 - 1. Pre-drill holes 13 mm (0.5") deeper than fastener penetration.
 - 2. Install fasteners staggered at not less than 600 mm (24") o.c.
 - 3. Reduce the spacing of fasteners to 300 mm (12") o.c. for a distance of 3000 mm (10'-0") from all inside and outside corners at the roof's perimeter.
 - 4. When bolts are used to secure wood blocking, recess washers and bolts below the finished surface.
- .13 Wood Components to Metal Components and Steel Deck:
 - 1. Install fasteners staggered at not less than 450 mm (18") o.c.
 - 2. Reduce the spacing of fasteners to 300 mm (12") o.c. for a distance of 3000 mm (10'-0") from all inside and outside corners at the roof's perimeter.
- .14 Pull-Out Tests: When security of fasteners appears to be in doubt, in consultation with the Consultant and fastener supplier, provide pull out tests at a minimum of five locations for each type of material and fastener being employed. Submit results to Consultant and act on Manufacturer's written recommendations on the type, length and spacing of fasteners to hold the member being secured permanently in place, and to prevent warping, deflection or displacement of materials against all wind and weather conditions. Minimum pull out resistance of each fastener to be 45 kg. (100 lb.). Submit summary of findings to the Consultant for review before proceeding.

PART 1 – GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for joint sealers related to built-up roofing. Additional requirements may be specified in individual sections of the Specifications.
- .2 All conditions of the Contract and Division 1 apply to this section.
- .3 Coordinate work of this section with related work specified in other sections to ensure construction schedule and protection of finished work is maintained at all times.

1.2 Description of Work

- .1 Complete all work as specified in the Summary of Work, Specifications and Drawings.
- .2 Work of this section includes the supply and installation of sealants at reglet joints, “S” lock joints, raised lock seams, metal flashings, vent stack flashings, metal sleeves, rain collars, through-wall scuppers, fastening bars, conduits, internal stacks and at all other locations where sealants are required or shown on the Drawings to provide a complete and finished system by reference or implication.
- .3 Work of this section also includes the supply and installation of firestop sealant to ULC List of Equipment and Materials, Firestop Systems and Components, 2004 Edition system designation at mechanical penetrations in firewalls, when specified in the Summary of Work and/or as shown on the Drawings.
- .4 Work includes cutting and cleaning of reglet joints, preparing substrate surfaces, installing joint backing, primer and sealant.
- .5 Work “as described” is held to include all incidental items that by implication, good trade practices, or customary usage are required to complete the work, even though they may not be specifically mentioned or shown.
- .6 Additional requirements may be specified in individual sections of the Specifications and/or shown on the Drawings.

1.3 Related Work

- .1 Roofing Specifications are comprised of the following:
 - 1. Section 07 50 13 – Common Work Results for Roofing
 - 2. Section 07 50 16 – Wood Blocking for Roofing
 - 3. Section 07 51 00 – Built-Up Bituminous Roofing
 - 4. Section 07 62 13 – Sheet Metal for Built-Up Roofing
 - 5. Sections 22 00 00 & 23 00 00 – Mechanical
 - 6. Section 26 00 00 – Electrical

1.4 References

The latest edition of all Standards shall apply if the referenced standards have been superceded.

- .1 CAN/CGSB-19.13–M87 Sealing Compound, One Component, Elastomeric, Chemical Curing.
- .2 CAN/ULC-S115-05 Standard Method of Fire Tests of Firestop Systems.
- .3 ULC List of Equipment and Materials, Firestop Systems and Components, 2004 Edition.

1.5 Qualifications

- .1 Employ only experienced and qualified workers that can provide quality results. Replace all work that results from inferior products or installation.

1.6 Examination

- .1 Examine surfaces and report any adverse conditions that could negatively impact the appearance and performance of the work.

1.7 Coordination

- .1 Coordinate sealant work with related work specified in other sections to ensure that the construction schedule, water-tightness, and protection of the building and work are maintained at all times.

1.8 Shop Drawings, Product Data, Samples and Mock-ups

- .1 Before proceeding with fabrication, provide a mock-up of each joint profile to be sealed showing size, shape, depth of joint, back-up material, primer and sealant. Mock-up may be part of finished work.
- .2 Submittals shall be in accordance with Section 07 51 00.
- .3 Additional requirements may be specified in other sections of the Specifications.

1.9 Delivery, Storage and Handling

- .1 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.

1.10 Environmental and Safety Requirements

- .1 Conform to Manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants, including special conditions governing use.
- .2 In confined spaces, provide a portable supply of outside air and exhaust fans to ensure that fumes will not impact workers or building occupants.
- .3 Remove all rubbish and surplus materials from the job site on a daily basis.

1.11 Inspection and Testing

- .1 Field review of the work will be completed by Fishburn Building Sciences Group Inc. (Consultant).
- .2 Examination of materials' certificates and test reports shall not be construed as relieving the Contractor of his responsibility for proper completion and guarantee of the work in accordance with the Drawings and Specifications.
- .3 Notify the Architect/Owner/Consultant and material Manufacturer at least 48 hours before roofing operations commence, and arrange for a site meeting for discussion of procedure. Subsequently, give two working days prior notice for the commencement of each phase of work. Notify of delays and re-starts.
- .4 Cooperate with Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to, during their use and during the warranty period. Act immediately on instructions given. Make cut-out for testing purposes when and where required and **make good** roofing of test areas and of any and all defects of materials and workmanship without additional cost.
- .5 Do not conceal or cover any phase of the work until after it has been inspected and approved.

- .6 Inspection of the Contract Documents as to extent of work, quality of workmanship and materials, methods, etc. is the responsibility of the Architect.

1.12 Non-Compliance with Inspections and Tests

- .1 If the initial inspection and tests required to establish compliance with the Contract Documents indicates non-compliance with the Contract Documents, subsequent tests or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.
- .2 The Contractor shall replace or correct defective work not done in accordance with the Contract. If, in the opinion of the Architect, it is not expedient to correct defective work or work done in accordance with the Contract, the Owner may deduct from the Contract price the difference in value between the work as done and called for by the Contract, the amount of which will be determined by the Architect.
- .3 Replace all work that results from inferior products or workmanship.

1.13 Contractor Quality Control

- .1 The Contractor shall appoint a worker for the purpose of quality control on the construction site (Quality Control Inspector) to ensure that the work is installed in accordance with the Contract, Specifications and Drawings.
- .2 In addition to procedures that may be specified elsewhere, on Drawings provided by the Consultant, the Contractor's Quality Control Inspector shall maintain a Plan showing the following record of construction:
 - .1 The progress and limits of each day's work.
- .3 In addition to procedures that may be specified elsewhere, the Contractor's Quality Control Inspector shall maintain written records of the following:
 - .1 A written record of the workers on site.
 - .2 A written record of changes that affect the work (i.e. site instructions, change orders, addenda, etc.).
 - .3 A written record of materials shipped to and incorporated in the work including dates, name of Manufacturer, type of material, lot and serial numbers and compliance standards as written on the labels.
- .4 In addition to procedures that may be specified elsewhere, the Contractor's Quality Control Inspector shall make available on a daily basis the following:
 - .1 Labels showing serial and lot numbers for each type and lot of materials.
 - .2 Samples required by the Specifications.

1.14 Warranty

- .1 The work of this section shall be included in the warranty as specified in Section 07 51 00.

1.15 Final Cleaning and Painting

- .1 To Section 07 51 00.

PART 2 – PRODUCTS

2.1 Materials

- .1 Unless otherwise specified:
 - .1 Polyurethane Sealant: For use with reglets, sheet metal flashings, raised lock seams, vent stack flashings, metal sleeves, rain collars, chimney sleeves, through-wall scuppers, fastening bars, conduits, internal stacks, ductwork, door thresholds, exterior precast and masonry joints and other exterior uses, use 1-part moisture-curing polyurethane compound, non-staining, non-bleeding, Tremco Dymonic or

approved equal, to CAN/CGSB-19.13-M87, Type II. Where exposed to view, use colour to match adjacent materials as close as possible and selected from Manufacturer's standard colour chart where exposed to view.

- .2 Silicone: For "S" lock joints, aluminum and glazing joints and EIFS, use 1-part silicone base, solvent curing, "Spectrum 2" by Tremco or approved equal, to CAN/CGSB-19.13-M87.
- .3 Firestop Sealant: By Tremco, Dow Corning Canada Inc., GE Silicone, 3M Corporation or approved equal, to CAN/ULC-S115-05.
- .2 Joint Cleaner: Non-corrosive, non-staining, non-porous type, compatible with joint forming materials and sealant, recommended by sealant Manufacturer.
- .3 Joint Backing: Round, extruded polyethylene foam rod, closed cell, Shore A Hardness 20, tensile strength 140 to 210 kilopascals. Oversize 30% larger than joint width.
- .4 Bond Breaker Tape: Pressure sensitive tape that will not bond to caulking, as recommended by Manufacturer.
- .5 Primer: Non-staining type, as recommended by Sealant Manufacturer.

PART 3 – EXECUTION

3.1 Protection

- .1 Protect installed work of other trades from staining or contamination.

3.2 Preparation of Joint Surfaces

- .1 Prepare surfaces in accordance with Manufacturer's directions.
- .2 Examine joint sizes and conditions to establish correct depth-to-width relationship for installation of backup materials and sealants.
- .3 Clean bonding joint surfaces of harmful substances including dust, rust, oil, grease and other foreign matter, which may impair work.
- .4 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.
- .5 Ensure joint surfaces are dry and frost free.

3.3 Cleaning

- .1 Clean and solvent wipe surfaces with joint cleaner prior to priming and caulking.

3.4 Priming

- .1 Prime joints in accordance with Manufacturer's instructions.
- .2 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .3 Conduct adhesion tests to determine whether primer is required for pre-finished metal surfaces.
- .4 Prime copper, concrete and masonry surfaces to receive sealant.
- .5 Prime sides of joints in accordance with sealant Manufacturer's instructions immediately prior to caulking.

3.5 Backup Material

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

3.6 Mixing

- .1 Where required, mix materials in strict accordance with sealant Manufacturer's instructions.

3.7 Application

- .1 Install sealant in accordance with Manufacturer's instructions.
- .2 Apply sealant when air and substrate temperatures are within the application range recommended by the Manufacturer. Do not work during inclement weather.
- .3 Mask edges of joint where irregular surface or sensitive joint border exists to provide a neat joint.
- .4 Apply sealant in continuous beads.
- .5 Apply sealant using gun with proper size nozzle.
- .6 Use sufficient pressure to fill voids and joints solid.
- .7 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities.
- .8 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .9 Remove excess compound promptly as work progresses and upon completion.
- .10 Apply sealant in "S" locks of metal flashings as it is installed. Apply to the bottom and top and sides before the metal is pushed into the joint. Clean off all excess material visible after flashing is installed.

3.8 Curing

- .1 Cure sealants in accordance with sealant Manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.
- .3 Protect sealants until cured.

3.9 Cleanup

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess droppings as work progresses, using recommended cleaners.
- .3 Remove masking taper after initial set of sealant.
- .4 Clean all contaminated surfaces to Owner's acceptance.
- .5 Remove all rubbish and surplus materials from the job site on a daily basis.

END OF SECTION 07 50 19

PART 1 – GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for conventional built-up bituminous roofing. Additional requirements may be specified in individual sections of the Specification.
- .2 All conditions of the Contract and Division 1 apply to this section.
- .3 Coordinate work of this section with related work specified in other sections to ensure construction schedule, protection of finished work and water tightness is maintained at all times.
- .4 The Roofing Contractor shall provide an original, complete insurance policy identifying specific coverage for torch applied roofing systems.

1.2 Description of Work

- .1 Complete all work as specified in the Summary of Work, Specification and Drawings.
- .2 Work of this section includes the supply and installation of Built-Up Roofing.
- .3 Review the extent of the work with the Consultant on site before proceeding.
- .4 Work “as described” is held to include all incidental items that by implication, good trade practices, or customary usage are required to complete the work, even though they may not be specifically mentioned or shown.
- .5 Additional requirements may be specified in individual sections of the Specification and/or shown on the Drawings.

1.3 Related Work Specified Elsewhere

- .1 Roofing Specification is comprised of the following:
 - 1. Section 07 50 13 – Common Work Results for Roofing
 - 2. Section 07 50 16 – Wood Blocking for Roofing
 - 3. Section 07 50 19 – Sealants for Roofing
 - 4. Section 07 62 13 – Sheet Metal for Built-Up Roofing
 - 5. Sections 22 00 00 & 23 00 00 – Mechanical
 - 6. Section 26 00 00 – Electrical

1.4 References

The latest edition of all Standards shall apply if the referenced standards have been superseded.

Primers:

- .1 CGSB 37-GP-9Ma-83 Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .2 CGSB 37-GP-15M-84 Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.

Thermal Barrier, Adhesives and Tapes:

- .3 ASTM C1396/C1396M-04 Standard Specification for Gypsum Board. (Supersedes CSA A82.27-M and ASTM C36/C36M-03)

Vapour Barriers and Air Seals:

- .4 CAN/CGSB-51.33-M89 Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

Insulations:

- .5 ASTM C726-05 Mineral Fibre Roof Insulation Board.
- .6 ASTM C728-05 Perlite Thermal Insulation Board.

- .7 CAN/ULC-S126-M86 (R2000) Fire Spread Under Roof-Deck Assemblies.
- .8 CAN/ULC-S701-05 Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .9 CAN/ULC-S702-97 Thermal Insulation, Mineral Fibre for Buildings.
- .10 CAN/ULC-S704-03 Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .11 CAN/ULC-S705.1-01 Thermal Insulation - Spray Applied Rigid Polyurethane Foam.
- .12 CAN/ULC-S705.2-98 Thermal Insulation - Spray Applied Rigid Polyurethane Foam.
- .13 CAN/ULC S706-02 Wood Fibre Thermal Insulation for Buildings.
- .14 CAN/ULC S770-03 Determination of Long-term Thermal Resistance (LTTR) of Closed-Cell Thermal Insulating Foams.

Asphalts and Bitumens:

- .15 CAN/CSA A123.4-04 Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

Felts and Membranes:

- .16 ASTM D173-03 Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing.
- .17 ASTM D1970-01 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .18 CAN/CSA-A123.3-98 (R2004) Asphalt Saturated Organic Roofing Felt.
- .19 CSA A123.17 and ASTM D2178-97a-05 Asphalt Glass Felt Used in Roofing and Waterproofing.
- .20 CGSB 37-GP-52M-84 Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric.
- .21 CGSB 37-GP-56M-85 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .22 CGSB 37-GP-64M-77. Mat Reinforcing, Fibrous Glass, for Membrane Waterproofing Systems and Built-Up Roofing.

Miscellaneous Roofing Sealants and Adhesives:

- .23 CAN/CGSB 37.29-M-89 Rubber-Asphalt Sealing Compound.

Miscellaneous Fixtures:

- .24 CAN/CGA-8.1-M86 (R2001) Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas.

Fasteners:

- .25 ASTM A153/A153M-05 Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .26 ASME B18.6.1 – 1981 Wood Screws (Inch Series).
(Supersedes CSA B35.4-1972)
- .27 ASME B18.6.4 – 1999 Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws, Inch Series.
(Supersedes CSA B35.3-1969)
- .28 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
- .29 CAN/CSA-G164-M92 (R2003) Hot Dip Galvanizing of Irregularly Shaped Articles.

Aggregates and Pavers:

- .30 ASTM D1863-03 Mineral Aggregate Used on Built-Up Roofs.
- .31 CSA A231.1-99 (R2003) Precast Concrete Paving Slabs.

1.5 Qualifications

- .1 Employ only experienced and qualified workers that can provide quality results. Replace all work that results from inferior products or installation.

1.6 Examination

- .1 Examine surfaces and report any adverse conditions that could negatively impact the appearance and performance of the work.

1.7 Coordination

- .1 Coordinate work with related work specified in other sections to ensure that the construction schedule, water tightness, and protection of the building and work are maintained at all times.

1.8 Specification

- .1 Work of this section includes new roofing system installation including all relative work shown on the Drawings. Provide a complete roofing, insulation, flashing and air vapour barrier system.
- .2 Provide temporary drains and provide seals as required to make drains watertight. Remove and replace air seals and raise drain to elevations dictated by design intent before proceeding with roofing operation.
- .3 'WORK AS DESCRIBED' is held to include all incidental items that by implication, good trade practice, or customary usage are required to complete the work even though they may not be specifically mentioned or shown.

1.9 General Requirements

- .1 Comply with the General Requirements, General Instructions and Supplementary Conditions.
- .2 Execute work in accordance with Specification, Drawings and Details.
- .3 Anchor roofing to meet requirements of Insurance Underwriter and Authorities having jurisdiction.
- .4 Regard Manufacturer's printed recommendations as minimum requirement for materials, methods and workmanship not otherwise specified.
- .5 Contact the Consultant if the Specification conflicts with the Manufacturer's recommendations. Otherwise it will be assumed that the Contractor and Manufacturer are in agreement with procedures outlined.
- .6 Advise the Consultant of adjustments to specified roofing procedures recommended by Manufacturer's caused by weather and site conditions. Make adjustment to specified procedures only after review with the Consultant.
- .7 Lay out work to avoid working over newly installed felts. If any foreign material is inadvertently incorporated into the membrane, remove the material immediately and repair to restore membrane to its original integrity.
- .8 Maintain equipment in good working order to ensure control of roofing operations and protection of work. Types of roofing equipment and laying techniques to be employed are to meet the approval of the Consultant.
- .9 Do not penetrate roof deck with any fastening devices that would do damage or impair the function of the assembly.

1.10 Environmental Requirements

- .1 Ensure at all times protection of the building and any unfinished work that can be damaged by inclement weather.
- .2 If inclement weather is forecast or appears imminent, postpone work that would risk the work or building being damaged by moisture.
- .3 If it becomes apparent that work would threaten the buildings water tightness, the Owner has the right to stop the work. Any additional expenses due to work stoppage or postponement of the work will be at the Contractor's expense.
- .4 Ensure at all times protection of materials and equipment that are sensitive to damage by moisture.

- .5 Install products sensitive to damage by moisture, snow or fog only when weather permits. Observe Manufacturer's printed recommendations regarding temperature and weather conditions.
- .6 As governed by design intent, apply each part of roofing system only when surfaces and weather allow for a successful application and performance of completed work.
- .7 When temperatures are below 5°C (40°F), proceed with work only with the mutual documented agreement between the Contractor and material supplier that, with the materials and method used, the specified installation under the conditions can be successfully achieved.

1.11 Health and Safety Requirements

- .1 The Contractor shall comply with the requirements as provided in the Hot Work and Safety Checklist where welding, soldering or torching on the roof is to take place.

1.12 Open Flame and Fire Safety

- .1 Appoint a Fire Watch where welding, soldering or torching on the roof is to take place.
- .2 Fire Watch shall be knowledgeable and must have successfully completed the Canadian Roofing Contractors Association (CRCA) National Torch Safety Program, provincial affiliate or member Manufacturer equivalent.
- .3 Fire Watch shall be knowledgeable and trained in identifying and minimizing fire hazards, in propane safety, and in the proper use of fire extinguishers.
- .4 Maintain surveillance for a minimum of 2 hours after the completion of torching operation, after which an inspection of the area is to be made.
- .5 Maintain extinguishers to requirements of IAO (Insurer's Advisory Organization) and Ontario Building Code Article 3.2.5.6 and NFPA #10 (National Fire Protection Association).

1.13 Welding

- .1 Welding must conform to the latest issue of CSA W59-03.
- .2 All Sub-Contractors undertaking to weld must be fully approved by the Canadian Welding Bureau under the latest requirements of CSA W47.1-03.

1.14 Roofing Kettles and Mops

- .1 Use kettles that are in good working order, have tight fitting lids and equipped with accurate thermometers or gauges to prevent overheating of the bitumen that could otherwise pose a fire threat.
- .2 Locate kettles in a safe place outside of the building that avoids the possibility of ignition of combustible material.
- .3 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire.
- .4 Disconnect propane burners from heating containers when not in use. Store propane in protected area away from ignition sources and buildings. Contact local Fire Chief and advise of work in progress. Act on instructions given to render the site free of fire hazards.
- .5 Use only glass fibre roofing mops. Do not leave used roofing mops on the roof unattended. Store mops away from the building and combustible materials. Remove from site daily.
- .6 Supply and maintain in good working order, ABC fire extinguishers with a minimum of 4.5 kg (10 lbs) capacity at the kettle and at each location where work is in progress including at ground level, kettles and tankers. Keep extinguishers in locations away from propane tanks. A separate fire extinguisher must be provided to the Fire Watch.

1.15 Additional Fire Safety Requirements

- .1 All workers must comply with procedures set out in the Health and Safety Guidelines for Low Slope Roofing, Construction Safety Association of Ontario, 1998 Edition.
- .2 All workers using a propane torch must have successfully completed the Canadian Roofing Contractors Association (CRCA) National Torch Safety Program provincial affiliate or Manufacturer's equivalent.
- .3 All workers must be trained in identifying and minimizing fire hazards and in propane safety and must comply with the procedures as set out in the membrane Manufacturer's literature and/or the National Torch Safety Program.

1.16 Protection of Work & Property

- .1 Provide protection to allow for normal building operations during work of this Contract.
- .2 Close off area; provide warning signs and safety barricades and/or scaffolding to protect motor vehicle and/or pedestrian traffic. When working overhead, including hoisting and replacing electrical or mechanical equipment or damaged deck, provide safety inspectors or flag operators using two-way radios to control traffic flow.
- .3 When interior protection is required, coordinate the work with the Owner.
- .4 Protect the work, building and property from damage. Provide tarpaulins and minimum 12.5 mm (0.5") plywood sheets in hoisting, pumping and set-up areas to prevent damage and staining of surfaces.
- .5 Protect landscaping and paving adjacent to kettles and areas where chopping of bitumen will take place, by installing minimum 12.5 mm (0.5") plywood sheets under and adjacent to all areas that may be impacted by the operation.
- .6 Prevent damage to landscaping by installing minimum 50 mm (2") thick wood planks continuously under tankers, dolly wheels of trailer, and disposal bins.
- .7 Cover openings and joints in deck to prevent dust, moisture or construction materials from entering the building.
- .8 Close doors leading to construction areas for security reasons and to prevent dust, water or fumes from entering the building.
- .9 Protect roofs and flashings in hoisting, dumping and traffic zones with 9.5 mm (0.375") plywood sheets. Underlay plywood sheets with 10-mil polyethylene when working over new bituminous membrane. Remove plywood when not in use, otherwise weigh down to prevent removal by wind.
- .10 Provide temporary plumber's plugs to protect drains during roofing operations. General Trades is responsible for daily removal of the temporary plumbing plug and must coordinate work with the Mechanical Contractor.
- .11 If in the performance of the work it becomes apparent that proper protection is not being provided and the Roofing Contractor's work is disrupting building or site, the Owner has the right to stop work until the problem or conditions are rectified. Any cost due to the stoppage or postponement of work will be the Roofing Contractor's responsibility.

1.17 Manufacturer's Instructions

- .1 Regard Manufacturer's printed recommendations as minimum requirements for materials, methods and workmanship not otherwise specified. Do not rely solely on labels or enclosures provided with products. Submit one copy and keep one copy of Manufacturer's instructions available on the site for each product used in the work.
- .2 Contact the Consultant if the Specification conflicts with the Manufacturer's recommendations. Otherwise, it will be assumed that the Roofing Contractor and Manufacturer are in agreement with procedure outlined.

- .3 Advise the Consultant of adjustments to specified roofing procedures recommended by Manufacturer's due to weather and site conditions. Make adjustments to specified procedures only after review with the Consultant.
- .4 If installation or erection of products does not comply with the requirements, the Consultant is authorized to request removal and re-installation at no increase in the Contract Price.

1.18 Identification and Delivery

- .1 Materials and equipment shall be delivered and stored to the site undamaged and in their original packaging, with Manufacturers seals and labels intact and visible, attesting to their conformity to specific standards.
- .2 Provide bill of lading for bulk loads of bitumen clearly showing Equiviscous Temperatures (EVT), Flash Point (FP) and Final Blowing Temperature (FBT).
- .3 Ensure that shelf life of materials has not expired.
- .4 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage.
- .5 Inspect insulation for physical and moisture damage, size, cupping, bowing and edge cavitations. Mark defective material with spray paint to ensure it is not incorporated into roofing system.
- .6 Remove damaged or rejected material from site and replace with new product.
- .7 Touch-up damaged factory-finished surfaces on equipment to the Consultant's satisfaction. Use primer or enamel to match original. Do not paint over nameplates.

1.19 Compatibility

- .1 Compatibility between components of the system and adjacent materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly. Notify the Consultant in writing when the materials and components of the assembly do not meet this requirement.
- .2 Defective work resulting from work with incompatible materials will be considered the responsibility of the Roofing Contractor.
- .3 Repair all work that could result in damage or interfere with performance.

1.20 Storage and Handling

- .1 Manufacturer's recommendations for handling and storing products are to be considered a minimum requirement.
- .2 Do not store material on roof.
- .3 If insulation or other roofing products are shipped to the site in plastic wrap, cut or remove wrap. Keep material covered with waterproof, breathable covering and protect stored materials from moisture and degrading effects of the sun.
- .4 Elevate on raised platform a minimum of 100 mm (4") high and store as to prevent deformation of materials. Remove only those required for current day's operation.
- .5 At temperatures below 4°C (40°F), store membrane roofing, adhesive and sealants that will be affected by temperature in dry heated storage. Only remove product immediately prior to installation.
- .6 Protect temperature sensitive materials and products such as adhesives from cooling on the roof by providing temporary shelter or hotbox.
- .7 Protect edges of all rolled goods. Stand on end to prevent deformation. Do not store more than one skid high.
- .8 Remove and replace all wet or damaged materials.

- .9 Do not store aggregate on roof. Keep covered during inclement weather. Heat to dry by acceptable method prior to installation.

1.21 Examine Existing Conditions

- .1 Before proceeding with roofing installation, examine existing conditions and inspect substrate surfaces and verify that:
 - .1 Surfaces are free of debris, contamination, snow, frost and moisture.
 - .2 The deck is clean and sufficiently dry to ensure specified adhesion will be obtained.
 - .3 Adjacent construction and installation of related work (i.e. curbs, drain openings, penetrations, wood nailers, etc.) is complete.
 - .4 Roof deck is sound and irregularities are corrected to provide a suitable surface for new roofing.
 - .5 Sharp edges or protrusions that could impair the function of the roof are removed.
- .2 Notify Consultant of any adverse conditions to Section (07 50 13 (1.9)).

1.22 Examine Underside of Deck

- .1 Inspect underside of deck to ensure fasteners will not damage interior electrical and mechanical services.
- .2 Notify Consultant of any adverse conditions to Section (07 50 13 (1.9)).

1.23 Submittals

- .1 Submit to the Consultant a list of materials and, if applicable, substitute materials intended for use before they are ordered.
- .2 Submit Manufacturer's instructions for each product intended for use in the work.
- .3 Submit documentation specified under Roofing Contractor Quality Control, including:
 - .1 Roof Plan Drawings documenting the record of construction.
 - .2 Written records of construction.
 - .3 Bills of lading and labels from materials.
 - .4 "As-built" Drawings at the end of the project:
- .4 If applicable, submit Pull-Out Test results for fasteners before proceeding with the work.
- .5 Submit Cut Test results for the finished roofing.
- .6 Submit Warranties on the pre-approved form.
- .7 Do not proceed with work until relevant submissions are reviewed.
- .8 Allow 5 working days from the date of receipt for review of submittals.
- .9 Additional requirements may be specified in other sections of the Specification.

1.24 Shop Drawings

- .1 Submit fully detailed dimensioned Shop Drawings wherever requested in the Specification before proceeding with work.
- .2 Shop Drawings refer to Drawings, designs, schedules, brochures and illustrations.
- .3 The Roofing Contractor is responsible to cross reference Shop Drawings to all applicable portions of the Contract.
- .4 Shop Drawings shall show clearly the construction, size, layout, joints, seams, provision for expansion, stiffeners, cleat fasteners, anchorage, designation of materials, colour, finishes and all other relevant information.

- .5 Unless otherwise specified, submit Engineered Shop Drawings, including but not limited to the following work:
 - .1 Insulation: Base Insulation and fastener layout;
 - .2 Insulation: Tapered Insulation (sumps) at roof drains as specified under Tapered Insulation & Crickets;
 - .3 Insulation: Tapered Insulation, crickets and fastener layout at roof perimeter as specified under Tapered Insulation & Crickets;
- .6 When specified in individual sections of the Specification, Drawings are to be stamped by a qualified Engineer, licensed in the Province in which the work is to be undertaken.
- .7 Until submissions are reviewed, work involving relevant products may not proceed.
- .8 Shop Drawings submittal and re-submittal must be completely identified by the following:
 - .1 Project Name.
 - .2 Project Number.
 - .3 Name and Address of Roofing Contractor.
 - .4 Name and Address of Sub-Contractor, Supplier and/or Manufacturer.
 - .5 Drawing Number, Date and Revision Dates.
 - .6 Specification section to which the Submittal applies.
- .9 Stamp and sign the Shop Drawings indicating that they have been checked and reviewed prior to submission.
- .10 Review of Shop Drawings is for the sole purpose of ascertaining compliance with general design concept, does not constitute approval, nor does it relieve the Roofing Contractor from complying with the Contract Documents. The Roofing Contractor is responsible for the designs inherent in the Shop Drawings and the performance of completed work including any oversights and errors that result. The review and any subsequent resubmittals will not be a cause for extension to the Contract completion date or schedule.
- .11 Submit Shop Drawings in triplicate.
- .12 New information cannot be added to Shop Drawings previously submitted. New information is to be submitted on new Shop Drawings.
- .13 Shop Drawings that do not comply with all requirements will be stamped **“REVISE AND RESUBMIT”**.
- .14 Shop Drawings deemed to comply with these requirements will be stamped **“REVIEWED”**.
- .15 Keep copies of **“REVIEWED”** Drawings on site for reference.
- .16 Allow 5 working days from the date of receipt for review of Shop Drawings.
- .17 Additional requirements may be specified in other sections of the Specification.

1.25 Product Data

- .1 Product data includes: Manufacturer’s catalogue sheets, brochures, literature, performance charts, reference standards, labels on products, and diagrams used to illustrate standard manufactured products.
- .2 Unless otherwise specified, submit to the Consultant the following items before they are ordered:
 - .1 A list of materials intended for use;
 - .2 Standard colour charts for painting rooftop equipment;
 - .3 Standard colour charts for eavestroughs, downspouts, water-conductors, metal flashings and prefinished metal siding; and;
 - .4 Manufacturer's catalogues, brochures, literature, and performance charts detailing reference standards for alternative materials and products intended for use.
 - .5 Submit 2 copies of product data to the Consultant upon request.

1.26 Samples

- .1 When the submission of samples is requested in individual sections, submit one (1) sample for review unless otherwise requested.
- .2 Unless otherwise specified, submit samples before proceeding with work, including but not limited to the following:
 - .1 Aggregate: Sample of surface aggregate.
- .3 Submit samples of alternative materials and products intended for use.
- .4 A sample is an example of material or equipment for quality, finish and workmanship.
- .5 Submit the full range of the sample including colour, pattern or texture.
- .6 Reviewed and accepted samples will become standards of quality of work and material against which installed work will be verified.
- .7 Allow 5 working days from the date of receipt for review of samples.
- .8 All colours to be approved by the Architect.

1.27 Mock-Ups

- .1 When the requirements for a mock-up is requested in individual sections or shown on the Drawings, erect mock-ups at locations acceptable to the Consultant for approval.
- .2 Construct built-in mock-up for review before proceeding with the work, including but not limited to the following:
 - .1 Miscellaneous Fixtures: Installed roof drain; and,
 - .2 Miscellaneous Fixtures: Installed custom-fabricated scupper/overflow scupper.
- .3 Provide a 1200 mm (4'-0") mock-up for each item.
- .4 Reviewed and accepted mock-ups will become standards of quality of work and material against which installed work will be verified.
- .5 Failure to prepare a mock-up in a timely manner is insufficient reason for an extension of Contract time.
- .6 Verify all dimensions and conditions and provide alterations required to adapt work to specific site conditions without additional cost.
- .7 Allow 24 hours for review of the mock-up.
- .8 All colours to be approved by the Architect.
- .9 The mock-up, if acceptable to the Consultant, may form part of the finished work.
- .10 Additional requirements may be specified in other sections of the Specification.

1.28 Consultant Field Observations

- .1 Notify the Consultant and material Manufacturer at least 48 hours before work commences. Provide 24 hours notice of delays and restarts.
- .2 If the Roofing Contractor covers the work before it has been inspected; the Roofing Contractor must uncover such work.
- .3 If the initial inspection required establishing compliance with the Contract Documents indicates non-compliance, additional re-inspection or testing must be performed.
- .4 The cost of re-inspection and testing performed by the Consultant will be borne by the Roofing Contractor and deducted from the price of the Contract.
- .5 Replace all poor quality work or inferior products to meet specified requirements.
- .6 All incomplete work under the Contract, including correction of deficiencies and submission of Warranties, must be completed within 10 working days of the date of the Semi-Final Inspection Report.
- .7 The Roofing Contractor must replace or correct work not completed in accordance with the Contract. If in the opinion of the Consultant, it is not expedient to correct work not done in accordance with the Contract, the Consultant may deduct from the Contract Price the

difference in value between the work as done and called for by the Contract. The difference will be returned to the Owner. The Consultant will determine the amount.

1.29 Roofing Contractor Quality Control

- .1 The Roofing Contractor shall appoint a worker for the purpose of quality control on the construction site (Quality Control Inspector) to ensure that the work is installed in accordance with the Contract, Specification and Drawings.
- .2 In addition to procedures that may be specified elsewhere, on Drawings provided by the Consultant, the Roofing Contractor's Quality Control Inspector shall maintain a Roof Plan showing the following record of construction:
 - .1 The progress and limits of each day's work.
 - .2 Locations of water cut-offs.
 - .3 Locations and elevations of low points that will pond water.
 - .4 Areas and quantity where lightweight fill has been installed.
 - .5 Areas where additional waterproofing has been installed to build-up low points.
 - .6 Areas that have been double poured with asphalt and gravel (other than corners and adjacent to equipment).
- .3 In addition to procedures that may be specified elsewhere, the Roofing Contractor's Quality Control Inspector shall maintain written records of the following:
 - .1 A written record of the workers on site.
 - .2 A written record of changes that affect the work (i.e. site instructions, change orders, addenda, etc.).
 - .3 A written record of materials shipped to and incorporated in the work including dates, name of Manufacturer, type of material, lot and serial numbers and compliance standards as written on the labels.
 - .4 A written record of bitumen temperatures on forms provided by the Consultant at the Pre-Construction Meeting (i.e. Bitumen Temperature Log). Provide continuous supervision and monitor the temperatures of tankers and kettles to ensure that bitumen is not overheated. Check temperature of bitumen in the tanker, kettle, mop cart or felt layer at minimum 30-minute intervals with an accurate thermometer.
 - .5 A completed Hot Work and Open Flame Checklist, a copy of which shall be provided by the Consultant at the Pre-Construction Meeting.
- .4 In addition to procedures that may be specified elsewhere, the Contractor's Quality Control Inspector shall make available on a daily basis the following:
 - .1 A copy of bills of lading for each shipment of bulk asphalt delivered.
 - .2 Labels showing serial and lot numbers for each type and lot of materials.
 - .3 Samples required by the Specification.
- .5 The Contractor's Quality Control Inspector shall provide a copy of "as built" Drawings at the end of the project:
 - .1 On two sets of white prints provided by the Consultant, maintain Project Record Drawings that accurately record deviations from Contract Documents, including field changes of dimensions, Details and changes made by Change Orders.
 - .2 Record changes on one set of prints in red. At completion of project and prior to final inspection, transfer changes to second set and submit both sets to the Consultant.

1.30 Removal of Samples for Testing

- .1 Provide samples of material to testing laboratory to allow verification of installed work. The Roofing Contractor will cooperate with the Consultant and/or Test Laboratory as requested to facilitate inspection and testing and removal and delivery of samples.

- .2 Carry the cost for testing of roof samples in your Base Price unless otherwise shown paid from the Cash Allowance.
- .3 Remove one roof sample, 305 mm x 305 mm (12" x 12") for Imperial felts or 330 mm x 330 mm (13" x 13") for metric felts, randomly located by the Consultant, for each day's work (minimum 1 per roof section), as follows:
 - .1 Typically remove samples of membrane before installation of bitumen and aggregate surfacing, unless otherwise directed.
 - .2 When retaining samples cut only through the top layer of insulation, unless otherwise directed. Remove membrane and underlying insulation intact, and keep them together.
- .4 In addition, remove a minimum of one sample from each roof section with bitumen and aggregate surfacing or modified cap sheet in place.
- .5 In addition, samples of unused ply felt or modified bitumen base and cap sheets, each 3000 mm (10'-0") long by sheet width, shall accompany each roof sample. Larger samples may be requested at no additional cost.
- .6 Provide a 500 mil sample of residue asphalt left in kettles and/or tankers from previous projects prior to its use on this project.
- .7 Provide a 500 mil sample of each type of bitumen before heating.
- .8 Provide daily a 500 mil sample of each type of bitumen after heating.
- .9 Containers for asphalt samples will be provided to the Contractor by the testing agency.
- .10 Locate cut tests away from drains, projections, curbs, etc.
- .11 Cut with power saw around template supplied by the testing agency. The testing agency will provide plastic bags and labels to retain sample. Locate cut area on Roof Plan. The testing agency protects samples from damage during removal, storage or delivery.
- .12 For built-up roofs, repair the area as follows:
 - .1 Fill void left by the sample removal with fibreboard insulation installed with bitumen to match the finished height of membrane.
 - .2 Restore the membrane to match existing materials and finish by repairing the cut test with 1-ply base sheet and 3-ply felt to match the materials employed in the construction of the roof. The first ply of felt to lap onto the roof 150 mm (6") each side of cut test, then each additional ply to lap minimum 75 mm (3") beyond preceding ply.
 - .3 Provide bitumen and aggregate surface over the repair area when samples are removed from the finished roof.
- .13 Retain and pay for the services of Global Laboratory and Research Corporation as the testing laboratory at Tel.: (905) 878-8993, Fax: (905) 878-5166 for the testing of all felt, asphalt and membrane samples.
- .14 Comply with testing laboratory's recommendations as it relates to removing, wrapping, labelling, handling and recording of samples.
- .15 Arrange to deliver the samples to the testing agency within 24 hours of removal. Testing agency to protect samples from damage and maintain custody of samples until end of project.
- .16 Testing of samples will be in accordance with ASTM D3617 and D2829.
- .17 Fax a copy of all reports and records to the Consultant daily. Fax to the Consultant the results of analyzed samples no later than two days following the delivery of the sample.
- .18 In the event that test results are unsatisfactory, additional cuts and the Consultant may request lab testing, the cost of which will be borne by the Roofing Contractor.
- .19 If a test shows that the Contract requirements have not been met, the Contractor before proceeding with additional work must provide to the Owner and Consultant a written proposal as to how the Contractor intends to bring the work into compliance with the Contract.

1.31 Flood and Water Test

- .1 If specified at locations agreed to by Consultant, complete flood and water testing of all flashings, projections, and equipment and roofing system.
- .2 Water test all flashings and seals for water tightness with a hose. Temporarily plug drains during testing and raise water levels on the roof to 25 mm (1") and maintain water depth for 24 hours. Monitor site conditions and remove test plugs in the event of inclement weather.
- .3 At end of test period, remove drain plugs and check levels for ponding water to verify that specified requirements have been achieved.
- .4 Repair all areas that resulted in leaks and re-test as required.
- .5 **Make good** damage caused by water test to match existing material and finish.

1.32 Final Cleaning

- .1 Clean the roof and drainage system free of debris at project completion.
- .2 Clean interior and exterior surfaces including glass and all polished surfaces of all contaminants caused by the work, including but not limited to bitumen, grease, dust, dirt, stains, labels, fingerprints and other foreign materials.
- .3 Clean exposed surfaces such as walls, rooftop equipment, gas lines and flashings free of dirt, bitumen, adhesive or caulk before leaving the site. **Make good** finishes to the satisfaction of the Consultant and Owner.
- .4 Use cleaning materials and methods that do not damage surfaces, and/or are recommended by the Manufacturer.
- .5 Schedule cleaning operations so that resulting dust, debris and other contaminants do not fall on or damage completed work.
- .6 Leave roof, building and landscape free of debris, spills and bitumen spread by pedestrian or construction traffic.
- .7 Rake out excessive piles of surface aggregate to a neat and even surface.
- .8 Broom clean and water wash paved, concrete or paving stone surfaces. Rake grounds around building free of all debris.
- .9 Remove debris and surplus materials from crawl areas and accessible concealed spaces.
- .10 Clean all drain screens free of bitumen and contaminants.
- .11 Removal all surplus materials and equipment from the site.
- .12 **Make good** and pay all costs and fees required to rectify damage caused by the work.

1.33 Painting

- .1 Touch-up and **make good** all painted surfaces damaged by work of this Contract with material and colour to match the existing.
- .2 Comply with the Manufacturers' instructions for cleaning, and for mixing and painting.

1.34 Disposal

- .1 Remove from site all surplus or waste material in compliance with all relevant Municipal, Provincial and Federal regulations.

1.35 Warranties

- .1 The Roofing Contractor must submit Warranties before final payment.
- .2 The Roofing Contractor must submit a Warranty on the pre-approved form. A copy of the form is enclosed and forms part of the Specification. The Warranty period is two (2) years.
- .3 The Warranty period commences on the date of substantial completion of the work.
- .4 The Warranty includes the prompt remedy of defects stipulated on the Certificate of Roofing Warranty, including all materials, labour, equipment and services required to **make good**. In the case of factory-fabricated components, the Roofing Contractor is to supply

and install new components. The Warranty also includes **making good** other work, components, finishes and other property damage that has resulted in the course of remedying defects.

- .5 In the case of work performed by Sub-Contractors and/or Suppliers, where additional Warranties are specified, the Contractor must secure such additional written Warranties and submit same to Owner.
- .6 The Warranty is not intended to restrict the liability of the Roofing Contractor arising out of any applicable law.
- .7 In addition, as dictated by the roof design, dislodged surfacing and degradation of colour that detracts from the performance or visual appearance of the roof will also be judged as defective work and will require correction under the Contract.
- .8 All defective work and/or material evident during the period of the 2-year Warranty must be repaired and to be “**made good**” to the original intent of the Drawings and Specification.
- .9 In addition, within the 2-year Warranty period, the Roofing Contractor must remedy any defects that appear and pay for any damage to other work that has resulted from the work under this Contract.
- .10 The Owner reserves the right to either reject or accept any Warranty having qualification other than that stated herein.
- .11 In compliance with the Certificate of Roofing Warranty, the Roofing Contractor shall, thirty (30) days prior to the expiration of the Warranty, notify the Owner in writing of the lapsing of the Warranty. The Roofing Contractor shall arrange to accompany the Owner or his representative on an inspection of the work to ascertain the condition of the roof and correct all deficiencies, without additional cost, as specified in the Certificate.
- .12 If the site conditions at the time of the scheduled inspection do not allow for a proper evaluation of the roof's condition, then the inspection may be postponed until such conditions occur. If the inspection is postponed, the Roofing Contractor agrees to extend the warranty until the inspection is complete. All deficiencies discovered during the inspection shall be reported to the Consultant and Owner. All deficiencies shall be repaired in the manner previously indicated within 15 days of such inspection or as soon as weather permits in the event of inclement weather.

1.36 Asphalt

- .1 Built-Up Membranes:
 - .1 Roofs with slopes up to 127 mm/m (1.5"/ft.) (1:8): Use Type II asphalt.
 - .2 Roofs with slopes greater than 127 mm/m (1.5"/ft.) (1:8): Use Type III asphalt.
- .2 Felt and Bitumen Vapour Barriers: Use Type III asphalt.
- .3 Coverboard: Use Type III asphalt.
- .4 Insulation installed with bitumen: Use Type III asphalt.
- .5 Mineral Fibre Cant Strips installed with bitumen: Use Type III asphalt.
- .6 Bitumen for Aggregate Surfacing: Use asphalt type as specified for the roof membrane.
- .7 Heat asphalt to obtain EVT temperature at point of contact as recommended by the asphalt Manufacturer.
- .8 If heating temperatures are not shown on the containers or bills of lading for the asphalt on site, heat to no more than 246°C (475°F) for Types II and III.
- .9 Maintain constant supervision of tankers and kettles to ensure that bitumen is not overheated. Check temperature of bitumen at a minimum of 30-minute intervals with an accurate thermometer. Maintain a record of bitumen temperatures.
- .10 In cold weather, insulate pump pipes. Transport bitumen on the roof in insulated carriers.

- .11 Unless otherwise specified by the Manufacturer’s literature, use the following EVT temperatures for felt application:

Asphalt	Mechanical Application	Mop Application
Type II	228°C (±13°C) 442°F (±25°F)	212°C (±13°C) 414°F (±25°F)
Type III	246°C (±13°C) 475°F (±25°F)	229°C (±13°C) 444°F (±25°F)

- .12 Reduce EVT temperature of asphalt to that recommended by membrane Manufacturer when installing modified membranes.
- .13 Reduce EVT temperature of asphalt when installing insulation with bitumen, as recommended by the Manufacturer. If information is not available, reduce temperature by 13°C (25°F).
- .14 Reduce EVT temperature of asphalt when installing bitumen and aggregate surfacing, as recommended by the Manufacturer. If information is not available, reduce temperature by 22°C to 33°C (40°F to 60°F).
- .15 Bitumen shall only be heated up to 13°C (25°F) of the flash point, and shall not be held at final blowing temperature for more than 4 hours. Do not use asphalt that is outside bitumen heating range. Remove overheated bitumen from the job site.
- .16 Install bitumen in a uniform, continuous application insuring good adhesion is achieved. Ensure that bitumen bleeds out from both sides of the roll not less than 13 mm (0.5”).
- .17 For No. 15 felts, apply asphalt at the rate of not less than 1 kg/m² (20 lbs/100 ft²) per coat.
- .18 For glass felts, apply asphalt at the rate of not less than 1.2 kg/m² (25 lbs/100 ft²) per coat.
- .19 For modified bitumen membranes installed with bitumen, apply asphalt at the rate of not less than 1.2 kg/m² (25 lbs/100 ft²) per coat.
- .20 For coverboard, apply asphalt at the rate of not less than 1.45 kg/m² (30 lbs per 100ft²).
- .21 For insulation installed with bitumen, apply asphalt at the rate of not less than 1.2 kg/m² (25 lbs./100 ft²), unless otherwise specified.
- .22 For mineral fibre cant strips installed with bitumen, apply asphalt at the rate of not less than 1.45 kg/m² (30 lbs per 100ft²).

1.37 Drains and Drainage Plane

- .1 Inspect surfaces and ensure that:
 - .1 Roof deck is level or sloped to drains in conforming to design intent.
 - .2 Roof drains are set at a level to drain and are connected or capped.
 - .3 Inspect roof drains to ensure they are open and working properly.

1.38 Hidden Services

- .1 Investigate the location of all known hidden services by reviewing interior conditions, plans, Specification and Drawings for the building, any subsequent alterations, completion of cut tests and interviewing those involved in the construction and maintenance of building services. These services include but are not limited to mechanical, electrical, cable, communication, computer, security or roof assembly. Ensure all services are located and will be protected from damage under the Contract.

1.39 Equipment

- .1 Inspect equipment affected by the work, including but not limited to rooftop equipment, curbs, drains and plumbing, mechanical, electrical and services, to ensure they are in good repair. Record any damage and advise the Consultant.
- .2 During roofing, ensure that all mechanical equipment is properly supported.
- .3 Notify Owner and/or Consultant of any equipment which is damaged prior to the commencement of work.

1.40 Advise Consultant

- .1 Advise the Consultant of any unusual circumstances affecting the work. Notify the Consultant of any defective or malfunctioning equipment or drains found plugged, damaged or leaking. Do not commence work until defects and incorrect levels have been verified and rectified.

1.41 Proceeding with Work

- .1 The commencement of work is proof that the Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.
- .2 Be responsible and repair and pay all cost and fees required to rectify damage caused by work of this Contract with materials and finish to match the original.

1.42 Services

- .1 Contractor to verify location of services prior to commencement of work. Notify Owner/Consultant of any unusual conditions.
- .2 The Contractor and their employees must hold valid certificates for the work undertaken.

PART 2 – PRODUCTS

2.1 General

- .1 All standards, regulations and specifications listed herein are considered to be the latest available edition.
- .2 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in the roof assembly.

2.2 Primers

- .1 Asphalt Primer: Conforming to CGSB 37-GP-9Ma-83.
- .2 Modified Bitumen Primer: For modified roofing, as recommended by the membrane Manufacturer. To CGSB 37-GP-9Ma-83.

2.3 Vapour Barriers, Adhesive and Air Seals

- .1 Steel Deck Applications: For permanence not greater than 45 ng/Pa.s.m² use Type II reinforced Kraft paper. For high humidity conditions, permanence not greater than 15 ng/Pa.s.m², use Type I foil and Kraft laminate. ULC and Factory Mutual listed, conforming to CAN/CGSB-51.33-M89.
- .2 Vapour Barrier Adhesive: ULC listed, Non-Flammable Roof Adhesive, as recommended by the Manufacturer of the vapour barrier.
- .3 Air Seal on Steel Deck: Unless otherwise provided by Section 06111, provide minimum 26-gauge galvanized or pre-finished sheet metal to suit profile, or SOPRAVAP'R by Soprema, or approved equal, as specified and/or as otherwise shown on the Drawings.
- .4 Air Seal at Pipe Projections: Flexible membrane, FR-40 by Lexcor Roofing Products, as shown on the Drawings.
- .5 Air Seal at Drains: Minimum 18 gauge galvanized sheet metal plate covered with SOPRAVAP'R or Sopraseal Stick 1100 by Soprema or approved equal, size minimum 600 mm x 600 mm (2'-0" x 2'-0"), as shown on the Drawings.

2.4 Insulation

- .1 Polyisocyanurate: Rigid foam board, minimum compressive strength 138 kPa (20 psi), Type III, Class 2, manufactured with HC blowing agent, meeting requirements of CAN/ULC S126 and S107 and CAN/ULC-S704-03 and S770-03 for LTTR values. Approved and listed for Factory Mutual 1 - 75 wind classification and Factory Mutual 4470 requirements for Class 1 fire. Maximum board size 1200 mm x 1200 mm (4'-0" x 4'-0").

- .2 Fibreboard: Minimum 2% asphalt impregnated, minimum 310 kPa (45 psi) compressive strength, to CAN/ULC S706-02, maximum board size 600 mm x 1200 mm (2'-0" x 4'-0").
- .3 Perlite: High density to ASTM C728-03. Thickness as specified in the Summary of Work and/or shown on the Drawings. Maximum board size 1200 mm x 1200 mm (4'-0" x 4'-0"). Fesco board high density by Johns Mannville.
- .4 Tapered Drain Sumps: Polyisocyanurate tapered minimum 2% from a maximum thickness matching the base insulation to the drain. Size as specified and/or shown on the Drawings.
- .5 Tapered Insulation and Crickets: Polyisocyanurate or plain fibreboard as shown above. Type, size and thickness as shown on the Drawings.
- .6 Polystyrene Extruded Foam Board: Thickness as specified and/or shown on the Drawings, conforming to CAN/ULC-S701-05, Type IV by DOW or Owens Corning.
- .7 Mineral Fibre Cant Strips: 100 mm x 100 mm (4" x 4") or shown on the Drawings. Glass fibre, Perlite, torchable mineral fibre thermal board or approved equal.
- .8 Spray-In-Place Urethane: As specified and/or shown on the Drawings, conforming to CAN/ULC-S705.1-01 and CAN/ULC-S705.2-98.
- .9 Batt Insulation: Mineral wool fibre, with density 32 kg/m² (2 lb/ft³), to CAN/ULC-S702-97, ROXUL FLEXIBATT or ROXUL PLUS or approved equal, thickness as shown on the Drawings.
- .10 Adhesive: Same as Thermal Barrier Adhesive.
- .11 Mineral Fibre: Thickness as shown on Drawings to CAN/ULC 702 by Roxul or approved equal.

2.5 Coverboard

- .1 As specified and/or shown on the Drawings:
 - .1 Fibreboard: minimum 2% asphalt impregnated, minimum 310 kPa (45 psi) compressive strength, conforming to CAN/ULC S706-02, maximum board size 600 mm x 1200 mm (2'-0" x 4'-0"), shiplap edges for thickness greater than 12.7 mm (0.5");
 - .2 Perlite: high density, to ASTM C728-05, maximum board size 1200 mm x 1200 mm (4'-0" x 4'-0"), Fesco Board High Density by John's Manville (thickness 25 mm (1")).

2.6 Asphalt and Bitumen

- .1 Bitumen: Roofing asphalt conforming to CAN/CSA A123.4-04.

2.7 Felts and Membranes

- .1 Dry Sheet: Unsaturated No. 15 felt.
- .2 Organic Felts: No. 15 asphalt-saturated roof felt, perforated, conforming to CAN/CSA-A123.3-98 (R2004).
- .3 Inorganic Felts: Type IV or VI asphalt coated glass fibre roofing felts to CSA A123.17/ASTM D2178-97a-05.
- .4 Modified Bitumen Base Sheet – Mop Grade: Minimum 95 gm/m² glass reinforced, SBS polymer modified, Sand/Sand base sheet to CGSB 37-GP-56M-85, Type II, Class P, Grade 2.
- .5 Modified Bitumen Base Sheet for Membrane Flashings - Torch Grade: 180 gm/m² non-woven polyester reinforced, SBS polymer modified base sheet to CGSB 37-GP-56M-85, Type II, Class P, Grade 2.
- .6 Modified Bitumen Cap Sheet for Membrane Flashings - Torch Grade: 250 gm/m² reinforced, SBS polymer modified cap sheet, to CGSB 37-GP-56M-85, Type II, Class G, Grade 2. Colour as specified or to Owner's approval.

- .7 Self-Adhering Base Sheet: Minimum 160 gm/m² non-woven polyester reinforced, SBS polymer modified base sheet to CGSB 37-GP-56M-85. Sopralene Flamstick by Soprema or "NP 180 Tack Sheet" by Bakor Inc., or approved equal. Primer as recommended by the Manufacturer of the membrane (membrane underlay).
- .8 Firestop Tape: Self-adhering glass-reinforced modified bitumen membrane, minimum thickness 1.5 mm x 150 mm (0.06" x 6") wide. Soprema Sopraguard self-adhering membrane or approved equal.
- .9 Flexible Membrane: FR-40 by Lexcor Roofing Products or approved equal.

2.8 Miscellaneous Roofing Sealants

- .1 One Component Rubberized Mastic: Polybitume by Henry, Sopramastic 200 by Soprema, MBR flashing cement by Johns Mannville or approved equal to CAN/CGSB 37.5M.
- .2 Two Component Modified Sealant: Cold Gold flashing cement by IKO Industries or approved equal.
- .3 Box Filler: One part pourable sealer by Chemlink Inc. and M1 Structural Sealant Primer.

2.9 Miscellaneous Fixtures

- .1 Galvanized Metal Sleeve Inserts: 26 gauge galvanized steel, straight body, 150 mm (6") high. Sized slightly larger than pipe or conduit as specified and/or shown on Drawings.
- .2 Sanitary Vent Stack Flashings: Size as specified and/or shown on the Drawings, by Altra Metal Specialties Inc. or approved equal: Aluminum, tapered body w/ tapered rubber gasket collar, 300 mm (12") G-AVTB-R12 (supply by Sections 22 00 00 and 23 00 00);
- .3 Vandal Resistant Vent Cap: Stainless steel vandal resistant vent cap G-VRC by Altra Metal Specialties or approved equal (supply by Sections 22 00 00 and 23 00 00).
- .4 Metal Sleeves: Size as specified and/or shown on the Drawings, by Altra Metal Specialties Inc. or approved equal (supply by Sections 22 00 00 and 23 00 00):
Aluminum, tapered body. 300 mm (12") G-ATS-12.
- .5 Pipe Rain Collar: Clamp-on type rain collar: Aluminum G-ASRC, by Altra Metal Specialties Inc. or approved equal or as otherwise shown on the Drawings (supply by Sections 22 00 00 and 23 00 00).
- .6 Roof Drains: Copper drain with clamping ring and cast aluminum strainer, by Altra Metal Industries Inc. Model G-CBD-CR-X-SS. Size as specified by Mechanical Engineer with control flow devices where shown (supply by Sections 22 00 00 and 23 00 00).
- .7 Scuppers and Through-Wall Overflow Scuppers (Custom-Fabricated): To Section 07 62 13 by Roofer.
- .8 Pre-manufactured Metal Roof Equipment Curbs: Fabricate from 18 gauge galvanized steel, 450 mm (18") high, pre-insulated, fully welded construction, with monolithic and smooth top surface. Size to suit equipment (supply by Sections 22 00 00 and 23 00 00).
- .9 Custom-Fabricated Flashing Boxes: 454 gm (16 oz) copper to Section 07 62 13.
- .10 Pipe Supports:
Wood Pipe Supports: For pipes up to 100 mm (4"), fabricate from pressure treated wood blocking on concrete pavers as specified and/or shown on the Drawings. Height to suit pipeline height (supply by Sections 22 00 00 and 23 00 00).
- .11 Roof Hatch: Model Type S by Bilco or Model R100 by Lexcor Roofing Products or approved equal. Aluminum, 450 mm (18") high, complete with safety bar. Size 762 mm x 914 mm (30" x 36") unless otherwise specified. Roofer to supply to General Trades for installation.
- .12 Multiple Mechanical and Electrical Services: Custom-fabricated box to Section 07 63 00 supplied and installed by Roofing Contractor.
- .13 Miscellaneous Clamps: For extending mechanical services to CAN/CGA-8.1-M86 (R2001). Size to suit existing site conditions, and as shown on the Drawings. By Sections 22 00 00 and 23 00 00.

2.10 Fasteners

- .1 Obtain Consultant and Owner's approval when using hammer drills since drilling hours may be restricted.
- .2 All fasteners for steel, wood, concrete and specialty decks must meet Factory Mutual approvals.
- .3 Use galvanized, copper, aluminum or stainless nails or screws as most compatible with materials being employed. Screws shall be minimum 38 mm (1.5") #10 cadmium plated hex head with neoprene and steel washers by Atlas Bolt or approved equal. Rawl lead shields as required for anchoring. Use fasteners as most generally suitable to Consultant's approval. Nails and caps to be hot dipped galvanized or mechanically galvanized to CSA G164-M. Supply by Lexcor (1-800-268-2889) or AMA Roof Supplies (1-877-594-6071) or approved equal.
- .4 General Fasteners: No. 10 ardox nails of length to penetrate bases minimum 13 mm (0.5"). Horizontal Membrane Fasteners: Use 50 mm ardox (2") nails with minimum 25 mm (1") solid caps for securing membrane to insulation stops. Nails and caps to be hot dipped galvanized or mechanically galvanized to CSA G164-M. Supply by Lexcor (1-800-268-2889) or AMA Roof Supplies (1-877-594-6071) or approved equal.
- .5 All nails to meet CSA B111-1974 (R2003).
- .6 All tapping and driving screws to meet ASTM B18.6.4 – 1999.
- .7 All wood screws to meet ASTM B18.6.1 – 1981.
- .8 All galvanizing to meet ASTM A153/A153M-05 and CAN/CSA-G164-M92.
- .9 Pressure Treated Wood: When pressure treated wood is specified, use minimum No. 304 stainless steel fasteners.
- .10 All fasteners for decks must meet Factory Mutual approvals.
- .11 All fasteners, size and spacing to meet the most stringent requirements of this section, the Drawings, the Ontario Building Code or Factory Mutual requirements.
- .12 Steel Deck Insulation Fasteners: Factory Mutual approved, corrosion resistant, anti-back out screws: Dekfast No. 12 Phillips Head Fastener with 2.875" Recessed Galvalume Steel Hex Insulation Plate or Dekfast 75 mm (3") Round Plastic Lock Plate, by SFS intec, or approved equal. Fasteners spaced to achieve minimum pull-out to meet Factory Mutual 1 - 75 wind uplift approval. Of sufficient length to penetrate the top flute of the deck 19 mm (0.75").
- .13 Horizontal Membrane Fasteners: For securing membrane to insulation stops, same as .1 above.
- .14 Vertical Flashing Fasteners: For Wood: No. 10 hot dip galvanized spiral nails. For Metal: Powers No. 12 "Deck Screws" with "Perma-Seal" coating. For Concrete, Brick or Masonry: Perma-Grip (Tru-Fast) "Tap-Grip" concrete screw with "Tru-Kote" coating, Powers "Tapper" concrete screw with "Perma-Seal" coating, Powers "Roofing Spike" with "Perma-Seal" coating, or Powers "Zamac Nailin". All fasteners to be 50 mm (2") length with 25 mm (1") hot dipped galvanized solid caps.
- .15 Metal to Wood: Where exposed fasteners are specified or shown, use No. 10 cadmium plated, pre-finished hex head screws with neoprene and steel washers by Atlas Bolt or approved equal, of sufficient length to penetrate the base minimum 32 mm (1.25"). Minimum length 38 mm (1.5"). Colour of screw head to match colour of flashing. Provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process. Alternatively, use screws with colour match nylon caps where shown or approved by the Consultant.
- .16 Pull-Out Tests: The type of fastener may be subject to results of pull-out tests. When security of fasteners appears to be in doubt, in consultation with the Consultant and fastener supplier, provide pull-out tests at a minimum of five locations for each type of material and fastener being employed. Minimum pull-out resistance of each fastener shall be 45 kg. (100 lb.). Submit results to Consultant and act on Manufacturer's written recommendations on the type, length and spacing of fasteners to hold the item being

secured permanently in place, and to prevent warping, deflection or displacement of materials against all wind and weather conditions. Submit summary of findings to the Consultant for review before proceeding.

2.11 Aggregate and Pavers

- .1 Aggregate: 10 mm to 16 mm (0.375" - 0.625") clean, washed, round pea gravel, to ASTM D1863-03. Submit samples of aggregate to Consultant for review prior to ordering.
- .2 Concrete Pavers: 600 mm x 600 mm x 38 mm (2'-0" x 2'-0" x 1.5"), unless otherwise specified and/or shown on the Drawings, to CSA A231.1-99 (R2003) with 6%-8% air entrainment, 30 MPa, by Brooklin Concrete Products or approved equal. See Section 07 50 13 for supply and installation requirements.

PART 3 - EXECUTION

3.1 General

- .1 Execute work in accordance with the Specification, Drawings and Details.
- .2 Anchor roofing to requirements of Insurance Underwriter and authorities having jurisdiction.
- .3 Do not install any roofing when temperatures, including wind chill, is below -26°C (-15°F).
- .4 Lay out work to avoid working over newly installed felts. If any foreign material is inadvertently incorporated into the membrane, remove the material immediately and repair to restore membrane to its original integrity. Repair with 4-ply felt or 2-ply modified bitumen base and cap sheet to match the original membrane type. All repair felts or sheets shall lap over the repair area and each previous ply 150 mm (6") in each direction. Broom all repair areas into place to ensure positive contact.
- .5 Maintain equipment in good working order to ensure control of roofing operations and protection of work. Types of roofing equipment and laying techniques to be employed are to meet the approval of the Consultant.
- .6 Before bitumen has set, avoid foot traffic or prolonged point loading on membrane that will result in displacement of bitumen between plies of felt or membrane.
- .7 Do not penetrate roof deck with any fastening devices that would do damage or impair the function of the roof assembly.

3.2 Daily Operations

- .1 Unless otherwise specified, complete entire roofing operation up to the line of termination of each day's work to meet the design intent in order to safeguard and protect the work and building from damage and weather.
- .2 Do not leave roofing felts exposed dry overnight; coat the surface of the last ply of felt with Type II asphalt immediately following installation of the felt.
- .3 Install base and cap sheet membrane and flashing the same work period.

3.3 Primer

- .1 Prime masonry and concrete surfaces which will be in direct contact with asphalt at the rate of 0.15L/m² (0.33 gal/100ft²) to CGSB 37-GP-15M-84. Ensure that surfaces are tack-free before proceeding.
- .2 Limit quantity of primer at deck openings and points of termination to prevent bleed through to the building interior.
- .3 Broom primer into surface.
- .4 Re-prime all surfaces not covered the same work period that become contaminated with dust or become marred due to their exposure to roof traffic or weather.

3.4 Air Seals

- .1 Unless otherwise specified in Section 07 50 16, provide air seals at the roof perimeter and roof openings as shown on the Drawings.

3.5 Vapour Barrier on Steel Decks

- .1 Install 1-ply Type II vapour barrier as specified and/or shown on the Drawings. Roller apply fire retardant adhesive to cover entire top flange of steel deck. Install 1-ply of specified vapour barrier with 100 mm (4") side laps and 150 mm (6") end laps sealed continuous with minimum 50 mm (2") wide bead of adhesive.
- .2 Ensure that side laps occur on the top flutes of the deck. When metric size vapour barriers do not fit Imperial size deck, increase side laps to occur on the top flange of the deck.
- .3 Broom vapour barrier into place to ensure total contact with adhesive.
- .4 Lap vapour barrier onto air seal a minimum 100 mm (4") in a continuous layer of adhesive to maintain systems continuity, as shown on the Drawings.
- .5 Encapsulate insulation at all points of termination. Install a ply of specified vapour barrier in a continuous layer of adhesive in maximum 3000 mm (10'-0") lengths. Extend minimum 150 mm (6") on to the deck and turn back on top of insulation, sealed continuous with adhesive. Overlap end laps minimum 150 mm (6"). Avoid contaminating adjacent surfaces with adhesive.
- .6 Install an additional 300 mm (12") ply of No. 15 felt in a continuous layer of Type III asphalt over the surface of the envelope plies.
- .7 Broom felts into place to ensure total contact with bitumen.
- .8 When the insulation is specified to be mechanically fastened, install the vapour barrier loose or with a sprinkle mopping of Type III asphalt installed at the maximum rate of 0.6 kg/m² (12 lb per 100 ft²). Seal all end and side laps with a continuous layer of Type III asphalt or bead of fire retardant adhesive minimum 50 mm (2") wide.

3.6 Base Insulation

- .1 Install base insulation over vapour barrier to design intent and thickness as specified and/or shown on the Drawings.
- .2 On Steel Decks: Mechanically secure insulation to deck with fasteners and plates unless otherwise specified and/or shown on the Drawings. Submit Engineered Shop Drawings showing board and fastener layout. Install additional fasteners at all insulation "T" joints. Install insulation by applying a sprinkle mopping of Type III asphalt over vapour barrier at a rate of 0.6 to 0.75 kg/m² (12 to 15 lbs/100ft²) to temporarily hold insulation in place. Adjust the length of the fasteners to accommodate variations in deck thickness to ensure specified penetration of fasteners is maintained. Install fasteners to Factory Mutual 1 - 75 wind uplift rating to Paragraph 3.5 – Thermal Barrier Mechanical Fastening on Wood, Steel and Acoustic Decks unless otherwise specified. Complete random Pull-Out Tests to determine average Pull-Out Resistance. Adjust fastener density as per Factory Mutual Bulletin 1-29 if required.
- .3 Reduce EVT temperature of asphalt when installing insulation with bitumen, as recommended by the Manufacturer. If not available, reduce temperature by 13°C (25°F).
- .4 At termination points envelope insulation per item 3.5.5 above.
- .5 Stagger all end joints of insulation a minimum 300 mm (12").
- .6 Stagger both end and side joints between insulation layers.
- .7 Butt sheets of insulation with moderate contact. Do not force insulation into place. Cut neatly at projections and points of termination. Replace all broken, damaged or misfit boards as work progresses.
- .8 Where necessary, back-cut insulation to allow it to conform and stay bonded to irregular surfaces without bridging.

- .9 Following placement, walk boards into place to ensure positive bonding is achieved. Shim all insulation at areas of deck depression or deflections with mineral wool insulation cut to suit so as to maintain the level of finished surface.
- .10 At areas where ponding water will form on the finished surface, provide minimum 900 mm (3'-0") wide drainage channels by cutting base insulation sloped from low point to drain. Check elevation with level and straight edge. Ensure positive slope to drain is achieved.

3.7 Tapered Insulation and Crickets

- .1 Install tapered insulation as specified and/or as shown on the Drawings. Tapered insulation may be the first layer of insulation or may be installed over the base insulation.
- .2 When tapered insulation is installed directly on the deck, install to the requirements under Base Insulation. Conform to Factory Mutual requirements for spacing and number of fasteners required to provide Factory Mutual 1 - 75 wind uplift rating, unless otherwise specified. Submit Engineered Shop Drawings from the Manufacturer showing layout of the insulation boards and the spacing and number of fasteners for the field, perimeter and corners of the roof for review prior to manufacture.
- .3 When tapered insulation and or crickets are installed over the base insulation, install in a continuous layer of Type III asphalt. Offset the end joints between the first layer of insulation and the tapered insulation a minimum of 300 mm (12"). Where installed as the base layer, install per item 3.6.2 above.
- .4 Unless otherwise specified and/or shown on the Drawings at all drain locations, provide tapered polyisocyanurate insulation to form a sump all around the drain to promote positive drainage. Insulation to be tapered as per the tapered insulation plan. Make allowance for the thickness of the drain flange and clamp to ensure water flow will not be impeded. Adjust drain sumps and locations to suite site conditions.

3.8 Separation Membrane

- .1 On steel deck underlay cap insulation with 1-ply 95 gm/m² modified bitumen base sheet set in Type III asphalt.
- .2 Overlap side laps of No. 15 felt half the width of the sheet plus 25 mm (1") and end laps minimum 150 mm (6"). Overlap side laps of 95 gm/m² base sheet 75 mm (3") and end laps not less than 225 mm (9").
- .3 Encapsulate cap insulation at all points of termination. Install a ply of No. 15 felt, 1/3 roll width, in a continuous layer of Type III asphalt in maximum 3000 mm (10'-0") lengths. Extend minimum 150 mm (6") on to the base insulation and turn back on top of insulation, sealed continuous with asphalt. Overlap end laps minimum 150 mm (6"). Avoid contaminating adjacent surfaces with asphalt.
- .4 Surface of felts may be left temporarily uncoated if completed operation is to be finished the same work period. Temporarily lower drains or provide temporary drains. Seal drains and roof penetrations. Provide a continuous squeegee coat of asphalt over the surface of the felts. Remove seals and raise drains to elevations dictated by design intent before proceeding with roofing operation. The cost of this additional work shall be at the Contractor's own expense.
- .5 Take spot levels and confirm with the Consultant locations and quantities of roof area which pond more than 6 mm (0.25") of water, which cannot be corrected by the application of additional bitumen and aggregate. Correct with slope correcting fill to Section 07 50 13, Slope Correcting Fill or as otherwise specified, shown on the Drawings or directed by Consultant.
- .6 The cost to correct slopes shall be borne by the Prime Contractor.

3.9 Cap Insulation

- .1 Cover the base and tapered insulation with cap insulation installed in a continuous layer of Type III asphalt at a rate of not less than 1.45 kg/m² (30 lb/100ft²).
- .2 Install as specified for Base Insulation.

- .3 Offset joints of board with joints of insulation boards by a minimum 300 mm (12").
- .4 Offset end joints between rows of board by a minimum 300 mm (12").

3.10 Cant Strips

- .1 As specified and/or shown on the Drawings, install mineral fibre cant strips with mechanical fasteners, foam adhesive or in a continuous layer of Type III asphalt.
- .2 When foam or bitumen used, press and hold cant strips in place to ensure a positive bond is achieved. Back-cut as required to accommodate anchors, slopes, or uneven surfaces.
- .3 Where mineral fibre cant strips will not stay bonded with foam or asphalt, substitute Type III asphalt with mechanical insulation fasteners installed at a minimum 450 mm (18") o.c. Install additional fasteners 100 mm (4") from all joints. Back-cut as required to accommodate anchors, slopes, or uneven surfaces.

3.11 Built-up Roof Membrane – General Application

- .1 As specified and/or shown on the Drawings, construct built-up roof membrane as follows:
 - .1 1-ply of 95 gm/m² modified bitumen base sheet mopped in place; and
 - .2 3-ply of Type IV glass felt mopped in place.
- .2 Construct membrane with 1-ply of 95 gm/m² modified base sheet. Overlap side laps not less than 75 mm (3") and end laps not less than 225 mm (9").
- .3 Cover base sheet with 3-ply of Type IV glass felt. Overlap each sheet not less than 2/3 the width of the sheet plus 20 mm (0.75") and end laps minimum 300 mm (12").
- .4 Before proceeding with the membrane installation, ensure all surfaces are dry.
- .5 Roll and broom each ply in a uniform and continuous layer of hot bitumen to obtain complete embedment. Ensure bitumen flows beyond all edges of the sheet minimum 13 mm (0.5").
- .6 Install felts smooth and free of wrinkles, air pockets, fishmouths and tears.
- .7 If fishmouths occur, immediately cut and work them into the bitumen while bitumen is still hot. Repair all fishmouths with an additional ply of felt used to construct the membrane. Extend felt a minimum 150 mm (6") beyond defect.
- .8 Do not gang rolls during the application that will result in the displacement of bitumen. Keep rolls a minimum 2000 mm (6'-6") apart during application.
- .9 Offset end laps minimum 1200 mm (4'-0").
- .10 Protect new membrane from wheel and foot traffic until bitumen is set.
- .11 Commence membrane application at low points, and install felts in a continuous layer of hot asphalt to the top of cants. Where metal flashings are built into the roof membrane, continue the application to the outside edge of the building and turn last two plies of felt down the outside face of the building a minimum of 50 mm (2"), unless otherwise shown.
- .12 Ensure that felts at inside and outside corners fit tight to all verticals without gaps. Seal membrane at the cant strips with a continuous layer of asphalt as work progresses. Cut membrane at all changes in plane and work felt into place to ensure that a proper bond to surfaces is achieved.
- .13 When wood insulation stops are shown, secure membrane at 212 mm (8.5") o.c. in the centre of the insulation stop at the toe of the cant while bitumen is still hot and prior to installing membrane flashings. Locate fasteners 38 mm (1.5") from edge of overlapping plies.
- .14 When installing the membrane, avoid coinciding end joints where possible. Terminating felts and cross strippings in ends is to be avoided. Use equipment and application techniques approved by the Consultant.
- .15 Install an additional 2-ply of felt installed in a continuous layer of asphalt to reinforce lap joints where the membrane changes direction.
- .16 Trim membrane neatly at all roof penetrations and drains.

- .17 Unless otherwise shown on the Drawings, seal all points of termination with a continuous layer of modified sealant. Trowel sealant to smooth consistent surface to completely obliterate the seam of the membrane.
- .18 Overnight Tie-In:
 - 1. Protect all work and provide temporary weatherproofing seals at points of termination of each day's work.
 - 2. Close off and make watertight open flutes of steel deck where they terminate against finished work.
 - 3. The temporary seals shall be a minimum 1-ply of No. 15 felt installed dry over the joint between the new and existing roof membrane or deck followed by 2-ply of No. 15 felt installed in a continuous layer of Type III asphalt, each lapping onto existing a minimum 300 mm (12") each side.
 - 4. Before leaving the site at the end of each work period, inspect all overnight tie-ins for damage or discontinuity.
 - 5. Before proceeding with the next phase of the work, remove and trim all temporary overnight seals to allow for tight fitting joints with the next phase of work.
- .19 Install an additional 180 gm/m² modified bitumen cap sheet torched in place extending 200 mm (8") beyond all areas where walkways, observation platforms or equipment supported by patio stones are to be installed. Torch sheet in place prior to gravelling.

3.12 Membrane Flashings

- .1 Construct membrane flashings at eaves, walls, curbs, joints, as specified and/or shown on the Drawings from the following:
 - .1 1-ply self-adhering base sheet underlay (over flammable substrates only);
 - .2 1-ply 180 gm/m² modified base sheet mopped in place (torch when underlay installed); and
 - .3 1-ply 250 gm/m² modified cap sheet torched in place.
- .2 Do not install flashings until bitumen membrane has cooled; otherwise, protect membrane with plywood under laid with 6 mil polyethylene.
- .3 Install membrane flashings true to line, free of wrinkles, air pockets or tears.
- .4 Fold over and secure membrane flashings on the outside face of the building with nails and caps, installed at 225 mm (9") o.c. Carry membrane up and/or over all walls, curbs, joints, sleepers, etc., to points shown on the Drawings. Secure the top of membrane flashings at vertical surfaces with fasteners with 25 mm (1") washers at 225 mm (9") o.c.
- .5 Seal all points of termination with modified or modified sealant as shown on the Drawings.

3.13 General Application for Modified Membrane Flashings

- .1 Use only asphalt or sealants that are shown to be compatible and approved for use by membrane Manufacturer and meet the specified standards.
- .2 Lay out all sheets so as to allow them to relax a minimum of 30 minutes. When temperatures are below 5°C (40°F) keep and lay out rolls in heated storage. Install rolls before temperature fallback of the sheet occurs.
- .3 Check for granular embedment, width and alignment. Do not use the last meter of any roll for the construction of the roof membrane. This may be used for membrane flashings.
- .4 Lay all membrane and membrane flashings starting at low point so that seams do not face the flow of water.
- .5 Offset all side laps between plies approximately 50%.
- .6 Overlap all end laps minimum 150 mm (6") and side laps 75 mm (3").
- .7 Install all membrane into place true to line, free of buckles, air pockets, fishmouths or tears.

- .8 At valley locations, run membrane continuously with the slope of the main roof. Lay out all sheets to ensure granular surface and minimum exposure at side laps are maintained through valley area and short section of roof beyond.
- .9 At side or end laps or other locations where cap sheet is supplied without a prepared edge, use a torch and trowel or “Bedder Tool” and embed granules at overlaps to ensure proper bonding of overlapping sheets is achieved.
- .10 Ensure all corners and laps are properly lapped and sealed for water-tightness.
- .11 Carry membrane to or up all vertical surfaces to point shown on the Drawings.
- .12 Cut off corners of roof membrane at 45° at end laps to be covered by the next roll prior to installation of following sheet.
- .13 Do not walk on membrane during application and until sufficient cooling has taken place so as to allow for traffic without doing damage or marring the membrane surface.
- .14 Cut all base sheet underlay and base sheet and cap sheet flashings from across the roll in 1000 mm (3'-3”) sections.
- .15 Prime all surfaces to be covered with base sheet underlay or torch applied base sheet with modified bitumen primer as recommended by membrane Manufacturer. Ensure primer is dry before proceeding with membrane installation. Where primer is installed but not covered by membrane the same work period, re-prime before proceeding.
- .16 Provide chalk line guide and install all membrane flashing true to line. Work membrane flashing with a torch, trowel and damp sponge.
- .17 Touch up bare spots, corners, scuffs and bleed out runs on cap sheet and cap sheet flashings that exceed specified exposure limits with granules matching membrane colour, as the membrane is being installed.
- .18 Should any deficiencies occur during the membrane or membrane flashing installation, immediately stop membrane application and correct the deficiency before proceeding. Notify Consultant and obtain approval for proposed repair methods. Questionable areas will be cut out and replaced.
- .19 Torch Application:
 - .1 The types of torches are to be approved by the membrane Manufacturer. Use only experienced workmen that are trained in proper torching techniques, torch safety and fire protection by the membrane Manufacturer or Roofing Trade Association.
 - .2 Install membrane by softening both surfaces simultaneously. Unroll membrane slowly into the fluid bitumen ensuring a continuous bond with consistent 3 mm to 6 mm (0.125" to 0.25") bitumen flow beyond each side of the roll. Ensure that the membrane is not overheated at any location and that bitumen flow does not exceed specified requirements.
 - .3 Ensure a watertight seal at all membrane joints and points of termination.

3.14 Modified Base Sheet Underlay

- .1 On surfaces that contain combustible materials at parapets, joints, walls, curbs, etc. intended to be covered with a torched on membrane flashing, prime surface and install 1-ply self-adhering base sheet underlay. Ensure primer is dry before membrane installation.
- .2 Commence application of self-adhering membrane beyond the toe of the cant strip and carry up all vertical surfaces and to points of termination shown on the Drawings.
- .3 Work membrane with hand pressure and roller to ensure that a proper bond is achieved.
- .4 Seal all terminations with Firestop Tape as recommended by membrane Manufacturer.

3.15 Modified Base Sheet Flashings (Mopped or Torched)

- .1 Install specified base sheet flashing starting at the low point. Layout rolls in place to verify alignment and proper overlap and re-roll prior to installation.
- .2 Carry all membrane flashings up walls and over canted eaves and parapets to points shown on the Drawings.

- .3 Carry base sheet flashings 100 mm (4") onto roof surface.
- .4 Install gusset reinforcing pieces at all corner locations.
- .5 Work membrane with hand pressure and damp sponge to achieve proper bonding.
- .6 At canted eaves, parapets and built-up wood curbs, back nail base sheet flashing with fasteners having 25 mm (1") diameter solid caps at 225 mm (9") o.c.
- .7 At vertical surfaces, seal top edge of sheet with a continuous bead of modified sealant if cap sheet is not installed the same work period.
- .8 Cover base sheet flashing with cap sheet as specified.

3.16 Modified Cap Sheet Flashings (Torched)

- .1 Install specified cap sheet flashings after installing the membrane cap sheet.
- .2 Install specified cap sheet flashing starting at the low point. Layout rolls in place to verify alignment and proper overlap and re-roll prior to installation.
- .3 Carry membrane flashings up all vertical surfaces and over eaves and parapets to points shown on the Drawings. At wall locations, unless otherwise specified, cap sheet flashings are to extend up 25 mm (1") higher than base sheet flashings.
- .4 Overlap inside and outside corner and ensure they are installed and trimmed neatly in accordance with Manufacturer's recommendations.
- .5 Carry cap sheet flashings 150 mm (6") onto roof surface.
- .6 Complete all overlaps and seal the top of the membrane and corners with a hot air welder to minimize the risk of fire as conditions dictate.
- .7 Work membrane with hand pressure and damp sponge to achieve proper bonding
- .8 At walls and pre-manufactured equipment curbs, nail through cap sheet and base sheet flashing with fasteners having 25 mm (1") diameter solid caps at 225 mm (9") o.c. Seal top of flashing with a continuous bead of modified sealant or liquid membrane as shown on the Drawings to achieve a watertight seal to obliterate the top edge of the flashing and fastener.

3.17 Copper Roof Drains

- .1 Install new roof drains and overflow roof drains at locations shown on the Drawings.
- .2 Roof drains shall be sized as specified by the Mechanical Engineer. Roof drains shall have control flows where specified by the Mechanical Engineer. Provide stainless steel drain guards where specified and/or shown on the Drawings. Coordinate installation of mechanical services with Sections 22 00 00 and 23 00 00.
- .3 Cutting of holes through roof deck is by other trades. Confirm location and install opening in deck to Section 07 50 13, Drains and Drainage Plane.
- .4 Install air seal around the drain opening and extend onto deck minimum 150 mm (6") as shown on the Drawings. Overlap vapour barrier onto the air seal a minimum 150 mm (6"). Seal vapour barrier onto the air seal with a continuous layer of modified sealant.
- .5 Install sloped insulation sumps around drain to provide positive drainage as specified and/or shown on the Drawings. Site cut insulation to adjust for drain flanges and clamping ring to ensure water flow will not be impeded. Adjust size and slope of drain sumps as required to suit site conditions.
- .6 Extend separation membrane and cap insulation over tapered insulation sump to the drain as shown on the Drawings.
- .7 Prime and set drain flange in a continuous layer of rubberized mastic. Ensure primer is dry before proceeding.
- .8 Prime drain flange with modified bitumen primer and install specified membrane roofing continuously over the drain sump and flange. Ensure primer is dry before proceeding. Neatly trim felts at drain opening and seal with rubberized mastic.

- .9 Install 1-ply 250 gm/m² modified bitumen cap sheet torched in place, size 1000 mm x 1000 mm (3'-3" x 3'-3"), centred over drain. Neatly trim felts at drain opening and seal with modified sealant.
- .10 Where cap insulation is not installed continuously from the field of the roof into the sump, reinforce transition with 1-ply 250 gm/m² modified bitumen cap sheet torched in place. Extend modified membrane 225 mm (9") beyond all sides of tapered insulation sump. Centre first sheet over drain. Neatly trim felts at drain opening and seal with rubberized mastic.
- .11 Install a continuous bead of rubberized mastic on modified cap sheet membrane, and set clamping ring. Secure clamping ring and integral strainer as dictated by drain design. Tighten bolts to ensure a permanent watertight compression seal. Torque to 13.6 N.m (10 lb ft.) with torque wrench.
- .12 Install test plug, water test roof and repair leaks after mechanical services are connected to drains as specified in Sections 22 00 00 and 23 00 00.

3.18 Custom-Fabricated Scuppers and Overflow Scuppers

- .1 Supply and install overflow scuppers through eaves and parapet walls as specified and/or as shown on the Drawings.
- .2 Install overflow scuppers on every roof area constructed with only one drain as specified and/or shown on the Drawings.
- .3 Scuppers shall be minimum 200 mm (8") wide.
- .4 Except at overflow scuppers, reduce the insulation thickness to a minimum 25 mm (1") for a distance of 1200 mm (4'-0") from scupper to provide positive drainage and ensure that water flow will not be impeded. Adjust wood blockings and flashings to suit site conditions.
- .5 Install scuppers on top of modified membrane base sheet and prior to the installation of the modified flashings and membrane cap sheet.
- .6 Cut neat hole through base sheet and cant 25 mm (1") larger than specified scupper size to prevent bitumen drippage.
- .7 Install scupper plumb, level and true to line.
- .8 Prime and set flanges in a continuous layer of rubberized mastic. Ensure primer is dry before proceeding.
- .9 Secure flange to the cant at outer edges at a minimum of four locations.
- .10 Prime and flash flange with 1-ply of 180 gm/m² modified bitumen base sheet. Extend base sheet flashing to within 25 mm (1") of the metal upturn and continue 125 mm (5") beyond flange.
- .11 Install specified base sheet flashing, membrane cap sheet, and cap sheet flashing as specified elsewhere in this section, terminating and cutting neatly at metal upturn.
- .12 Seal junction of metal upturn and membrane with rubberized mastic. Touch up surface with matching granules.
- .13 Protect exposed surfaces during roofing operation and clean surfaces free of bitumen before leaving site.
- .14 Clean gravel guards free of obstructions following the installation of the flashings.
- .15 Provide new down pipes or water-conductors as specified and/or as shown on the Drawings, to Section 07 62 13.
- .16 Connect new down pipes or water-conductors into existing drainage system or provide surface drainage as specified and/or as shown on the Drawings.
- .17 When surface drainage is specified, install concrete splash pad under downspouts and water-conductors to protect the surface from erosion. Size 600 mm x 600 mm (24" x 24") concrete paver or use oversize pavers as specified. Elevate concrete paver on 50 mm (2") thick polystyrene insulation. Cut insulation 38 mm (1.5") smaller on all sides so paver overhangs and protects insulation from direct sunlight. Underscore the insulation both top and bottom with 19 mm x 19 mm (0.75" x 0.75") drain grooves as shown on the Drawings.

- .18 Install test plug, water test and repair leaks to Sections 22 00 00 and 23 00 00.

3.19 Plumbing, Mechanical, Electrical and Miscellaneous Roof Penetrations

- .1 Install new flashings and sleeves at plumbing, mechanical, electrical and miscellaneous roof penetrations as specified and/or as shown on the Drawings.
- .2 Make all roof penetrations air and watertight at the deck level by installing flexible membrane seal over the pipe and extending 150 mm (6") onto the roof deck. Clamp flexible membrane to pipe and seal with modified sealant. Seal the vapour barrier to the air seal with a continuous layer of rubberized mastic.
- .3 Ensure rooftop penetrations are located no closer than 450 mm (18") from roof equipment or other penetrations.
- .4 If pipes are not at a proper elevation, have Mechanical Contractor adjust the pipes to specified heights by either cutting down or extending the pipes with matching materials attached with mechanical couplers. Ensure pipes are 38 mm (1.5") higher than flashing to allow for sealing to prevent condensation.
- .5 Install metal flashings and sleeves on top of the completed membrane roofing.
- .6 Prime and set flanges in a continuous layer of rubberized mastic. Ensure primer is dry before proceeding.
- .7 Protect all metal sleeves and flashings not to be covered with roofing with flashing protector to prevent bitumen stains and damage.
- .8 Prime flanges to be covered with felt flashings with modified bitumen primer and flash with 2-ply of felt and bitumen to match that used in the construction of the roof membrane. Ensure primer is dry before proceeding. Install first ply 75 mm (3") and second ply 50 mm (2") from upturn. Extend first ply 150 mm (6") and second ply 225 mm (9") beyond the flange.
- .9 Cover felt flashings with 1-ply 250 gm /m² modified bitumen cap sheet torched in place. Continue cap sheet to the metal upturn and beyond flange 300 mm (12").
- .10 Seal the joint between the metal upturn and the cap sheet with rubberized mastic and tool to form a minimum 19 mm (0.75") wide bead.
- .11 Insulate all stacks and sleeves unless otherwise shown on the Drawings. Insulate with loosely packed mineral wool insulation or two-part polyurethane foam if otherwise shown on the Drawings. Seal the opening between the top of the flashing and the pipe with polyurethane sealant sloped minimum 30° to shed water.
- .12 On vent pipes with tapered rubber gasket collar, verify size and install collar as shown on the Drawings.
- .13 On vent pipes install vandal proof cap to the Manufacturer's recommendation if specified and/or shown on the Drawings.
- .14 Install rain collars on all stacks as shown on the Drawings. Weld rain collars 22-gauge or heavier. Where collars are less than 22-gauge, install custom or pre-manufactured collars soldered or caulked in place as shown on the Drawings.
- .15 Remove and replace all damaged flashings and poorly fitting collars. Clean exposed surfaces free of bitumen before leaving site. Paint all sleeves marred with bitumen with two coats of compatible paint to match original colour.

3.20 Re-pour Low Points in Finished Roof Surface

- .1 Clean and prime surfaces and install an additional layer of bitumen and glass felts to build up low points prior to the installation of bitumen and aggregate surfacing.

3.21 Bitumen and Aggregate Surfacing

- .1 Do not install bitumen and aggregate surface until membrane and membrane flashings are complete, and incorrect roof levels have been rectified.

- .2 Prior to installation of bituminous and aggregate surface, carefully inspect and repair all defects and deficiencies in the membrane and membrane flashing that was not corrected during the initial installation.
- .3 Pour SEBS Kettle Modified Asphalt or asphalt flood coat over the entire surface without skips at a rate of not less than 3 kg/m^2 (60 lbs/100 ft²). Inspect continuity of bitumen and aggregate surface with a stiff broom. Pay particular attention to areas of overlaps, openings in the roof, and toes of cant strips.
- .4 Apply full covering of aggregate at the rate of not less than 24 kg/m^2 (500 lbs/100 ft²).
- .5 At all areas of bare spots and where the bitumen and aggregate pour is discontinuous, remove all loose aggregate and embed an additional layer of specified bitumen and aggregate to make continuous.
- .6 Remove all loose aggregate and embed a second 600 mm (24") wide full layer of specified bitumen and aggregate for a distance of 3000 mm (10'-0") at all inside and outside corners of the building and 600 mm (2'-0") back from all roof penetrations.
- .7 Provide a double pour of specified asphalt and aggregate at locations where ponding depth is beyond 6 mm (0.25") but no more than 19 mm (0.75").
- .8 Repeat application of specified bitumen and aggregate for a total aggregate mass of not less than 0.36 kg/m^2 (8.5 lbs/100ft²).
- .9 Apply second pour only after the Consultant has inspected the first pour.
- .10 Check areas with broom to ensure proper embedment of aggregate. Clean and re-pour all areas as required to obtain a minimum 40% of adhesion of aggregate into bitumen.
- .11 On each roof section provide 10% extra aggregate for use in future repairs. Spread aggregate over area so as not to overload the structure.
- .12 On gravel surfaced roofs, rake out excess piles of aggregate to a neat and even surface.

3.22 Concrete Pavers

- .1 When specified and/or shown on the Drawings, install concrete pavers at all roof access points, walkways, patios and to and around rooftop units and as otherwise specified and/or shown on the Drawings.
- .2 Install pavers on 50 mm (2") thick extruded polystyrene insulation underscored in both directions, both top and bottom, at 150 mm (6") o.c. for drainage and venting. Cut insulation 50 mm (2") smaller than paver on all sides to protect insulation from direct sunlight.
- .3 When concrete pavers are to be used as a walkway, patio or roof finish, install pavers on 150 mm x 150 mm (6" x 6") polystyrene pads or paver pedestals installed at the corners and edges of pavers. Trim insulation pads to fit at inside corners of walkways.
- .4 Adjust height of pads to provide finished height. Maximum Variation of Surface Flatness: 3 mm in 3000 mm (0.125" per 10'-0").
- .5 Install pavers true to line with neat, even joints. Provide plastic levelling shims where required to prevent rocking of pavers and ensure surface plane of pavers is maintained.
- .6 Cut and shape pavers to fit neatly at all points of termination and roof openings.

3.23 Gas Pipe Supports (by Mechanical Contractor)

- .1 Elevate gas line on supports to minimum 300 mm (12") above final roof (Finish) and to clear all expansion and control joints by 25 mm (1") unless otherwise specified or shown.
- .2 Gas line supports to be pre-manufactured metal and pressure treated wood as specified and shown on the Drawings.

- .3 Secure wood blocking to concrete paver with two 9 mm (0.375") galvanized iron bolts installed through paver. Insert bolts from bottom and bolt to paver with washer and nut tightened for positive securement. Tighten roller assembly into bracket at desired height and secure in place with lock nuts. Ensure roller assembly is allowed 3 mm (0.125") minimum spacing and will accommodate movements of pipes due to expansion and contraction.
- .4 Install supports at spacing specified in Sections 22 00 00 and 23 00 00. Adjust spacing to safeguard the roof from damage due to excessive spot loading. Maximum loading on any paver to be 244 kg/m² (50 lbs/ft²).
- .5 Adjust heights to ensure even distribution of gas pipe weights between supports. Increase spacing of supports to prevent deflection of pipes in snow piling areas.
- .6 Locate pipe supports over joists, beams or other structural members wherever possible.

3.24 Clean Up

- .1 At all times, keep the premises free from accumulation of waste materials or rubbish. Stock piling of debris on the roof will not be permitted.
- .2 Repair defects in surface and bitumen runs with granules to match existing to leave the roof in an even consistent finish.
- .3 Leave roof clear of debris and bitumen left by spills and machine tracking.
- .4 Leave grounds and building free of debris and bitumen spread by pedestrian traffic where applicable.
- .5 Clean surfaces and penetrations of all contaminants and touch up to the satisfaction of the Owner. Include rooftop equipment, curbs, soil stacks, sleeves, gas lines, vents, drains and ladders.
- .6 Check drains to ensure they are functional and where required removal of all debris by vacuum.
- .7 At the completion of the work remove all rubbish, tools, equipment and surplus materials.
- .8 Be responsible to repair and pay all costs and fees required to rectify damage caused by work of the Contract with materials and finish to match original.

3.25 Contractor Quality Control

- .1 Contractor's quality control shall be completed in accordance with Section 07 51 00.

3.26 Inspection and Testing

- .1 Field review of the work will be completed by Fishburn Building Sciences Group Inc. (Consultant).
- .2 Examination of materials' certificates and test reports shall not be construed as relieving the Contractor of his responsibility for proper completion and guarantee of the work in accordance with the Drawings and Specification.
- .3 Notify the Architect/Owner/Consultant and material Manufacturer at least 48 hours before roofing operations commence, and arrange for a site meeting for discussion of procedure. Subsequently, give two working days prior notice for the commencement of each phase of work. Notify of delays and re-starts.
- .4 Cooperate with Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to, during their use and during the warranty period. Act immediately on instructions given. Make cut-out for testing purposes when and where required and **make good** roofing of test areas and of any and all defects of materials and workmanship without additional cost.

- .5 Do not conceal or cover any phase of the work until after it has been inspected and approved.
- .6 Inspection of the Contract Documents as to extent of work, quality of workmanship and materials, methods, etc. is the responsibility of the Architect.

3.27 Non-Compliance with Inspection and Testing

- .1 If the initial inspection and tests required to establish compliance with the Contract Documents indicates non-compliance with the Contract Documents, subsequent tests or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.
- .2 The Contractor shall replace or correct defective work not done in accordance with the Contract. If, in the opinion of the Architect, it is not expedient to correct defective work or work done in accordance with the Contract, the Owner may deduct from the Contract price the difference in value between the work as done and called for by the Contract, the amount of which will be determined by the Architect.
- .3 Replace all work that results from inferior products or workmanship.

END OF SECTION 07 51 00

PART 1 – GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for metal flashing and trim related to built-up roofing. Additional requirements may be specified in individual sections of the Specifications.
- .2 All conditions of the Contract and Divisions 1 apply to this section.
- .3 Coordinate work of this section with related work specified in other sections to ensure construction schedule and protection of finished work is maintained at all times.

1.2 Description of Work

- .1 Complete all work as specified in the Summary of Work, Specifications and Drawings.
- .2 Work of this section includes the supply and installation of all Sheet Metal Work, including eavestroughs and downspouts as required in the Summary of Work and/or as shown on the Drawings. If pre-manufactured units are not specified, custom-fabricate sleeves, scuppers, and overflow scuppers as specified in the Summary of Work and/or shown on the Drawings.
- .3 Work also includes sealing joints in flashings as flashing is being installed, and cutting and sealing new reglet joints and open sheet metal joints at locations shown on the Drawings.
- .4 Work “as described” is held to include all incidental items that by implication, good trade practices, or customary usage are required to complete the work, even though they may not be specifically mentioned or shown.
- .5 Additional requirements may be specified in individual sections of the Specifications and/or shown on the Drawings.

1.3 Related Work

- .1 Roofing Specifications are comprised of the following:
 1. Section 07 50 13 – Common Work Results for Roofing
 2. Section 07 50 16 – Wood Blocking for Roofing
 3. Section 07 50 19 – Sealants for Roofing
 4. Section 07 51 00 – Built-Up Bituminous Roofing
 5. Sections 22 00 00 - & 23 00 00 – Mechanical
 6. Section 26 00 00 – Electrical

1.4 References

The latest edition of all Standards shall apply if the referenced standards have been superseded.

- .1 ASTM A153/A153M-05 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .2 ASTM A653/A653M-04a: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 ASME B18.6.1 – 1981 Wood Screws (Inch Series)
(supercedes CSA B35.4 - 1972)
- .4 ASME B18.6.4 – 1999 Thread Forming and Thread Cutting Tapping
(supercedes CSA B35.3 - 1969) Screws and Metallic Drive Screws, Inch Series
- .5 CGSB 37-GP-9Ma-83 Primer, Asphalt, Unfilled, for Asphalt Roofing,
Dampproofing and Waterproofing.
- .6 CGSB 37-GP-15M-84 Application of Asphalt Primer for Asphalt Roofing,
Dampproofing and Waterproofing.
- .7 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
- .8 CAN/CSA-G164-M92 (R2003) Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 CAN3-G312.1-75 (R2003) Preferred Metric Dimensions for Flat Metal Products.
- .10 CRCA (Canadian Roofing Contractor’s Association) Manual.

- .11 SMACNA Architectural Sheet Metal Manual – 2003 Edition.

1.5 Qualifications

- .1 Employ only experienced and qualified workers that can provide quality results. Replace all work that results from inferior products or installation.

1.6 Examination

- .1 Examine surfaces and report any adverse conditions that could negatively impact the appearance and performance of the work.

1.7 Coordination

- .1 Coordinate work with related work specified in other sections to ensure that the construction schedule, water-tightness, and protection of the building and work are maintained at all times.

1.8 Submittals

- .1 Submit to the Consultant a list of materials intended for use, before they are ordered.
- .2 Submittals shall be in accordance with Section 07 51 00.
- .3 Additional requirements may be specified in other sections of the Specifications.

1.9 Shop Drawings, Product Data, Samples and Mock-ups

- .1 Submit Samples of materials and/or built-in mock-ups for review before proceeding with the work, including but not limited to the following:
 - .1 Eavestroughs, Downspouts and Water-Conductors;
 - .2 Metal Flashings; and,
 - .3 Custom-Fabricated Scuppers and Overflow Scuppers.
- .2 Submittals shall be in accordance with Section 07 51 00.
- .3 Additional requirements may be specified in other sections of the Specifications.

1.10 Delivery, Storage & Handling

- .1 Provide and maintain safe storage.
- .2 Protect materials from damage or removal by wind at all times.

1.11 Environmental Requirements

- .1 Ensure at all times protection of the building and any unfinished work that can be damaged by inclement weather.
- .2 If inclement weather is forecast or appears imminent, postpone work that would risk the work or building being damaged by moisture.
- .3 If it becomes apparent that work would threaten the buildings water tightness, the Owner has the right to stop the work. Any additional expenses due to work stoppage or postponement of the work will be at the Contractor's expense.
- .4 Ensure at all times protection of materials and equipment that are sensitive to damage by moisture.

1.12 Inspection and Testing

- .1 Field review of the work will be completed by Fishburn Building Sciences Group Inc. (Consultant).
- .2 Examination of materials' certificates and test reports shall not be construed as relieving the Contractor of his responsibility for proper completion and guarantee of the work in accordance with the Drawings and Specifications.

- .3 Notify the Architect/Owner/Consultant and material Manufacturer at least 48 hours before operations commence, and arrange for a site meeting for discussion of procedure. Subsequently, give two working days prior notice for the commencement of each phase of work. Notify of delays and re-starts.
- .4 Cooperate with Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to, during their use and during the warranty period. Act immediately on instructions given. Make cut-out for testing purposes when and where required and **make good** roofing of test areas and of any and all defects of materials and workmanship without additional cost.
- .5 Do not conceal or cover any phase of the work until after it has been inspected and approved.
- .6 Inspection of the Contract Documents as to extent of work, quality of workmanship and materials, methods, etc. is the responsibility of the Architect.

1.13 Non-Compliance with Inspection and Testing

- .1 If the initial inspection and tests required to establish compliance with the Contract Documents indicates non-compliance with the Contract Documents, subsequent tests or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.
- .2 The Contractor shall replace or correct defective work not done in accordance with the Contract. If, in the opinion of the Architect, it is not expedient to correct defective work or work done in accordance with the Contract, the Owner may deduct from the Contract price the difference in value between the work as done and called for by the Contract, the amount of which will be determined by the Architect.
- .3 Replace all work that results from inferior products or workmanship.

1.14 Contractor Quality Control

- .1 Contractor Quality Control shall be completed in accordance with Section 07 51 00.

1.15 Warranty

- .1 The work of this section shall be included in the warranty as specified in Section 07 51 00.

1.16 Final Cleaning and Painting

- .1 Clean the roof free of debris at project completion.
- .2 Clean surfaces including glass and all polished surfaces of all contaminants caused by the work, including but not limited to caulking, grease, dust, dirt, stains, labels, fingerprints and other foreign materials.
- .3 Clean exposed surfaces such as walls, rooftop equipment, gas lines and flashings free of dirt, adhesive or caulk before leaving the site. **Make good** finishes to the satisfaction of the Consultant and Owner.
- .4 Use cleaning materials and methods that do not damage surfaces, and/or are recommended by the Manufacturer.
- .5 Schedule cleaning operations so that resulting dust, debris and other contaminants do not fall on or damage completed work.
- .6 Leave roof, building and landscape free of debris.
- .7 Removal all surplus materials and equipment from the site.
- .8 **Make good** and pay all costs and fees required to rectify damage caused by the work.

1.17 Painting

- .1 Touch-up and **make good** all painted surfaces damaged by work of this Contract with material and colour to match the existing.

- .2 Comply with the Manufacturers' instructions for cleaning, and for mixing and painting.

PART 2 - PRODUCTS

2.1 Sheet Metal Materials

- .1 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly.
- .2 All galvanized steel to conform to ASTM A653M-04a Grade 230 with G90 zinc coating.
- .3 Metal Flashings: As specified and/or shown on the Drawings, fabricate from 454 gm (16 oz.) copper, or 24 gauge galvanized steel with Stelco Series 8000 baked enamel finish. Size as shown on the Drawings. Colour to be approved by the Architect.
- .4 Custom-Fabricated Flashing Boxes: As specified and/or shown on the Drawings, fabricate from 454 gm (16 oz.) copper, 26 gauge galvanized steel, or 24 gauge galvanized steel with Stelco Series 8000 baked enamel finish. Colour to match flashings.
- .5 Through-Wall Overflow Scuppers (Custom-Fabricated): As specified and/or shown on the Drawings, fabricate from 454 gm (16 oz.) copper or 26 gauge stainless steel. All seams to be continuously soldered.
- .6 Cleats and Hook Strips: As shown on the Drawings, 567 gm (20 oz.) copper, or 22 gauge galvanized or prefinished steel to match metal flashing material.
- .7 Copper: 454 gm (16 oz.) as specified and/or shown on the Drawings.
- .8 Stainless Steel: 26-gauge, Type 304.
- .9 Solder: Block solder 50% tin, 50% lead to ASTM B32-83.
- .10 Wedges: Rolled plumber sheet lead.
- .11 Touch-Up Paint: Colour to match materials as recommended by pre-finished material Manufacturer.
- .12 Isolation Coating: Alkali resistant bitumen paint.

2.2 Fasteners

- .1 All nails and spikes to meet CSA B111-1974 (R2003).
- .2 All tapping and driving screws to meet ASTM B18.6.4 – 1999.
- .3 All wood screws to meet ASTM B18.6.1 – 1981.
- .4 All galvanizing to meet ASTM A153/A153M-05 and CAN/CSA-G164-M92.
- .5 All fasteners, size and spacing to meet the most stringent requirements of this section, the Drawings, the Ontario Building Code or Factory Mutual requirements.
- .6 Obtain approval when using hammer drills since drilling hours may be restricted.
- .7 Hook Strip Fasteners: Annular threaded nails long enough to penetrate wood or substrate minimum 32 mm (1.25"). Nail head to be minimum 5 mm (0.18"). Alternatively use 4 mm (0.19") (No. 8) screws to penetrate wood minimum 19 mm (0.75") or steel by 10 mm (0.375"). All fasteners to be corrosion resistant.
- .8 Nails and Screws: Use galvanized, copper, aluminum or stainless steel nails or screws dependent upon which is most compatible with materials and preservatives being utilized. Nails of sufficient length to penetrate the base minimum 32 mm (1.25"). No. 8 screws of sufficient length to penetrate wood minimum 19 mm (0.75") at 600 mm (2'-0") o.c.
- .9 Exposed Fasteners: Where specified or shown, use No. 10 cadmium plated, pre-finished hex head screws with neoprene and steel washers by Atlas Bolt or approved equal. Colour of screw head to match colour of flashing. Provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process. Alternatively, use screws with colour match nylon caps where shown or approved by the Consultant.
- .10 Concrete and Masonry Fasteners: "Zamac Nailin" with stainless steel drive nail, or "Roofing Spike" with "Perma-Seal" coating, or "Tapper" with "Perma-Seal" coating, all by Powers Fasteners. Minimum 6.4 mm (0.25") anchor diameter. All of sufficient length to ensure a minimum embedment of 38 mm (1.5"), as per Manufacturers recommendations,

unless otherwise specified or shown. Generally, provide fastener length 2.5 times the thickness of materials being secured .

2.3 Accessories

- .1 Modified Bitumen Primer: For built-up roofing, use “910-01” by Bakor. For modified roofing, as recommended by the membrane Manufacturer. To CGSB 37-GP-9Ma-83.
- .2 Underlay: No. 15 perforated asphalt felt to CSA A123-3.
- .3 Self-Adhering Membrane: Bakor Blueskin PE 200HT or Soprema Elastobond Shield HT.
- .4 One Component Rubberized Mastic: Polybitume by Henry or approved equal to CAN/CGSB 37.5M.
- .5 Two Component Modified Sealant: Bituthane Liquid Membrane by Grace Construction Products, Cold Gold flashing cement by IKO Industries or approved equal.
- .6 Box Filler: One part pourable sealer by Chemlink Inc. and M1 Structural Sealant Primer.
- .7 Sealants: Unless otherwise shown, to Section 07901. Use colour to match adjacent materials as close as possible and selected from Manufacturer's standard colour chart where exposed to view.
- .8 Bituminous Metal Paint: “Gilsonite Asphalt 410-02” by Monsey Bakor Inc. to CGSB1-GP-108 Type II.

PART 3 – EXECUTION

3.1 Fabrication

- .1 Fabricate all work in accordance with applicable Drawings and Details and as indicated.
- .2 Fabricate all work in maximum 2400 mm (8'-0”) lengths, unless otherwise shown on the Drawings, by brake forming, bench cutting, drilling and shaping. Match existing profiles where metal flashing is to be repaired.
- .3 Where the girth of counterflashings exceeds 600 mm (24”), reduce lengths of sheets to maximum 1200 mm (4'-0”) long.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces that are to be embedded in concrete or mortar.
- .6 Double-back exposed metal edges at least 13 mm (0.5”). Raw edges are not permitted. Mitre and seal corners with sealant.
- .7 Supply all accessories required for installation of sheet metal work of this section. Fabricate accessories of same material of that to which they will be used.

3.2 Installation

- .1 Install sheet metal flashings at copings, walls, expansion joints, roof openings and other components required to protect the membrane flashings as shown on the Drawings or otherwise required.
- .2 Install continuous concealed hook strips at all exterior faces. Install continuous interior hook strips if they are shown on the Drawings. Hook strips are to be installed on vertical surfaces only unless otherwise shown on Drawings.
- .3 Install cleats between lock joints as required to permanently hold flashing in place. Install hook & cleat strip fasteners in “V” pattern with maximum spacing of 225 mm (9”).
- .4 Sheet metal work must be installed to cover the entire area it protects, and must be watertight under all service and weather conditions. Install in a uniform manner, true to line, free of dents, warping and distortion.

- .5 Back-paint sheet metal that comes into contact with another kind of metal, masonry or concrete with modified bitumen primer at the rate of 0.15 L/m² (1/3 gal/100 ft²) to CGSB 37-GP-15M-84.
- .6 Install sheet metal with concealed fasteners at lock joints. Exposed fastening will only be permitted with the approval of the Consultant. When exposed fasteners are shown, use specified fasteners and space evenly in an approved manner.
- .7 Use concrete drive fasteners where metal flashings are installed over concrete or masonry.
- .8 Install underlay under sheet metal installed directly over wood or masonry surfaces.
- .9 Self-Adhering Membrane:
 - .1 Install 1-ply of self-adhering membrane to the Details under sheet metal on horizontal or vertical surfaces that are not otherwise covered by membrane flashings.
 - .2 Ensure all surfaces to be covered with self-adhering membrane are complete, free of moisture and contaminants, and are above 5°C (40°F). Below 5°C (40°F), heat materials to be covered. Store all materials in heated storage if outside temperature is below 5°C (40°F) and remove only as much material as can be used before it cools.
 - .3 Prime all surfaces to be covered with self-adhering membrane. Carry out thumb test to ensure that primer is tack dry.
 - .4 Remove paper backing and install membrane true to line to completely cover the area intended to be protected to points shown on the Drawings.
 - .5 Roll or work material into place by hand to ensure a positive bond.
 - .6 Membrane to be installed without air blisters and wrinkles. Rework, repair or replace all poorly installed membrane. Do not stretch material that would result in pull back and deformity of the membrane at intersections.
 - .7 Lap all side laps 75 mm (3") and end laps 150 mm (6"). Secure all membrane on vertical surface at points of termination at 150 mm (6") o.c. with approved fasteners.
 - .8 Turn up membrane 150 mm (6") at edge where horizontal meet vertical planes.
 - .9 Seal all points of termination at horizontal planes and vertical surfaces with modified sealant or liquid membrane as shown on the Drawings. Tool sealant to a consistent smooth and even surface.
 - .10 It is recommended that all self-adhering membrane be installed by a team of two workers. Avoid working in windy conditions or weather that produces an inferior result.
- .10 Join sheet metal by "S" lock seams, to permit thermal movement. Seal all fasteners and completely fill all joints with low modulus caulking as flashing is being installed. Clean off all excessive visible material subsequent to installation.
- .11 Space metal joints evenly where exposed. When flashing is being installed in more than one piece, offset joints in adjacent flashings by approximately 50%.
- .12 Form inside and outside corners of flashings by means of raised seams. Lock seams and caulk all overlaps to ensure water tightness. Do not use pop rivets.
- .13 Slope all flashings to interior of roof area to maintain minimum 2:12 slope. Do not form open joints or pockets that fail to drain water.
- .14 Caulk all open sheet metal joints with polyurethane caulking.
- .15 Provide new wall reglets minimum 10 mm (0.375") wide and 25 mm (1") deep.
- .16 Clean reglets and adjacent surfaces free of contaminants and dust.
- .17 Wedge flashings into reglet joints with lead wedges at 225 mm (9") o.c. Keep back from face of reglet joint 6 mm (0.25"). Fill joints with polyethylene rod and caulk.
- .18 Complete all caulking work in accordance with Section 07901.

END OF SECTION 07630

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Metal flashing and counterflashing.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-in-Place Concrete: flashing inserts.
 - .2 Section 04 05 23 - Masonry Accessories: through wall flashings.
 - .3 Section 07 62 13 - Sheet Metal for Built-Up Roofing.
 - .4 Section 07 92 00 - Joint Sealants.
- 1.3 REFERENCES
 - .1 ASTM A653/A653M-09: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B32-00: Standard Specification for Solder Metal.
 - .3 CAN/CGSB-1.108-M89: Bituminous Solvent Type Paint.
 - .4 Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA): Architectural Sheet Metal Manual.
- 1.4 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Verification Sample: 300 mm long sample, indicating design method of locking and method of anchoring and corner section fabricated from materials specified.
- 1.5 QUALITY ASSURANCE
 - .1 Applicator: company or individual engaged in applying roofing membrane to standard practices and details of SMACNA.
- 1.6 WARRANTY
 - .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
 - .2 Extended Warranty: for a period of five years, protecting against leakage, joint spalling and similar defects.
- 2 Products
- 2.1 MATERIALS
 - .1 Prefinished Steel Sheet: 0.76 mm thick prefinished steel; flat sheet stock; to ASTM A653/A653M, Grade 230; colour as selected by Consultant.
 - .2 Bare Sheet Metal: 0.61 mm thick steel; flat sheet stock, to ASTM A653/A653M, Grade 230.
 - .3 Nails: manufacturers standard corrosion resistant type, material to suit metal flashing.
 - .4 Cleats, Starter Strips and Back-Up Plates: same metal and thickness as metal flashing; cleats minimum 38 mm wide and interlocked with metal flashing; starter strips, continuous. Back-up plates minimum 300 mm wide where adjacent lengths of cap flashing meet, fabricated of same material thickness and finish as cap flashing.

- .5 Screws, Bolts and Expansion Shields: non-ferrous metal compatible with adjacent surfaces. Exposed fastenings; same materials as metal surfaces through which they penetrate. Use cadmium plated screws with round heads suitable for soldering for galvanized work.
- .6 Solder: to ASTM B32, 50 percent block tin, 50 percent pig lead.
- .7 Flux: commercial hydrochloric acid cut with zinc, or 10-20 percent solution of orthophosphoric acid in water, for use with galvanized work.
- .8 Sealant: as specified in Section 07 92 00.
- .9 Flashing Paint: to CAN/CGSB-1.108-M; quick drying asphaltic base paint; eg. Primer 910-02 by Bakor.

2.2 FABRICATION

- .1 Shop fabricate flashing components as much as possible to requirements of applicable requirements of SMACNA Architectural Manual.
- .2 Form sheet metal on bending brake. Perform shaping, trimming and hand seaming on bench, where practicable, using proper sheet metal working tools.
- .3 Fabricate material in clean shops, located away from areas where carbon steel is torch cut, ground, or cut with abrasive wheels to ensure that carbon steel dust will not be embedded in prefinished surfaces. Clean tools and dies which have been used on carbon steel prior to fabrication to prevent contamination of surface with carbon steel dust.
- .4 Form sections square, true and accurate to size. Flashings shall be free from distortion, waves, twists, buckles or other defects detrimental to appearance and performance.
- .5 Allow for thermal movement when forming, installing, interlocking and soldering sheet metal Work to avoid buckling, fullness of metal straining of joints or seams. Maximum length of flashing pieces; 2400 mm. Double back exposed edges at least 12 mm for appearance and stiffness.
- .6 Fabricate flashings, copings, closures, plastic boxes, pipe sleeves and flashings for roof mounted equipment to details shown, unless otherwise indicated.
- .7 Wipe and wash clean soldered joints immediately after joint is soldered to remove acid.
- .8 Where soldered joints are absolutely necessary and where approved for use in prefinished metal, clean paint off both surfaces before soldering for minimum area necessary.

2.3 FINISHES

- .1 Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- .2 Prime paint items with two coats.
- .3 Galvanizing: to ASTM A653/A653M or CAN/CSA-G164-M, hot dipped method, minimum 275 g/m² zinc coating.
- .4 Prefinished Steel: silicone modified polyester coating, applied to a minimum 0.025 mm dry film thickness; eg. WeatherX by Valspar, multiple colours as selected by Consultant from manufacturer's extended range of colours.

3 Execution

3.1 INSTALLATION

- .1 Install sheet metal flashings with joints lapped, locked, cleated with "S" cleats and sealed or soldered as required.

- .2 Hem exposed edges 12 mm.
 - .3 Type of joints used shall be adequate for various conditions, subject to approval.
 - .4 Fabricate exposed fastening in such a manner to prevent water penetration at point of fastening.
 - .5 Provide starter strips where indicated or required to present true, non-waving, leading edge. Anchor to back-up to provide rigid, secure installation.
 - .6 Make end joints where adjacent lengths of metal flashing meet using 300 mm long back-up flashing secured in place before installing flashing.
 - .7 Apply beads of sealant on face of back-up plate to seal ends of metal flashing.
 - .8 Leave 12 mm wide space between end of adjacent lengths of metal flashings.
 - .9 Fabricate back-up of same material and finish as metal flashing with which it is being used. Make back-up plate exact profile of flashing allowing for thickness of flashing joints.
 - .10 Form metal fascia with inner edge extended over fascia top and down cant to meet roofing aggregate. Nail with roofing nails and neoprene washers at 300 mm OC. Avoid placing nails in face of fascia, through membrane or flashing.
 - .11 Interlock counter flashing pieces with prefinished metal base flashing and fold locking seam into position ensuring complete sealing. Continue counter flashing down to hemmed and sprung position at base of cant and junction of aggregate.
 - .12 Provide underlay of resin sized paper under sheet metal installed over masonry, concrete or wood. Lay underlay dry as sheet metal work is installed. Secure in place and lap joints 100 mm.
 - .13 Imperfections in sheet metal work such as holes, dents, creases or oil-canning is cause for rejection.
 - .14 Repair damaged sheet metal work, wash entire installation down, and leave in neat condition.
 - .15 Provide flashings required for proper execution and completion of the Work in an acceptable manner, including metal flashing around mechanical and other equipment occurring on the roof.
 - .16 Seal joints in sheet metal flashing, as specified in Section 07 92 00.
- 3.2 ADJUSTING
- .1 Touch up marks and abrasions as installation proceeds.
 - .2 Discard dented panels.
 - .3 Defective materials or workmanship whenever found at any time prior to final acceptance of the work will be rejected regardless of previous acceptance.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Spray-applied fire resistive materials.
- .2 Refractory board fire protection.

1.2 RELATED SECTIONS

- .1 Section 05 12 00 - Structural Steel Framing.
- .2 Section 05 21 00 - Steel Joist Framing.
- .3 Section 05 30 00 - Metal Decking.
- .4 Section 07 21 00 - Thermal Insulation.
- .5 Section 07 84 00 - Firestopping.
- .6 Section 09 21 16 - Gypsum Board Assemblies.

1.3 REFERENCES

- .1 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
- .2 ASTM E119-07a: Standard Test Methods for Fire Tests of Building Construction and Materials.
- .3 ASTM E605-93 (2006): Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.
- .4 ASTM E736-00 (2006): Standard Test Method for Cohesion / Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- .5 ASTM E759-92 (2005): Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members.
- .6 ASTM E760-92 (2005): Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members.
- .7 ASTM E761-92 (2005): Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.
- .8 ASTM E859-93 (2006): Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members.
- .9 AWCI Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials.
- .10 CAN/ULC-S101-04: Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .11 CAN4-S114-M80 (R1997): Standard Method of Test for Determination of Non-Combustibility in Building Materials.
- .12 Underwriters Laboratories of Canada (ULC) List of Equipment and Materials.

1.4 DESIGN REQUIREMENTS

.1 Spray-Applied Fire Resistive Coating

- .1 Deflection: When tested in accordance with ASTM E759, the material shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical centerload resulting in a downward deflection of 1/120th of the span.
- .2 Bond Impact: When tested in accordance with ASTM E760, the material shall not crack or delaminate from the concrete topped galvanized deck to which it is applied.
- .3 Cohesion/Adhesion (bond strength): When tested in accordance with ASTM E736, the material applied over uncoated or galvanized steel shall have an average bond strength of 4.8 kPa.
- .4 Air Erosion: When tested in accordance with ASTM E859, the material shall not be subject to losses from the finished application greater than 0.27 grams per square metre.
- .5 Compressive Strength: When tested in accordance with ASTM E761, the material shall not deform more than 10 percent when subjected to a crushing force of 35.9 kPa.
- .6 Corrosion Resistance: When tested in accordance with ASTM E937, the material shall not promote corrosion of steel.
- .7 Non-combustibility: When tested in accordance with ASTM E136 or CAN4-S114-M, the material shall be noncombustible.
- .8 Surface Burning Characteristics: When tested in accordance with ASTM E84 or CAN/ULC-S102, the material shall exhibit the following surface burning characteristics:
 - .1 Flame Spread = 0
 - .2 Smoke Developed = 0
- .9 Density: When tested in accordance with ASTM E605, the material shall meet the minimum individual and average density values as listed in the appropriate UL/ULC design or as required by the authority having jurisdiction, or shall have a minimum average of 208 kg/m³.
- .10 The material shall have been tested and reported by Underwriters Laboratories of Canada (ULC) in accordance with the procedures of CAN/ULC-S101.
- .11 Spray-applied fire resistive materials shall be applied at the required thickness and density to achieve the ratings as noted on Drawings.

1.5 QUALITY ASSURANCE

- .1 Installer: a firm with expertise in the installation of fire protection or similar materials; licensed or otherwise approved by the spray-applied fire resistive material manufacturer.

1.6 SUBMITTALS

- .1 Submit Product data as specified in Section 01 33 00.
- .2 Product Data: Include certifications, to show compliance with Contract Documents.
- .3 Test Data: Submit independent laboratory test results for all specified performance criteria.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver Products to the Place of the Work in manufacturer's unopened packages, fully identified as to trade name, type and other identifying data. Packaging shall bear the UL labels for fire hazard and fire-resistance classifications.
- .3 Store Products above ground, in a dry location, protected from the weather. Remove damaged packages found unsuitable for use from the Place of the Work.

1.8 PROJECT CONDITIONS

- .1 When the prevailing outdoor temperature at the building is less than 4 degrees Celsius, maintain a minimum substrate and ambient temperature of 4 degrees Celsius prior to, during and a minimum of 24 hours after application of the spray-applied fire resistive material.
- .2 If necessary for job progress, provide heated protective enclosures to maintain temperatures. Refer to Section 01 50 00.
- .3 Provide adequate ventilation of not less than 4 air changes per hour to allow proper drying of the spray-applied fire resistive material during and subsequent to its application.

1.9 SEQUENCING / SCHEDULING

- .1 Perform fire protection work on a given floor prior to proceeding with fire protection work on the next floor.
- .2 Coordinate and schedule the fire protection work to avoid delays in the progress of the Work.
- .3 Do not install board fire protection on structural members until piping and other construction behind the fire protection has been completed, uninterrupted coverage can be provided and the need for subsequent cutting and patching can be eliminated.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of fire-resistive materials having Product considered acceptable for use:
 - .1 Cafco Industries Inc.
 - .2 AD Fire Protection Systems.
 - .3 Grace Canada Inc.
- .2 Substitutions: refer to Section 01 25 00.

2.2 MATERIALS

- .1 Spray-Applied Fire Resistive Material: free of all forms of asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite; eg. Cafco Blazeshield DC/F by Cafco Industries Inc.
- .2 Refractory Mineral Wool Board Fire Protection: Rigid boards of 144 kg/m³ (9 pcf) nominal density; produced from asbestos free materials by combining refractory mineral wool manufactured from slag with thermosetting resin binders to comply with ASTM C612 for Class 4 and as follows:
 - .1 Thermal Resistance: RSI 0.76 @ 24 degrees C (R-4.35 @ 75 degrees F).
 - .2 Surface Burning Characteristics: Flame Spread and Smoke Developed ratings of 15 and 5, respectively.
 - .3 Manufacturer and Product Name: eg. Cafco-board Mineral Wool Board Fire Protection by Cafco Industries Inc.
- .3 Fastening Accessories: For each fire resistive assembly in which mineral wool board fire protection serves as rigid fire protection, provide a board fastening system complying with the related UL design or other acceptable testing and inspecting organization's report.
- .4 Water: Potable.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Ensure surfaces to receive fire protection are free of oil, grease, loose mill scale, dirt, paints/primers (other than those listed and tested) or other foreign materials which would impair satisfactory bonding to the surface.
- .3 Ensure clips, hangers, supports, sleeves and other attachments to the substrate are to be placed by others prior to the application of spray-applied fire resistive materials.
- .4 Ensure that the installation of ducts, piping, conduit or other suspended equipment shall not take place until the application of sprayed fire protection is complete in an area.

3.2 APPLICATION

- .1 Apply fire resistive materials in accordance with the manufacturer's written application instructions.
- .2 Do not apply fire protection to steel floor decks prior to the completion of concrete work on that deck.
- .3 Do not apply sprayed fire protection to the underside of roof deck until the roof is completely installed and tight, all penthouses are complete, all mechanical units have been placed, and all roof traffic has ceased.
- .4 Provide masking, drop cloths or other suitable coverings to prevent overspray from coming in contact with surfaces not intended to be sprayed.
- .5 Apply bonding materials as per the identified ULC fire resistance design and the manufacturer's written recommendations.
- .6 Topcoat materials shall be the type recommended and approved by the manufacturer of each spray-applied fire resistive material required for the applications indicated.
- .7 Install mineral wool board fire protection to comply with requirements for thicknesses, number of layers, construction of joints and corners, and fastening methods referenced in the appropriate fire resistance design indicated.
- .8 Coordinate installation of board fire protection with other construction to minimize cutting into, or removal of, already installed board material.

3.3 FIELD QUALITY CONTROL

- .1 Test the spray-applied fire resistive material for thickness and density in accordance with one of the following procedures:
 - .1 ASTM E605 - Standard Test Method for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.
 - .2 AWCI Standard Practice for the Testing and Inspection of Field-Applied Sprayed Fire-Resistive Materials.

3.4 ADJUSTING

- .1 Make Good damaged fire protection.

3.5 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect completed installation.

- .3 Provide final protection and maintain conditions in a manner acceptable to Consultant and authorities having jurisdiction.
- .4 Ensure fire protection is not damaged at time of Substantial Performance of the Work.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Firestopping and smoke seals through penetrations at wall, floor and roof openings.

1.2 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete: penetrations in rated concrete assemblies.
.2 Section 04 22 00 - Concrete Unit Masonry: penetrations in rated masonry assemblies.
.3 Section 05 50 00 - Metal Fabrications: fire rated sleeves.
.4 Section 07 81 00 - Applied Fireproofing: sprayed fireproofing.
.5 Section 07 92 00 - Joint Sealants: non-rated joint sealants.
.6 Section 09 21 16 - Gypsum Board Assemblies: penetrations in rated gypsum board assemblies.

1.3 REFERENCES

- .1 ASTM C303-07: Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
.2 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
.3 ASTM E119-07a: Standard Test Methods for Fire Tests of Building Construction and Materials.
.4 ASTM E814-06: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
.5 ASTM E2174-04: Standard Practice for On-Site Inspection of Installed Fire Stops.
.6 CAN/CGSB-19.13-M87: Sealing Compound, One Component, Elastomeric, Chemical Curing.
.7 CAN/CGSB-19.24-M90: Multicomponent, Chemical Curing Sealing Compound.
.8 CAN-ULC-S101-07: Standard Methods of Fire Endurance Tests of Building Construction and Materials.
.9 CAN-ULC-S102-07: Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.10 CAN-ULC-S114-05: Standard Method of Test for Determination of Non-Combustibility in Building Materials.
.11 CAN-ULC-S115-05: Standard Method of Fire Tests of Firestop Systems.
.12 CAN-ULC-S129-06: Standard Method of Test for Smoulder Resistance of Insulation (Basket Method).
.13 CAN/ULC-S702-97: Standard for Thermal Insulation, Mineral Fibre, for Buildings.
.14 Underwriters' Laboratories of Canada: List of Equipment & Materials.

1.4 SYSTEM DESCRIPTION

- .1 Seal empty holes and penetrations at floors, fire rated walls and smoke barrier walls.
.2 Seal holes accommodating penetrating items such as cables, cable trays, pipes, ducts and conduits.

- .3 Seal penetration system used to maintain the integrity of time rated construction by providing a sealant against the spread of heat, flame and smoke.
 - .4 Systems shall be UL classified or listed by Warnock-Hersey International for the appropriate required time rating.
- 1.5 SUBMITTALS
- .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Product Data: sealant manufacturer's installation instructions and standard drawings, indicating ULC or WHI test designations.
 - .3 Shop Drawings: Indicate sizes of openings, nature of penetrations, and tested method of firestop and smoke seal protection being proposed.
 - .1 Shop Drawings are to be sealed, signed and dated by manufacturer's design engineer.
 - .2 Submit shop drawings to Consultant and to the authority having jurisdiction for their review and approval.
- 1.6 CERTIFICATES
- .1 Submit certification as specified in Section 01 33 00.
 - .2 Certificate: sealant manufacturer's letter of certification verifying that Products meet or exceed specified requirements.
- 1.7 TEST REPORTS
- .1 Submit test reports as specified in Section 01 33 00.
 - .2 Test Reports: certified laboratory reports, indicating that Products proposed for use conform to ASTM E814 and CAN-ULC-S115, and are so classified by the Underwriter's Laboratories of Canada or Warnock-Hersey International.
- 1.8 QUALITY ASSURANCE
- .1 Manufacturer's Design Engineer: a registered professional engineer licensed to practice in the Place of the Work and having a minimum of 10 years documented experience designing firestop and smoke seal systems.
 - .2 Applicator: approved and acceptable to sealant material manufacturer.
 - .3 Firestopping compounds shall not contain volatile solvents or require special application to protect plastic pipe from firestopping compound.
- 1.9 PRE-INSTALLATION MEETING
- .1 Prior to commencement of firestopping, arrange and conduct a pre-installation meeting as specified in Section 01 31 00.
 - .2 Pre-installation Meeting: discuss proposed methods and materials to be used in instances.
 - .3 Representatives of the Owner, Consultant, Contractor, installer, manufacturer and the authority having jurisdiction are to be in attendance. Do not conduct meeting unless identified parties are present.
- 1.10 MOCK-UPS
- .1 Construct job site mock-up as specified in Section 01 40 00.
 - .2 Apply one sample seal on representative substrates on each site for each fire rating required at each type of wall, floor or roof construction.

- .3 Comply with project requirements as to thickness and density of application to achieve fire rating.
- .4 Proceed with installation only after Consultant has reviewed and accepted mock-up.
- .5 Acceptable mockup may remain as part of the completed Work as standard.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver Products to the Place of the Work in their original unopened packages.
- .3 Store Products in an enclosed shelter, preventing damage to containers.

1.12 PROJECT CONDITIONS

- .1 Do not apply sealants when temperature of substrate material and surrounding air is below 5 degrees Celsius.
- .2 Maintain sealant at a minimum 18 degrees Celsius for best workability.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of firestop sealants having Product considered acceptable for use:
 - .1 3M.
 - .2 AD Fire Protection.
 - .3 Hilti Canada.
 - .4 Nuco Inc.
 - .5 Tremco.
 - .6 The Rectorseal Corporation.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Firestop Sealant Type A: single-component, water based, intumescent acrylic; ULC labelled; to CAN-ULC-S115 and CAN-ULC-S101-M; eg. TREMstop IA by Tremco.
- .2 Firestop Sealant Type B: three component; epoxidized polyurethane terpolymer; accommodating joint movement of +40/-25%; ULC labelled; to CAN/CGSB-19.24-M and CAN-ULC-S115; eg. DYmeric 240 ULC by Tremco.
- .3 Firestop Sealant Type C: three component; self-levelling; chemically curing polyurethane sealant; ULC labelled; to CAN-ULC-S115; eg. THC-900 ULC by Tremco.
- .4 Firestop Sealant Type D: single component; low modulus; silicone rubber; moisture curing; ULC labelled; to CAN/CGSB-19.13-M and CAN-ULC-S115; eg. Fyre-Sil by Tremco.
- .5 Firestop Sealant Type E: single component; modified polyurethane; moisture curing; ULC labelled; to CAN/CGSB-19.13-M and CAN-ULC-S115; eg. DYmonic ULC by Tremco.
- .6 Primer: as recommended by sealant manufacturer for specific material, substrate and end use.
- .7 Firestop Insulation: to CAN/ULC-S702, Type 2; mineral fibre manufactured from rock or slag, suitable for manual application:
 - .1 Density: 72 kg/m³ when tested to ASTM C303.
 - .2 Combustibility: Noncombustible to CAN-ULC-S114.
 - .3 Melt Temperature: >1175 degrees C.

- .4 Surface Burning Characteristics: to CAN-ULC-S102, maximum flame spread of 0, smoke developed of 0.
- .5 Moisture Sorption: 0.04 percent when tested to ASTM C1104.
- .6 Smoulder Resistance: 0.01 percent when tested to CAN-ULC-S129.

2.3 COMPONENTS

- .1 Provide firestopping and smoke sealing systems to CAN-ULC-S115 and as described below:
 - .1 Asbestos free materials and systems fully capable of maintaining an effective barrier against gases, flame and smoke in compliance with CAN-ULC-S115, not exceeding opening sizes stated.
 - .2 Service Penetration Assemblies: certified by CAN-ULC-S115 and used by ULC Guide 40 U19. Service components listed as certified in this guide are noted under Label Service of ULC.
- .2 Fire resistance rating of fire stopping material assembly must meet or exceed the fire resistance rating of the floor or wall section being penetrated.
- .3 Firestopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal; do not use a cementitious or rigid seal at such locations.
- .4 Damming and back up materials, supports and anchoring devices shall be to manufacturer's recommendations, and in strict accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .5 Sealants: non-sagging type for vertical joints.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Confirm compatibility of surfaces to receive sealant materials.
- .3 Verify surfaces of openings are sound, clean, dry and ready to receive application of sealant.
- .4 Verify that penetration elements are securely fixed and properly located.

3.2 PREPARATION

- .1 Protect adjacent surfaces and equipment from damage.
- .2 Clean contact surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of sealant.
- .3 Remove incompatible materials which affect bond by scraping, brushing, water or solvent cleaning, or sandblasting.

3.3 APPLICATION

- .1 Install mineral fibre insulation in compacted thicknesses required by ULC design. Compress insulation approximately 33 percent.
- .2 Apply sealant in strict accordance with manufacturer's instructions and ULC certification.
- .3 Coordinate and cooperate with adjacent, contiguous and related materials trades, such as concrete, drywall, plumbing, conduit, electrical wiring, communication systems, etc., to ensure a proper and timely installation.
- .4 Seal holes or voids made by penetrating items to ensure an effective fire and smoke barrier.

- .5 Seal intersections and penetrations of floors, ceilings, walls and columns.
 - .6 Seal around cutouts for lights, cabinets, pipes and plumbing, ducts, electrical boxes, etc.
 - .7 Wrap non-insulated heated pipes that may be subject to movement with a non-combustible smooth material to permit the pipe to move without damaging the firestopping and smoke seal.
 - .8 Maintain the integrity of any insulation and vapour retarders on insulated pipes and ducts at the fire separation.
 - .9 Where floor openings exceed 100 mm in width and may be subjected to traffic or loading, install cover plate systems capable of supporting same loading as floor.
- 3.4 FIELD QUALITY CONTROL
- .1 Perform field testing and inspection as specified in Section 01 40 00.
 - .2 Conduct inspections to ASTM E2174.
 - .3 Examine finished penetrations to ensure proper installation before concealing or enclosing any areas of work.
 - .4 Keep areas of work accessible until inspection has been completed.
 - .5 Manufacturer's Field Service: inspect to verify and confirm that systems installation is in strict accordance with manufacturer's and ULC requirements.
 - .6 Correct unacceptable work and provide further inspection to verify compliance with requirements.
- 3.5 CLEANING
- .1 Refer to Section 01 74 00.
 - .2 Immediately remove spots, smears, stains, residues, adhesives, etc., from installation, including from adjacent surfaces.
 - .3 Do not use Products containing volatile solvents.
 - .4 Leave the Work in a clean and satisfactory condition.
- 3.6 PROTECTION
- .1 Refer to Section 01 76 00.
 - .2 Protect firestopping assemblies from damage until Owner occupancy.
 - .3 Make Good damaged firestopping assemblies.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Joint sealing.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-In-Place Concrete: sealants used in conjunction with concrete.
 - .2 Section 04 05 00 - Common Work Results for Masonry: sealants used in conjunction with masonry.
 - .3 Section 06 40 00 - Architectural Woodwork: sealants used in conjunction with counters and casework.
 - .4 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders: sealants used in conjunction with building envelope air and vapour seal continuity.
 - .5 Section 07 50 19 - Sealants for Roofing: sealants used in conjunction with roofing.
 - .6 Section 07 62 16 - Sheet Metal Flashing and Trim: sealants used in conjunction with sheet metal flashing.
 - .7 Section 07 84 00 - Firestopping: firestop sealants.
 - .8 Section 08 11 13 - Hollow Metal Frames: sealants used in conjunction with hollow metal frames.
 - .9 Section 08 44 13 - Glazed Aluminum Curtain Wall: sealants used in conjunction with metal frames.
 - .10 Section 08 51 13 - Aluminum Windows: sealants used in conjunction with metal frames.
 - .11 Section 08 80 00 - Glazing: sealants used in conjunction with glazing methods.
 - .12 Section 09 21 16 - Gypsum Board Assemblies: sealants used in conjunction with acoustic treatment.
 - .13 Section 09 51 23 - Acoustical Tile Ceilings: sealants used in conjunction with suspended metal ceiling systems.
- 1.3 REFERENCES
 - .1 ASTM C920-08: Standard Specification for Elastomeric Joint Sealants.
 - .2 CAN/CGSB-19.13-M87: Sealing Compound, One Component, Elastomeric, Chemical Curing.
 - .3 CAN/CGSB-19.17-M90: One Component Acrylic Emulsion Base Sealing Compound.
 - .4 CAN/CGSB-19.24-M90: Multicomponent, Chemical Curing Sealing Compound.
- 1.4 SYSTEM DESCRIPTION
 - .1 Seal gaps between dissimilar Products and equipment, visible or otherwise, to protect building components from air infiltration and moisture penetration.
- 1.5 SUSTAINABLE DESIGN REQUIREMENTS
 - .1 Use low-emitting sealants conforming to CARB requirements.

1.6 QUALITY ASSURANCE

- .1 Arrange for sealant manufacturer's representative to be present prior to commencement of caulking. Consult with representative as to joint conditions.
- .2 Applicator: company specializing in applying the work of this Section with three years documented experience.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver Products in manufacturer's sealed packages.
- .3 Store Products in warm, dry conditions.

1.8 PROJECT CONDITIONS

- .1 Do not install solvent curing sealants in enclosed building spaces.
- .2 Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.9 WARRANTY

- .1 Submit extended warranties in accordance with the General Conditions of the Contract.
- .2 System Warranty: 2 year extended warranty including coverage of installed sealants and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

2 Products

2.1 MANUFACTURERS

- .1 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Exterior Weatherseal Sealant: to CAN/CGSB-19.24-M, Type II, Class B; three-part, epoxidized polyurethane; chemically curing; accommodating joint movement of plus or minus 50 percent; DYmeric 240FC by Tremco or Sonneborn NP2 by BASF; colours as selected by Consultant.
- .2 Glazing Sealant: one part, moisture curing, acetoxysilicone sealant; to CAN/CGSB-19.13-M, Type MG-2-25-A-L; Tremco Proglaze or Dow Corning 999A, Clear colour.
- .3 Mildew-Resistant Interior Sealant for Washroom Areas: to ASTM C920, Type S, Grade NS, Class 25, Use NT; one-part, fungicidal silicone rubber; Dow Corning 786; White colour.
- .4 Acoustical and General Purpose Interior Sealant: to CAN/CGSB-19.17-M; one-part, siliconized acrylic latex, mildew-resistant, accommodating joint movement of plus or minus 12-1/2 percent; Tremco Tremflex 834; White colour.

2.3 ACCESSORIES

- .1 Primer: non-staining type, recommended by sealant manufacturer to suit application.
- .2 Joint Cleaner: non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- .3 Joint Backing: open cell polyethylene foam core wrapped in a closed cell polyethylene skin.

- .4 Bond Breaker: pressure sensitive tape recommended by sealant manufacturer to suit application.
- 3 Execution
- 3.1 PREPARATION
- .1 Clean and prime joints to requirements of manufacturer's instructions.
 - .2 Remove loose materials and foreign matter which might impair adhesion of sealant.
- 3.2 APPLICATION
- .1 Install sealant to requirements of manufacturer's instructions.
 - .2 Seal gaps between dissimilar materials to prevent air infiltration and moisture penetration.
 - .3 Seal visible and unsightly gaps between dissimilar materials.
 - .4 Measure joint dimensions and size materials to achieve required width-to-depth ratios.
 - .5 Install joint backing to achieve a neck dimension no greater than one-third joint width.
 - .6 Install bond breaker where joint backing is not used.
 - .7 Tool joints to concave shape. Remove excess material.
- 3.3 FIELD QUALITY CONTROL
- .1 Field inspection will be conducted by Consultant as specified in Section 01 40 00.
 - .2 Joints filled with only a skin bead or insufficient volume of sealant will be rejected.
 - .3 Remove material from rejected joints, clean and re-seal to attain proper width-to-depth joint coverage.
- 3.4 CLEANING
- .1 Refer to Section 01 74 00.
 - .2 Clean adjacent soiled surfaces.
 - .3 Make Good surfaces that have become defaced or disfigured as a result of sealant application.

END OF SECTION

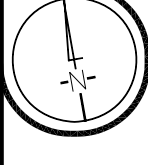
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Details

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2	Wall Reglet Detail	October 2009
2A	Wall Expansion / Through-Wall Detail	October 2009
2B	Window Detail	October 2009
3	Expansion Joint Detail	October 2009
4	Metal Curb Detail	October 2009
4A	Sleeper Detail	October 2009
4B	Hatch Detail	October 2009
4C	Curb Detail	October 2009
5	Drain Detail	October 2009
5A	Drain Detail	October 2009
5B	Overflow Scupper Detail	October 2009
6	Vent Stack Detail	October 2009
7	Sleeve and Collar Detail	October 2009
7A	Service Lines Detail	October 2009
8	Concrete Paver Detail	October 2009
8A	Condenser on Paver Detail	October 2009
8B	Pipe Support Detail	October 2009
9	Tie-In Detail	October 2009



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DO NOT SCALE DRAWING
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GENERAL NOTES

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009

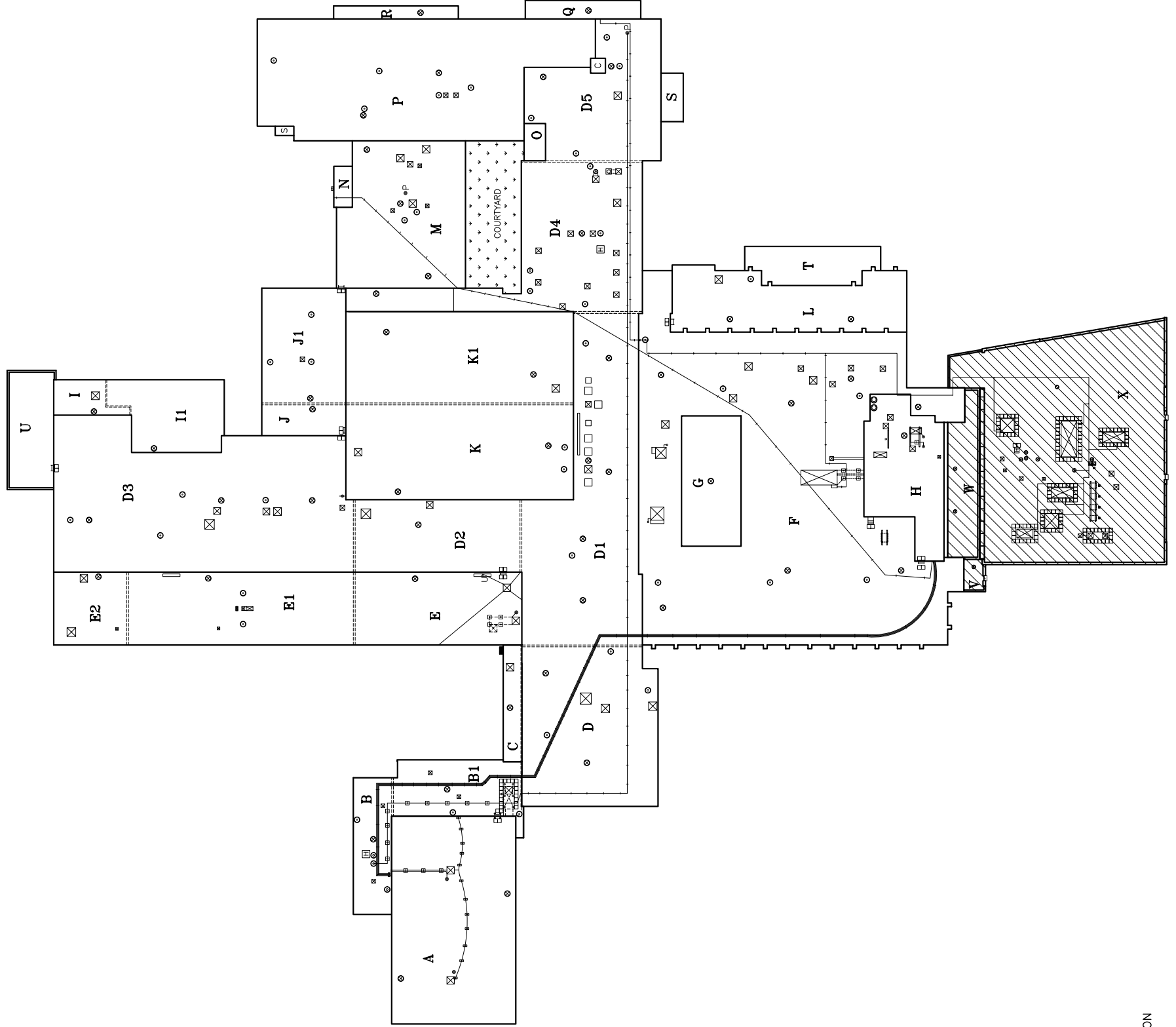
SYMBOLS	
⊗	ROOF DRAIN
⊕	FLUING STACK
⊙	SLEEVE & COLLAR
⊖	VENT
⊗	EQUIPMENT CURB
⊕	SQUARE TO ROUND
⊖	ROOF HATCH
⊗	SKYLIGHT
⊕	CHIMNEY
⊖	PARAPET
⊗	ANTENNA
⊕	INSULATION BREAKER
⊖	UNUSED EQUIPMENT
⊗	ROOF DRAIN
⊕	FLUING STACK
⊙	SLEEVE & COLLAR
⊖	VENT
⊗	EQUIPMENT CURB
⊕	SQUARE TO ROUND
⊖	ROOF HATCH
⊗	SKYLIGHT
⊕	CHIMNEY
⊖	PARAPET
⊗	ANTENNA
⊕	INSULATION BREAKER
⊖	UNUSED EQUIPMENT

REVISIONS	
No.	DATE

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 1000 SHEPPARD AVENUE EAST
 SUITE 1000
 SCARBOROUGH, ONTARIO M1B 2Y4
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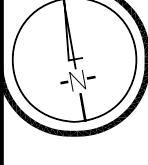
HALTON DISTRICT SCHOOL BOARD
GEORGETOWN HS ADDITION
 GEORGETOWN, ONTARIO

PROJECT:	EB0002	NUMBER	
DATE:	OCTOBER 2009		
SCALE:	NTS		
DRAWN BY:	AC		
FILE NAME:	GEORGETOWN-ADDITION		



— DENOTES AREAS OF NEW ADDITION





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DO NOT SCALE DRAWING
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DRAIN SUMP SCHEDULE		
I.D.	SIZE	SLOPE
S1	2400x2400mm	POLYISOCYANURATE 75mm TO 50mm

GENERAL NOTES

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009

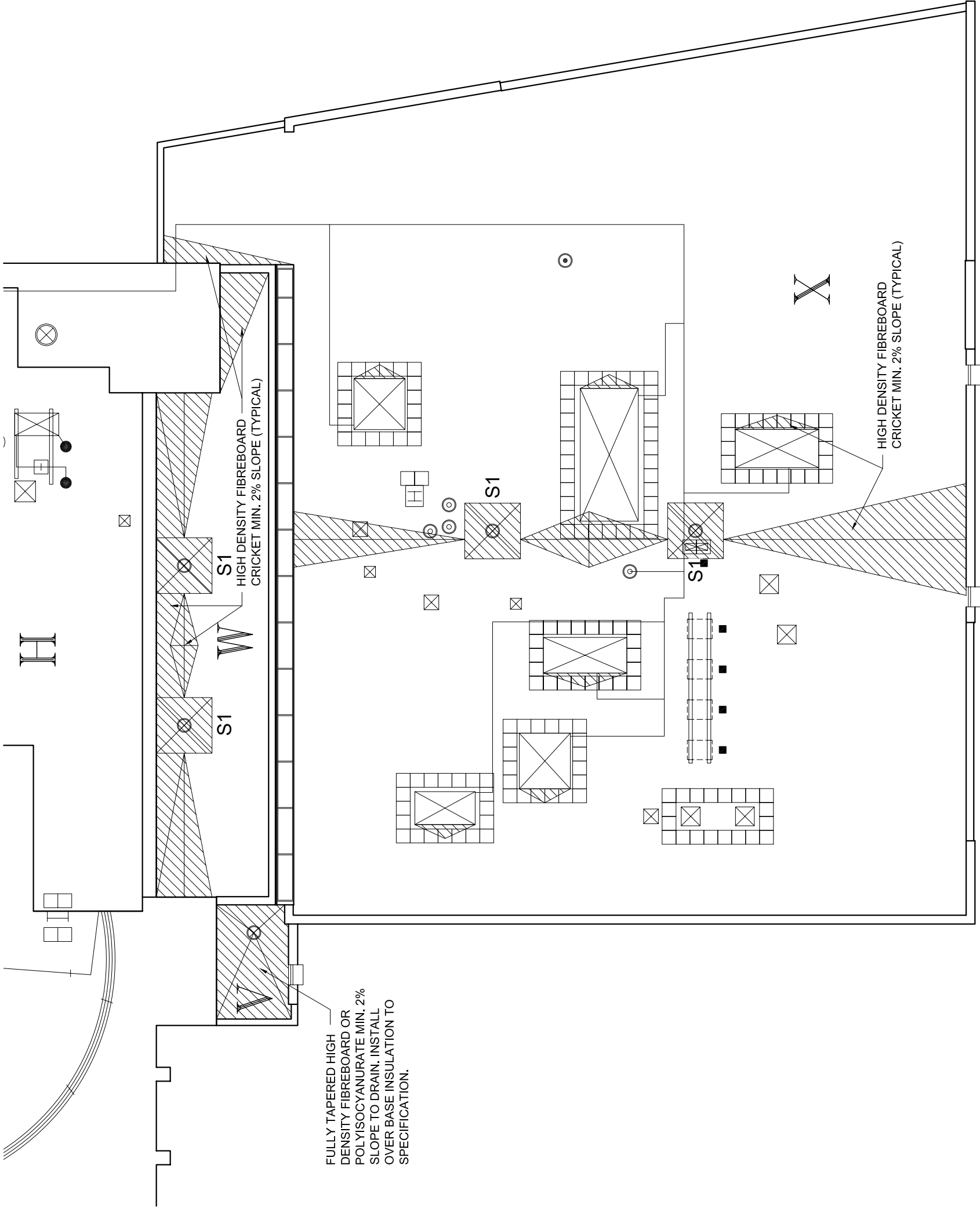
SYMBOLS	
⊗	ROOF DRAIN
⊕	LADDER
⊙	FUMING STACK
⊖	*P PITCH PAN
⊗	SLEEVE & COLLAR
⊙	*CW GUY WIRE SUPPORT
⊖	*A SAFETY ANCHOR
⊗	EQUIPMENT CURB
⊖	DOWNSPOUT
⊗	SQUARE TO ROUND
⊖	SCUPPER
H	ROOF HATCH
→	SLOPE
—	EXPANSION JOINT
—	CONTROL JOINT
C	CHIMNEY
—	PAVER
X	CUT TEST
⊖	ANTENNA
⊖	CAMERA LOCATION
△	INSULATION BREATHER
⊖	DETAIL BUBBLES
U	UNUSED EQUIPMENT

REVISIONS	
No.	DATE

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 SUITE 1000
 SCARBOROUGH, ONTARIO M1B 2Y1
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 FAX: (416) 291-2147

HALTON DISTRICT SCHOOL BOARD
GEORGETOWN HS ADDITION
 GEORGETOWN, ONTARIO

PROJECT:	EB0802	NUMBER	
DATE:	OCTOBER 2009		
SCALE:	NTS		
DRAWN BY:	AC		
FILE NAME:	GEORGETOWN_ADDITION		



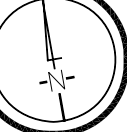
S1 HIGH DENSITY FIBREBOARD CRICKET MIN. 2% SLOPE (TYPICAL)

HIGH DENSITY FIBREBOARD CRICKET MIN. 2% SLOPE (TYPICAL)

FULLY TAPERED HIGH DENSITY FIBREBOARD OR POLYISOCYANURATE MIN. 2% SLOPE TO DRAIN. INSTALL OVER BASE INSULATION TO SPECIFICATION.

— DENOTES AREAS OF TAPERED INSULATION

TAPERED INSULATION PLAN



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DO NOT SCALE DRAWING
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GENERAL NOTES

- ALLOW FOR 6 VENT STACK FLASHINGS (DETAIL #6).

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009

SYMBOLS	
⊗	ROOF DRAIN
⊕	LADDER
⊙	FLUING STACK
⊖	*P PITCH PAN
⊗	SLEEVE & COLLAR
⊙	*CW GUY WIRE SUPPORT
⊖	*VA SAFETY ANCHOR
⊗	EQUIPMENT CURB
⊙	↓ DOWNSPOUT
⊖	SQUARE TO ROUND
⊗	SCUPPER
⊙	ROOF HATCH
⊖	→ SLOPE
⊗	SKYLIGHT
⊙	EXPANSION JOINT
⊖	CHIMNEY
⊗	CONTROL JOINT
⊙	PAWER
⊖	X CUT TEST
⊗	ANTENNA
⊙	○ CAMERA LOCATION
⊖	INSULATION BREATHER
⊗	○ DETAIL BUBBLES
⊙	UNUSED EQUIPMENT

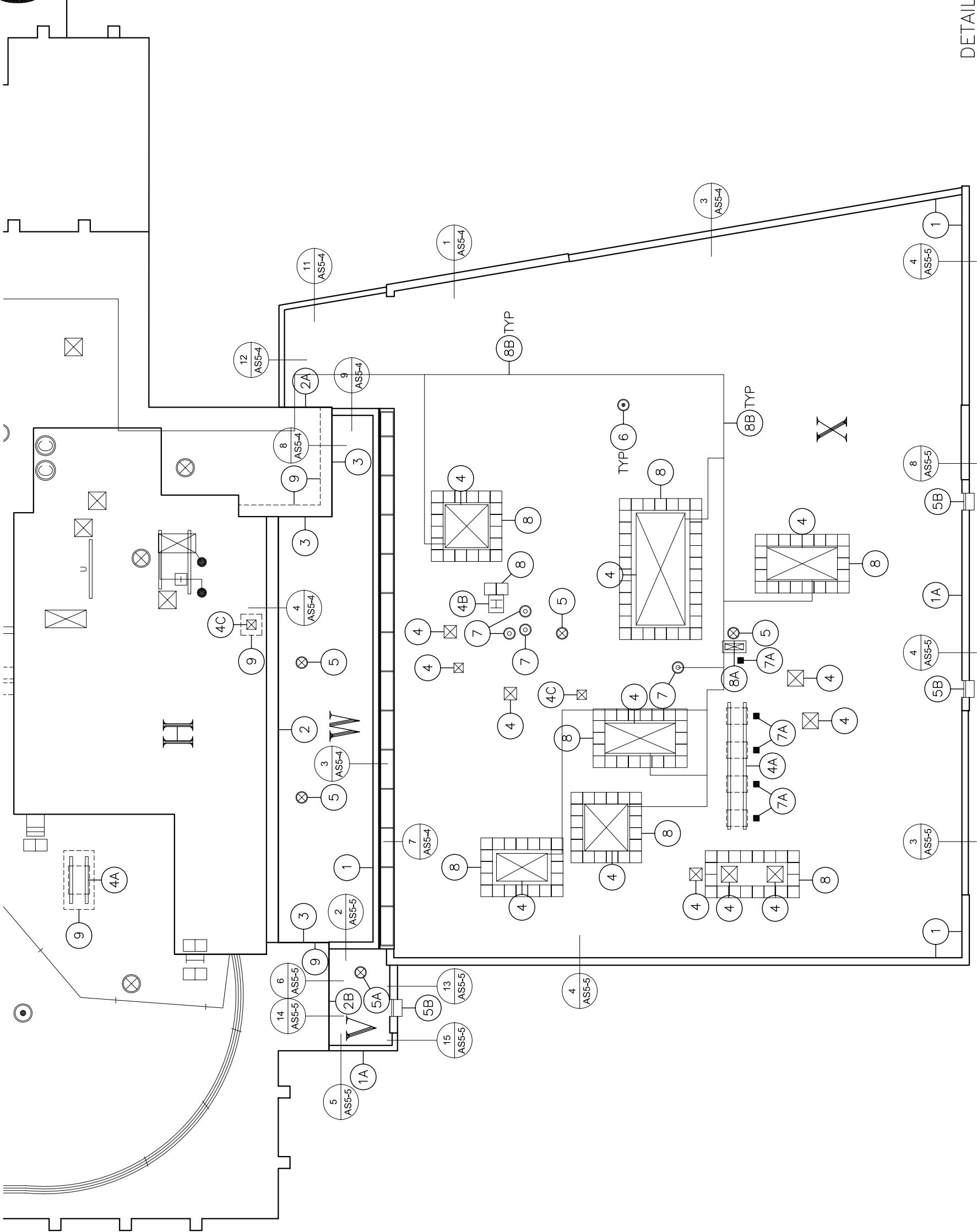
REVISIONS	
No.	DATE

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**HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN HS
 ADDITION
 GEORGETOWN, ONTARIO**

PROJECT:	ED0002	NUMBER	
DATE:	OCTOBER 2009		
SCALE:	NTS		
DRAWN BY:	AC		
FILE NAME:	GEORGETOWN_ADDITION		

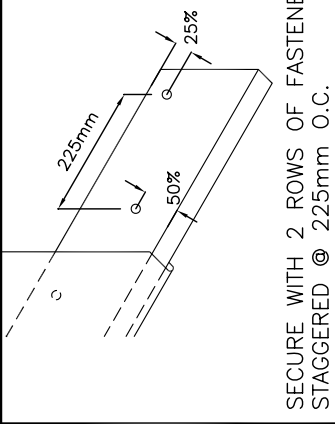
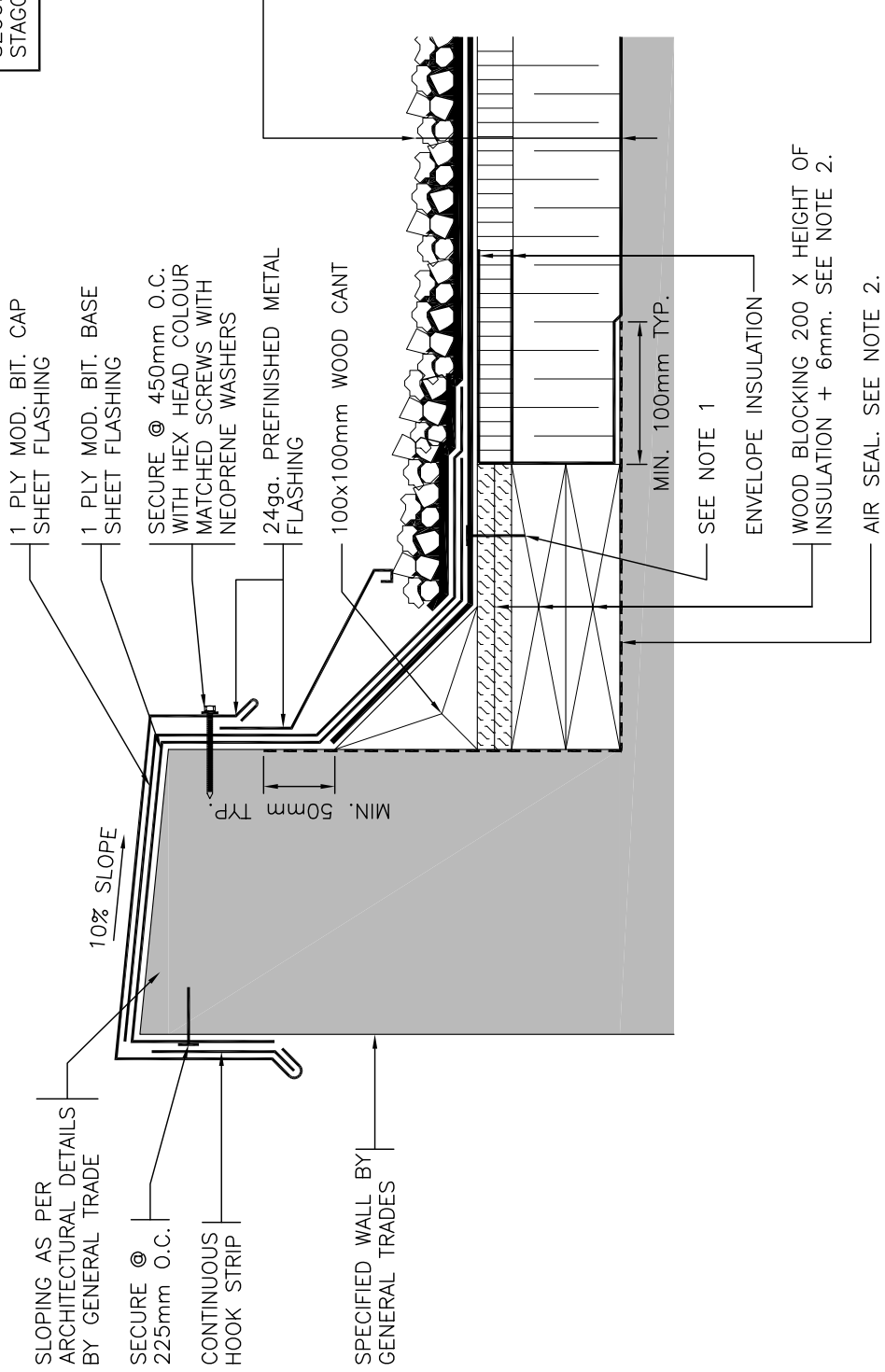
3



DETAIL PLAN

NOTES:

1. SECURE MEMBRANE @ 225mm O.C. WITH 38mm NAILS WITH 25mm CAPS PRIOR TO INSTALLING MEMBRANE FLASHINGS.
2. WOOD BLOCKING AND AIR SEALS BY GENERAL TRADES.
3. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR PARAPET CONSTRUCTION AND ROOF WALL AIR VAPOUR BARRIER CONNECTIONS.



SECURE WITH 2 ROWS OF FASTENERS STAGGERED @ 225mm O.C.

TYPICAL HOOK STRIP DETAIL

TYPICAL ASSEMBLY

- GRAVEL
- 3 PLYS TYPE IV GLASS FELT IN ASPHALT
- 1 PLY 95gm/m² MOD. BIT. BASE SHEET IN ASPHALT
- 25mm CAP INSULATION
- SEPARATION SHEET
- 75mm BASE INSULATION (MECHANICALLY SECURED)
- VAPOUR BARRIER (ADHERED)
- STEEL DECK

PARAPET DETAIL

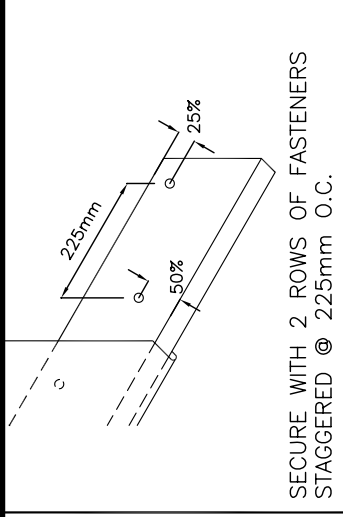
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**HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	1
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D01	

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009

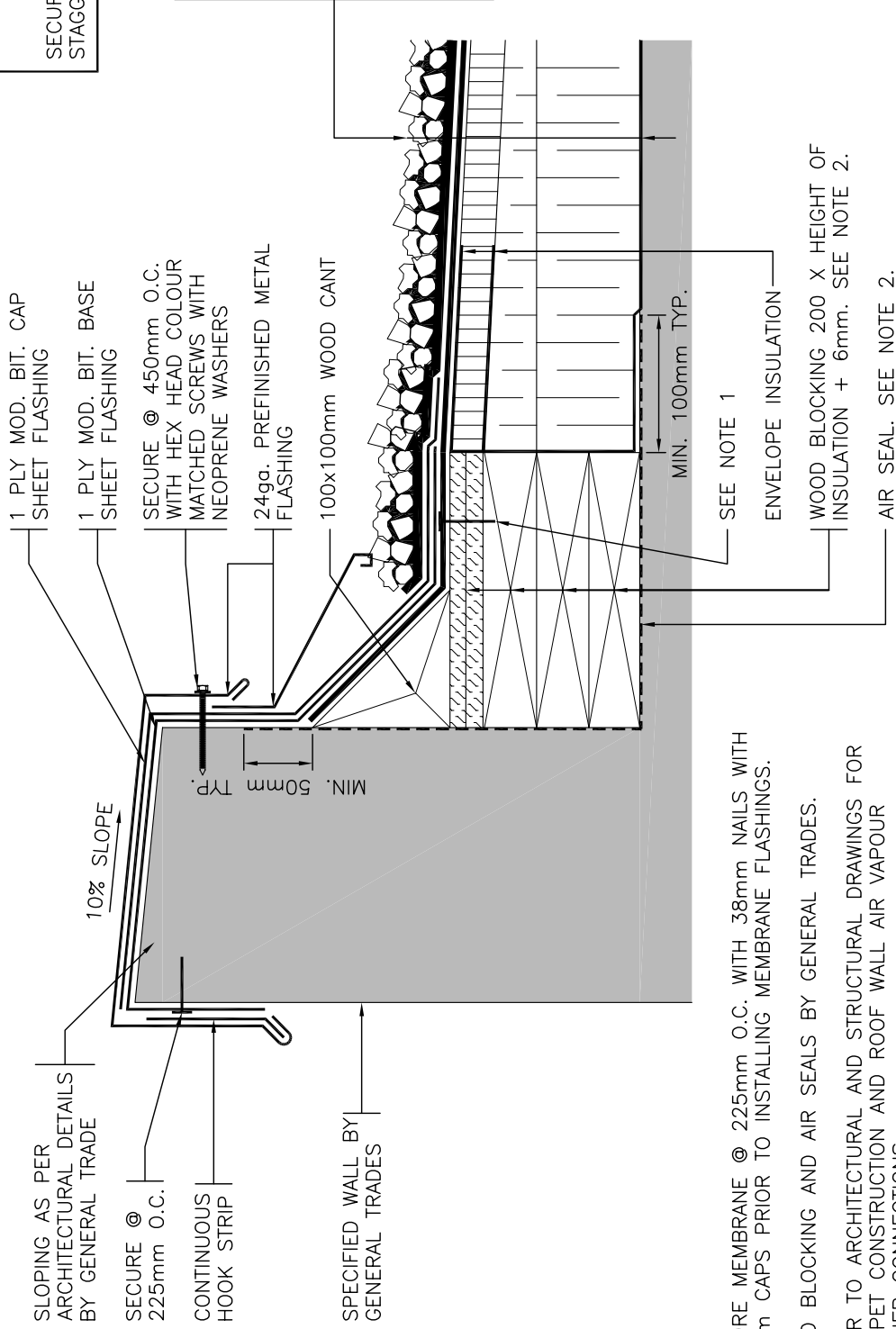


SECURE WITH 2 ROWS OF FASTENERS STAGGERED @ 225mm O.C.

TYPICAL HOOK STRIP DETAIL

TYPICAL ASSEMBLY

- GRAVEL
- 3 PLYS TYPE IV GLASS FELT IN ASPHALT
- 1 PLY 95gm/m² MOD. BIT. BASE SHEET IN ASPHALT
- 25mm CAP INSULATION
- SEPARATION SHEET
- TAPERED INSULATION AS PER TAPERED INSULATION PLAN
- 75mm BASE INSULATION (MECHANICALLY SECURED)
- VAPOUR BARRIER (ADHERED)
- STEEL DECK



NOTES:

1. SECURE MEMBRANE @ 225mm O.C. WITH 38mm NAILS WITH 25mm CAPS PRIOR TO INSTALLING MEMBRANE FLASHINGS.
2. WOOD BLOCKING AND AIR SEALS BY GENERAL TRADES.
3. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR PARAPET CONSTRUCTION AND ROOF WALL AIR VAPOUR BARRIER CONNECTIONS.

PARAPET DETAIL

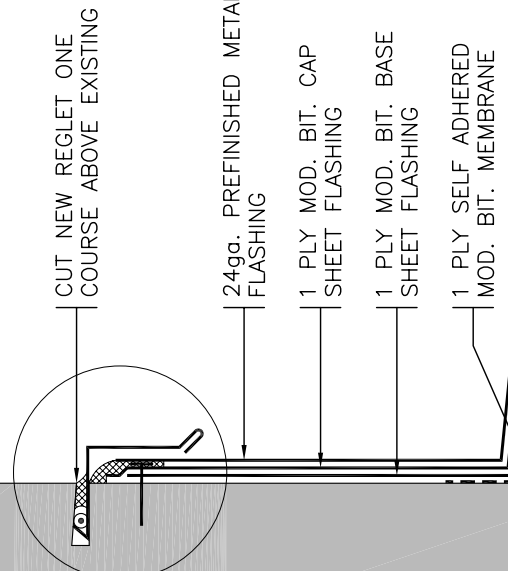
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PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	1A
SCALE: NTS	"ISSUED FOR BIDS (PHASE 2)", DATE: OCT 15, 2009
DRAWN BY: AC	
FILE NAME: 8082D01A	

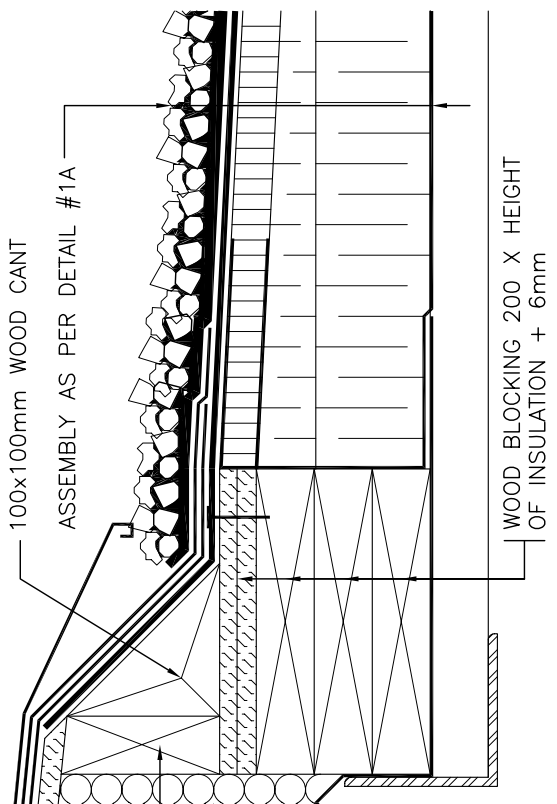
HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO

Building SCIENCES GROUP Inc.

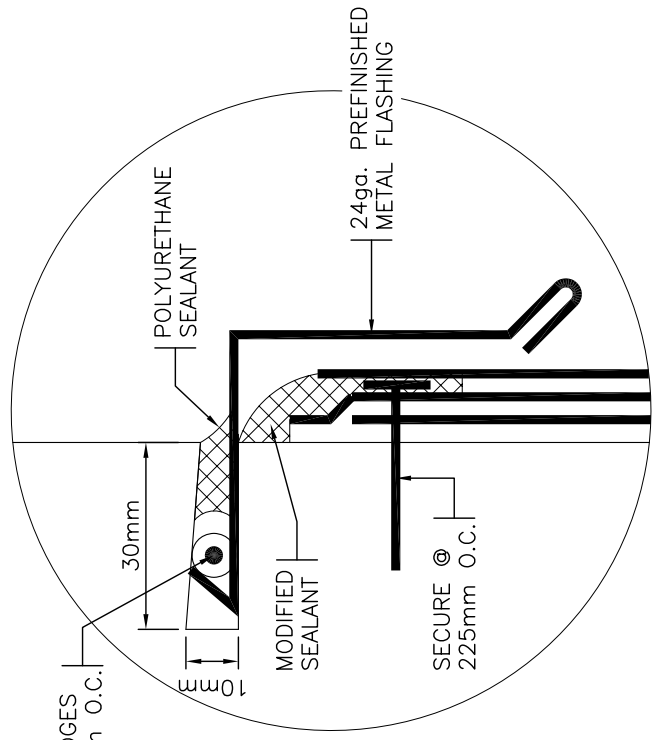
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 PHONE: (905) 878-1282
 FAX: (905) 878-2147



10% SLOPE



WALL REGLET DETAIL



NOTES:

1. PROVIDE 600mm MOCK-UP PRIOR TO CONSTRUCTION.
2. WOOD BLOCKING, MINERAL FIBRE INSULATION AND AIR SEALS BY GENERAL TRADES.

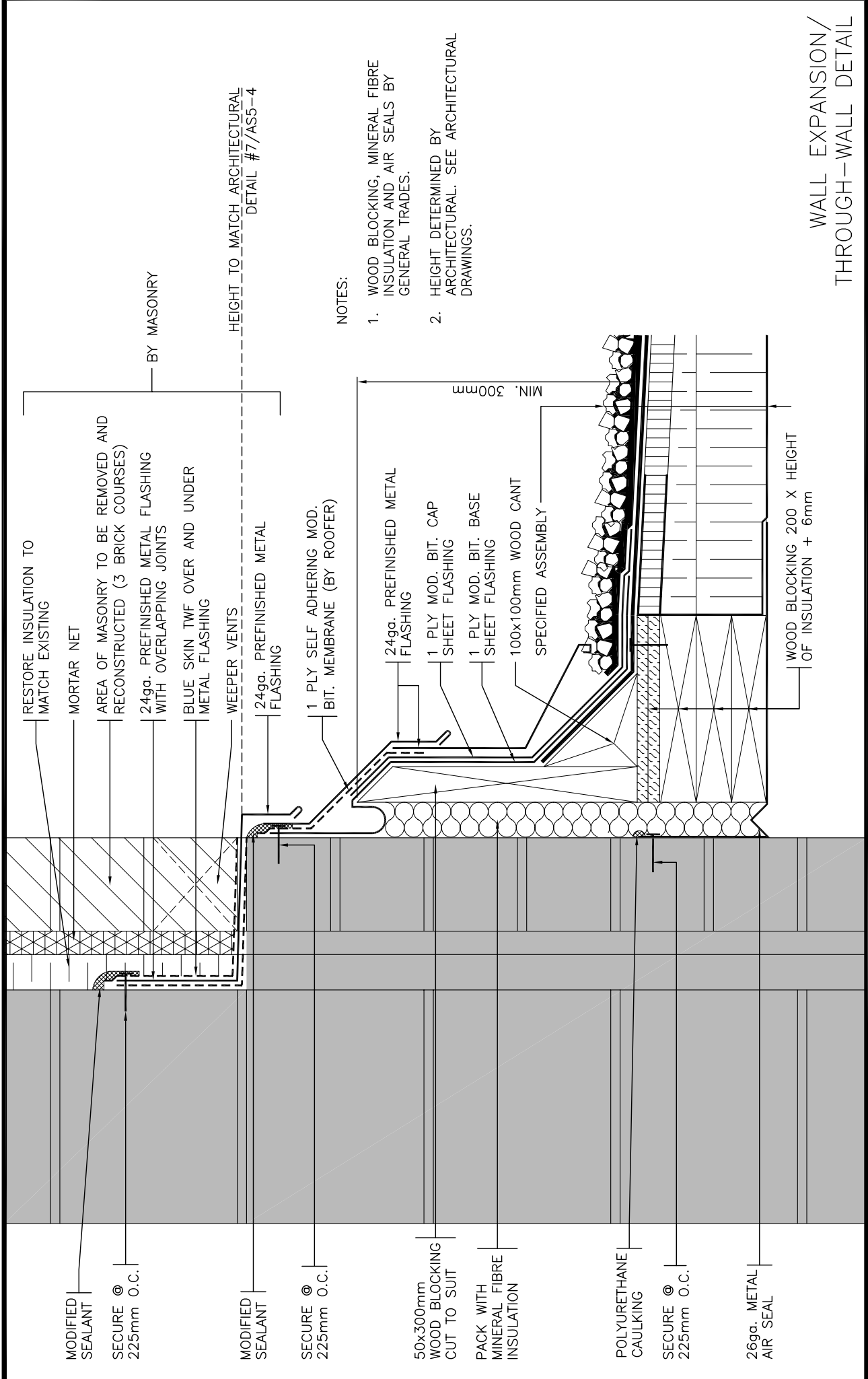
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**HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	2
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D02	

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009



NOTES:

1. WOOD BLOCKING, MINERAL FIBRE INSULATION AND AIR SEALS BY GENERAL TRADES.
2. HEIGHT DETERMINED BY ARCHITECTURAL. SEE ARCHITECTURAL DRAWINGS.

WALL EXPANSION/
THROUGH-WALL DETAIL

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PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	2A
SCALE: NTS	"ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009
DRAWN BY: AC	
FILE NAME: 8082D02A	

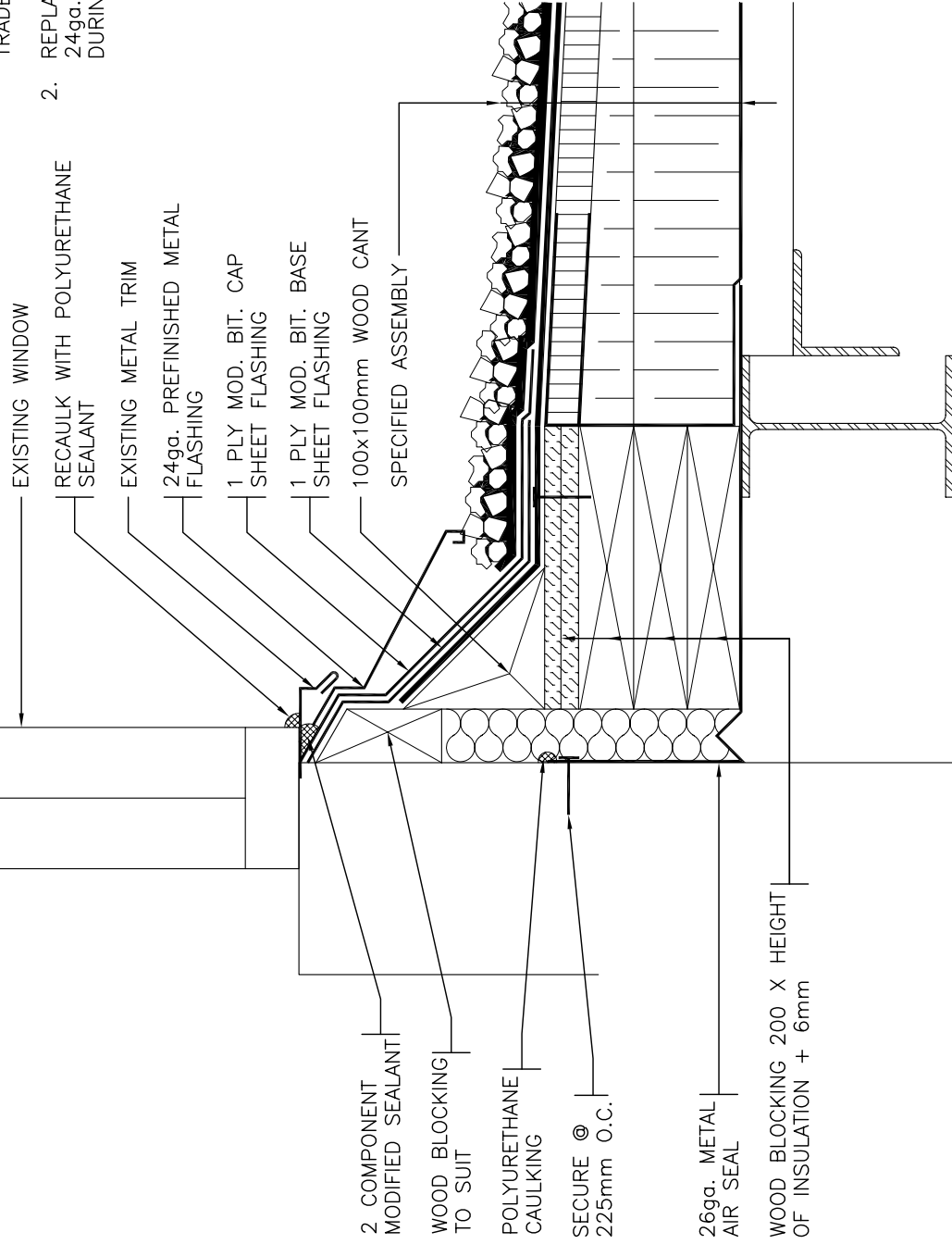
HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO

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 PHONE: (905) 878-1282
 FAX: (905) 878-2147

NOTES:

1. WOOD BLOCKING, MINERAL FIBRE INSULATION AND AIR SEALS BY GENERAL TRADES.
2. REPLACE EXISTING METAL TRIM WITH 24ga. PREFINISHED METAL IF DAMAGED DURING CONSTRUCTION.



WINDOW DETAIL

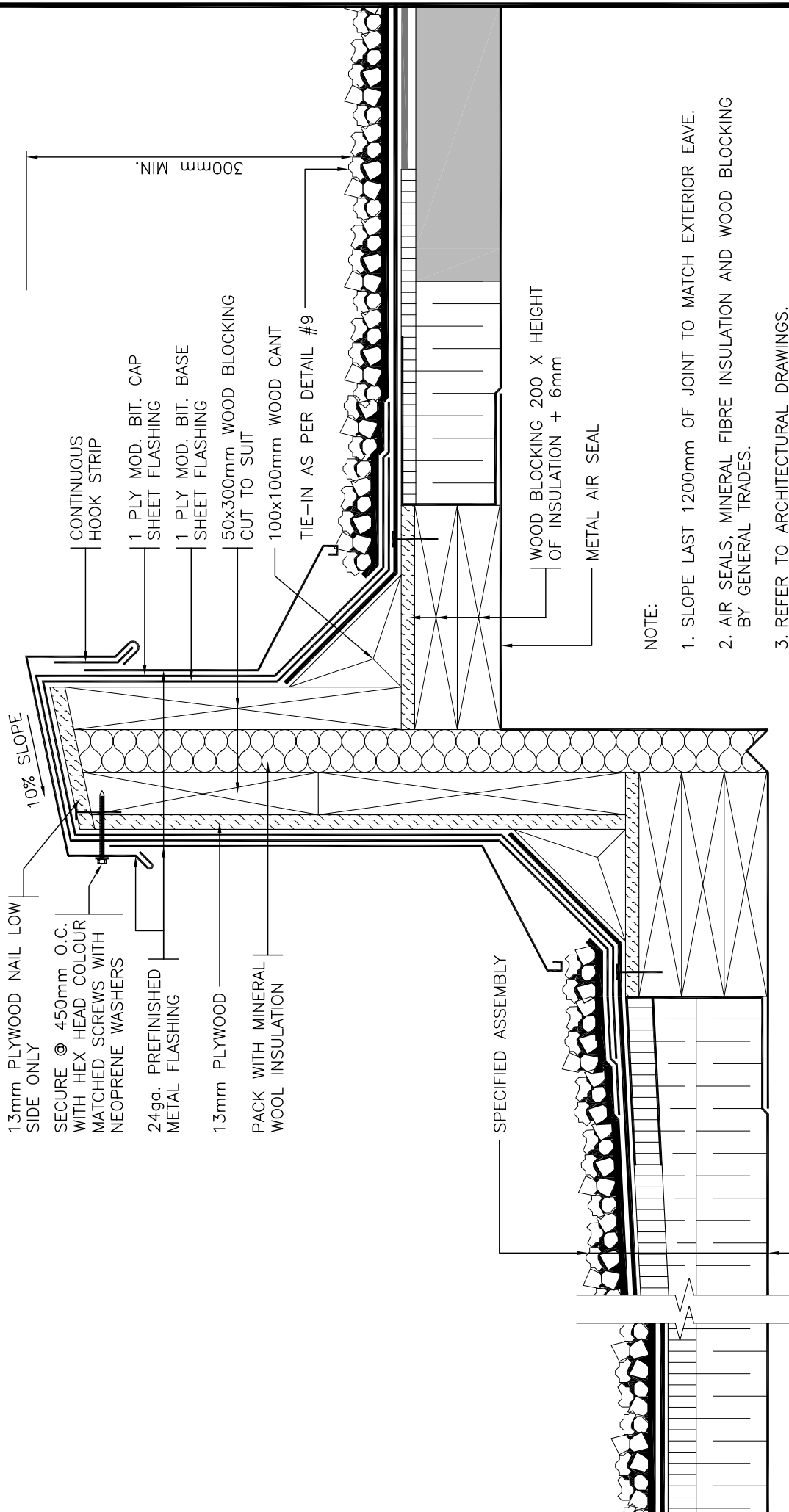
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PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	2B
SCALE: NTS	
DRAWN BY: AC	"ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009
FILE NAME: 8082D02B	

HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO

Building SCIENCES GROUP Inc.

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13mm PLYWOOD NAIL LOW SIDE ONLY
 SECURE @ 450mm O.C. WITH HEX HEAD COLOUR MATCHED SCREWS WITH NEOPRENE WASHERS
 24ga. PREFINISHED METAL FLASHING
 13mm PLYWOOD
 PACK WITH MINERAL WOOL INSULATION

CONTINUOUS HOOK STRIP
 1 PLY MOD. BIT. CAP SHEET FLASHING
 1 PLY MOD. BIT. BASE SHEET FLASHING
 50x300mm WOOD BLOCKING CUT TO SUIT
 100x100mm WOOD CANT
 TIE-IN AS PER DETAIL #9

WOOD BLOCKING 200 X HEIGHT OF INSULATION + 6mm
 METAL AIR SEAL

300mm MIN.

SPECIFIED ASSEMBLY

NOTE:

1. SLOPE LAST 1200mm OF JOINT TO MATCH EXTERIOR EAVE.
2. AIR SEALS, MINERAL FIBRE INSULATION AND WOOD BLOCKING BY GENERAL TRADES.
3. REFER TO ARCHITECTURAL DRAWINGS.

EXPANSION JOINT DETAIL

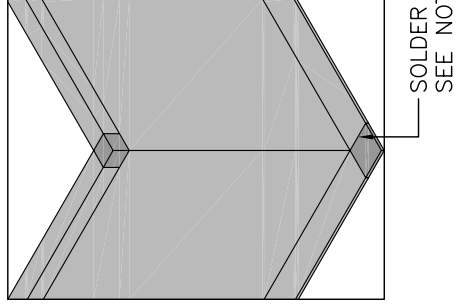
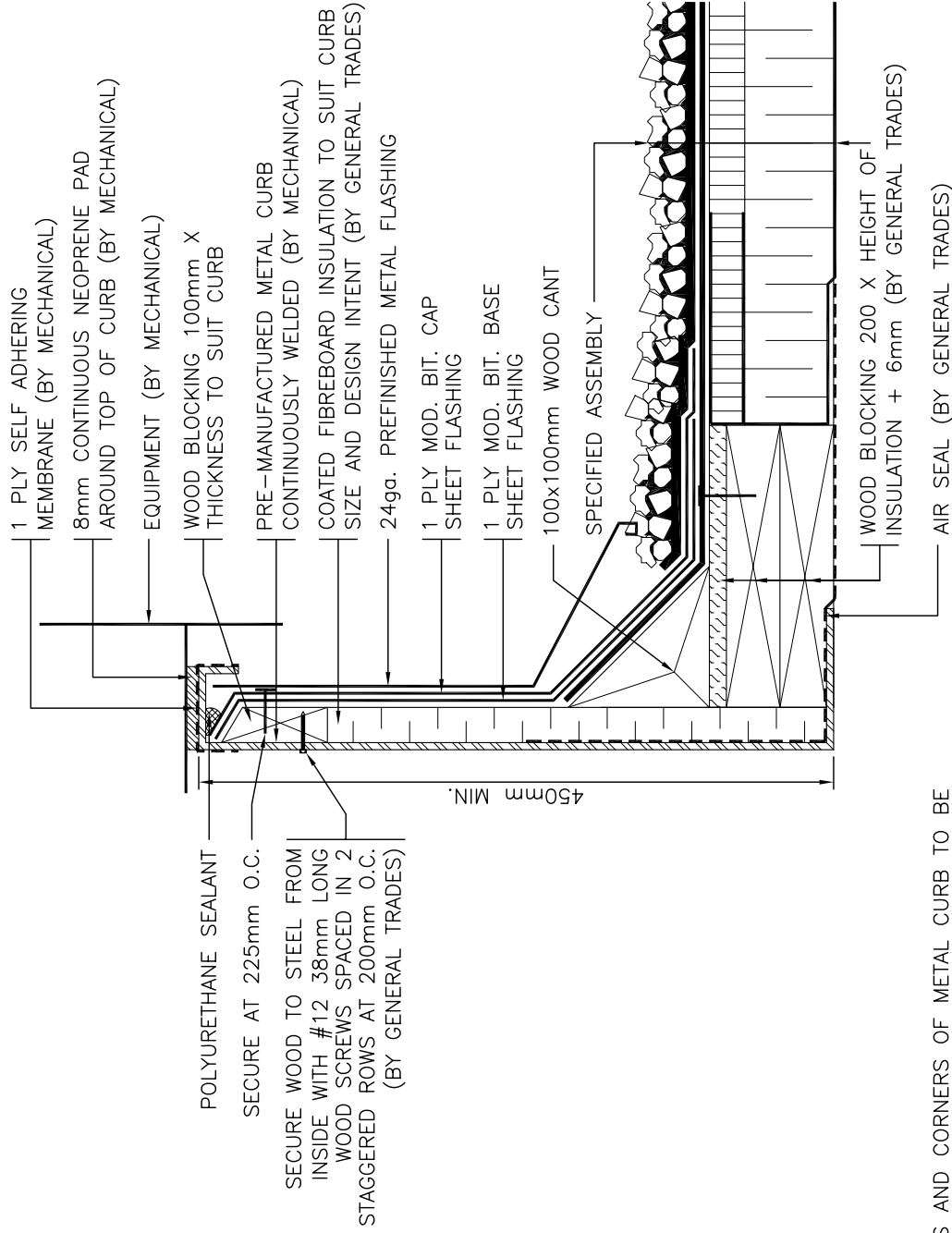
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HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	3
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D03	

"ISSUED FOR BIDS (PHASE 2)",
 DATE OCT 15, 2009



NOTES:

1. ALL JOINTS AND CORNERS OF METAL CURB TO BE CONTINUOUSLY WELDED OR SOLDERED.
2. WOOD BLOCKING AND AIR SEALS BY GENERAL TRADES.

METAL CURB DETAIL

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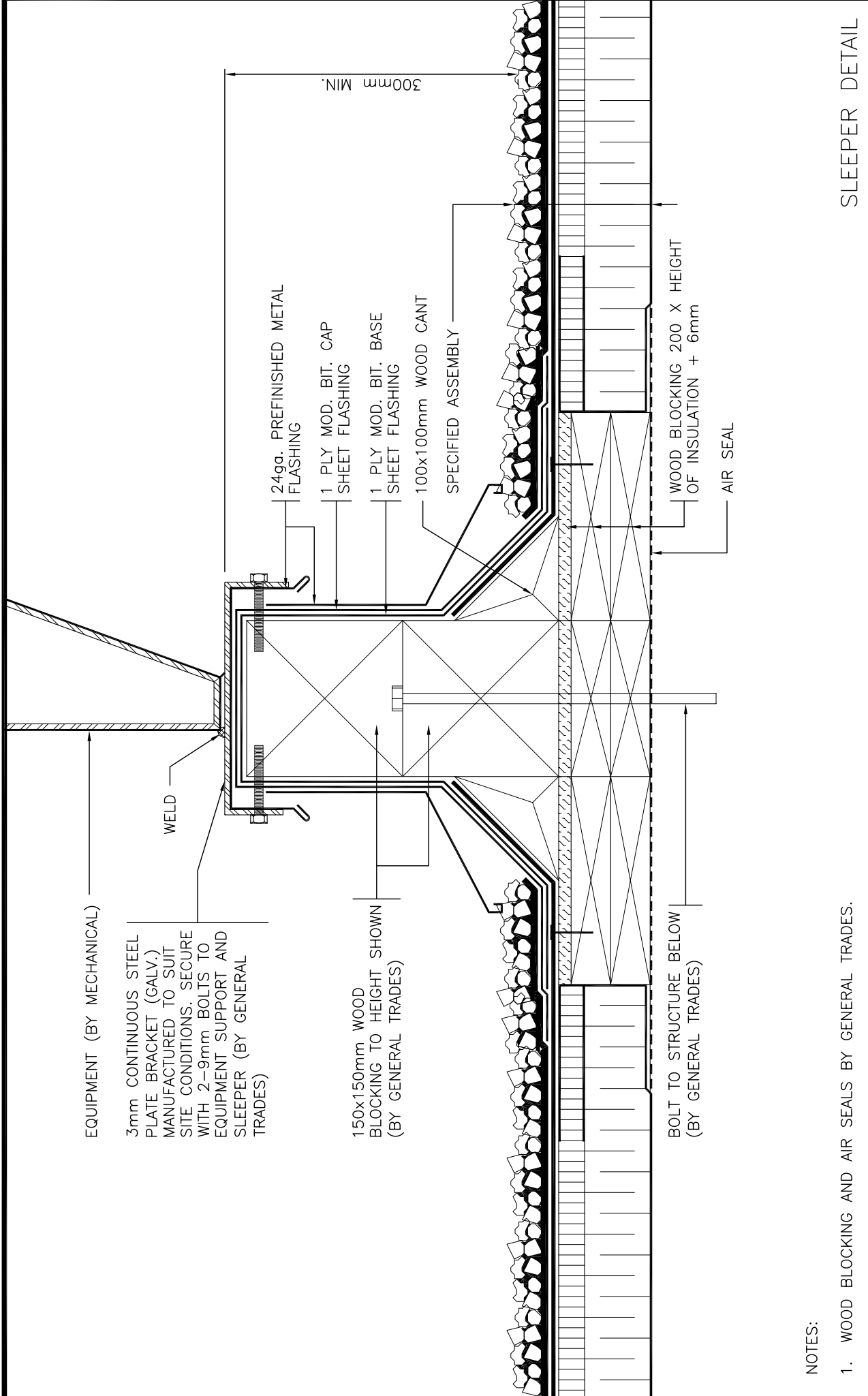
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**HALTON DISTRICT SCHOOL BOARD
GEORGETOWN H.S. ADDITION
GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	4
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D04	

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009



NOTES:

1. WOOD BLOCKING AND AIR SEALS BY GENERAL TRADES.

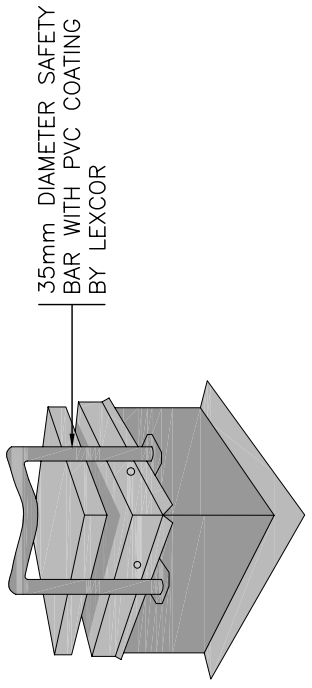
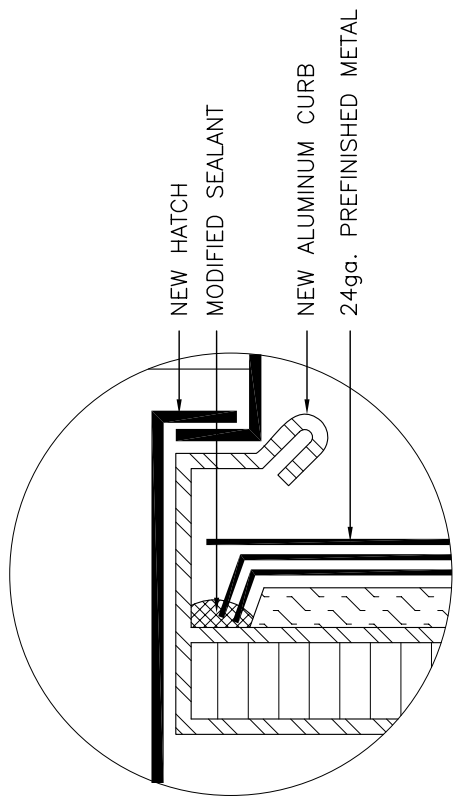
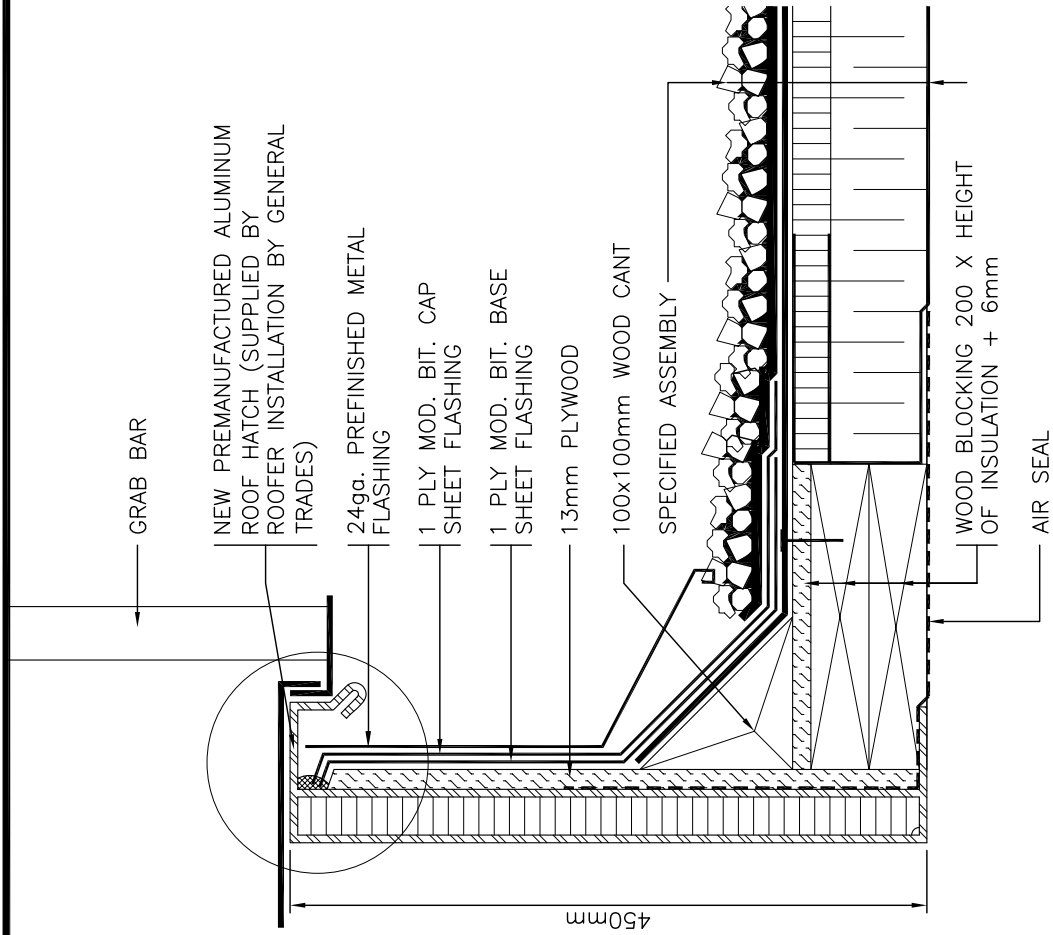
SLEEPER DETAIL

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**HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	4A
SCALE: NTS	
DRAWN BY: AC	"ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009
FILE NAME: 8082D04A	



NOTES:

1. ACCESS LADDER BY OTHERS.
2. WOOD BLOCKING AND AIR SEALS BY GENERAL TRADES.

HATCH DETAIL

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HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	4B
SCALE: NTS	
DRAWN BY: AC	"ISSUED FOR BIDS (PHASE 2)", DATE: OCT 15, 2009
FILE NAME: 8082D04B	

GOOSENECK EXHAUST HOOD (BY MECHANICAL)

PROVIDE INSECT SCREEN (BY MECHANICAL)

POLYURETHANE SEALANT

SECURE COLLAR WITH POP RIVETS @ 200mm O.C.

24ga. PREFINISHED METAL FLASHING

50x150mm WOOD BLOCKING

DUCTWORK

13mm PLYWOOD

50x300mm WOOD BLOCKING

1 PLY MOD. BIT. CAP SHEET FLASHING

1 PLY MOD. BIT. BASE SHEET FLASHING


100x100mm WOOD CANT

SPECIFIED ASSEMBLY

NOTES:
1. WOOD BLOCKING AND AIR SEALS BY GENERAL TRADES.

CURB DETAIL

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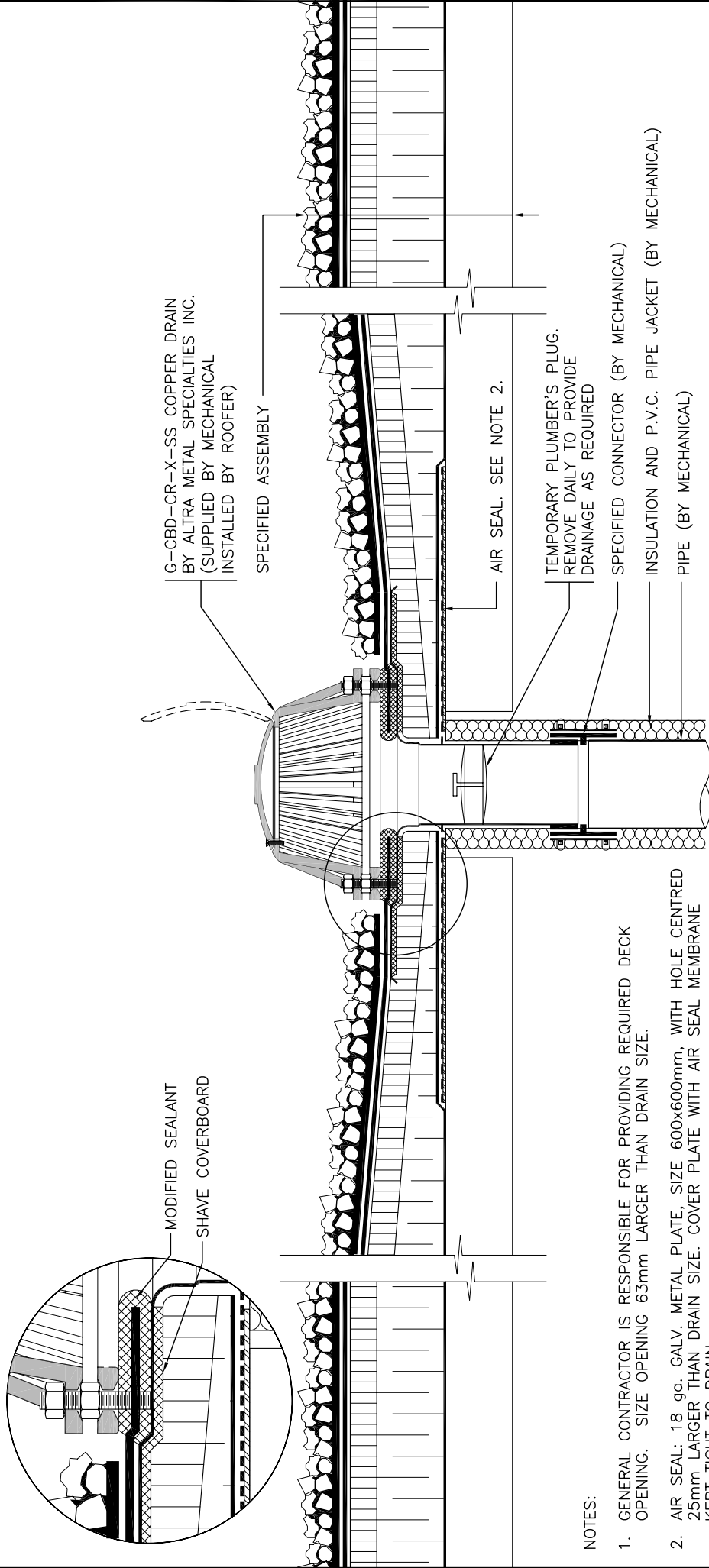


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**HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	4C
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D04C	

"ISSUED FOR BIDS (PHASE 2)",
DATE: OCT 15, 2009



G-CBD-CR-X-SS COPPER DRAIN
BY ALTRA METAL SPECIALTIES INC.
(SUPPLIED BY MECHANICAL
INSTALLED BY ROOFER)

SPECIFIED ASSEMBLY

AIR SEAL. SEE NOTE 2.

TEMPORARY PLUMBER'S PLUG.
REMOVE DAILY TO PROVIDE
DRAINAGE AS REQUIRED

SPECIFIED CONNECTOR (BY MECHANICAL)

INSULATION AND P.V.C. PIPE JACKET (BY MECHANICAL)

PIPE (BY MECHANICAL)

MODIFIED SEALANT
SHAVE COVERBOARD

NOTES:

1. GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING REQUIRED DECK OPENING. SIZE OPENING 63mm LARGER THAN DRAIN SIZE.
2. AIR SEAL: 18 ga. GALV. METAL PLATE, SIZE 600x600mm, WITH HOLE CENTRED 25mm LARGER THAN DRAIN SIZE. COVER PLATE WITH AIR SEAL MEMBRANE KEPT TIGHT TO DRAIN.
3. INSTALL SLOPED INSULATION AS PER TAPERED INSULATION PLAN.
4. SHAVE TOP SURFACE OF COVERBOARD TO ALLOW DRAIN FLANGE TO SIT SNUG AND LEVEL.
5. PRIME FLANGE AND SET IN MODIFIED SEALANT BEFORE FLASHING.
6. ENSURE PLUMBER'S PLUG IS IN PLACE AND DRAIN IS LEAK FREE UNTIL PLUMBING IS COMPLETED.
7. PROVIDE NEW PIPE AND INSULATION AND CONNECT TO EXISTING EXTERNAL DRAINAGE SYSTEM (BY SECTION 15000).

DRAIN DETAIL

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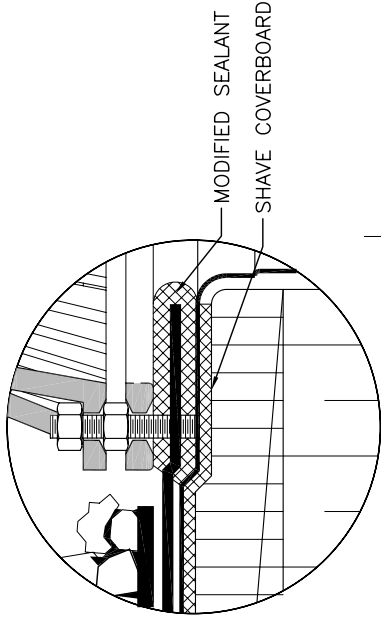
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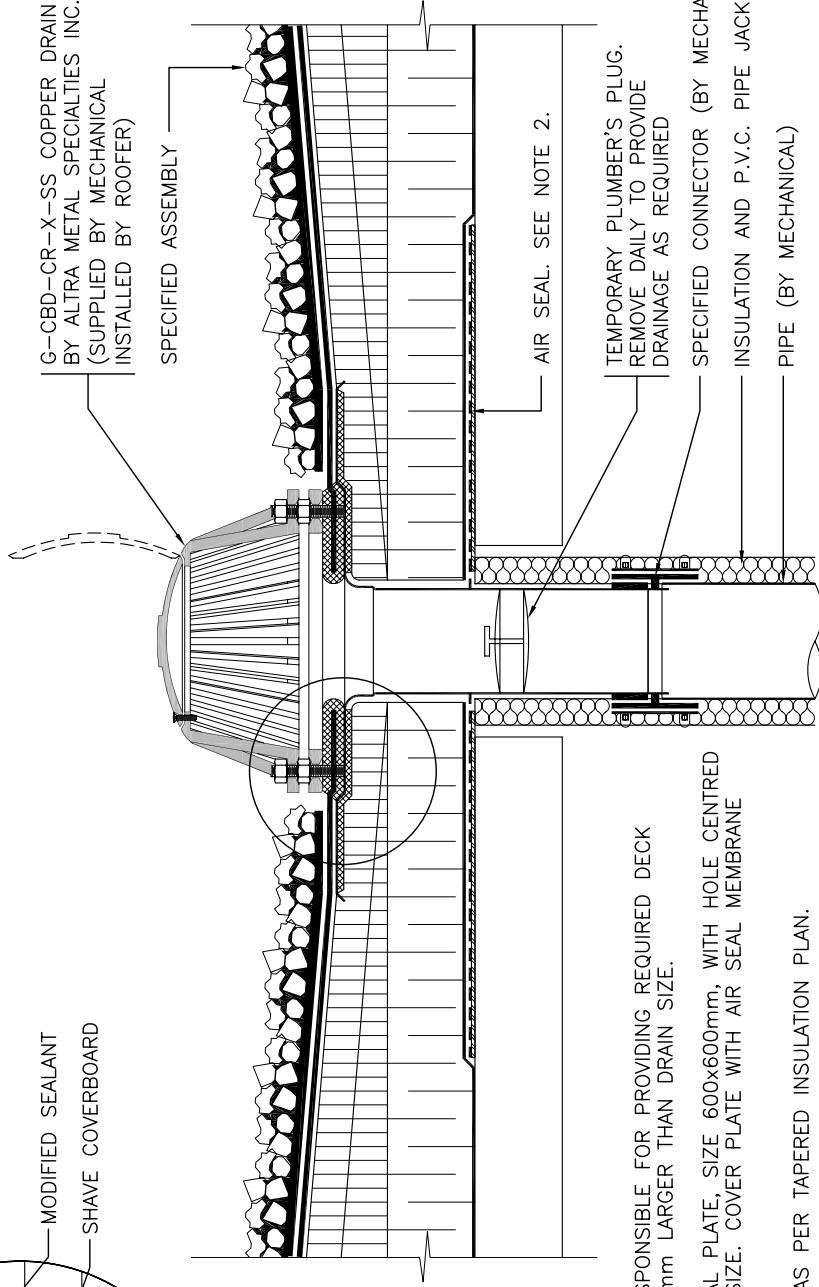
**HALTON DISTRICT SCHOOL BOARD
GEORGETOWN H.S. ADDITION
GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	5
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D05	

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009



MODIFIED SEALANT
SHAVE COVERBOARD



G-CBD-CR-X-SS COPPER DRAIN
BY ALTRA METAL SPECIALTIES INC.
(SUPPLIED BY MECHANICAL
INSTALLED BY ROOFER)

SPECIFIED ASSEMBLY

AIR SEAL. SEE NOTE 2.

TEMPORARY PLUMBER'S PLUG.
REMOVE DAILY TO PROVIDE
DRAINAGE AS REQUIRED

SPECIFIED CONNECTOR (BY MECHANICAL)

INSULATION AND P.V.C. PIPE JACKET (BY MECHANICAL)

PIPE (BY MECHANICAL)

NOTES:

1. GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING REQUIRED DECK OPENING. SIZE OPENING 63mm LARGER THAN DRAIN SIZE.
2. AIR SEAL: 18 ga. GALV. METAL PLATE, SIZE 600x600mm, WITH HOLE CENTRED 25mm LARGER THAN DRAIN SIZE. COVER PLATE WITH AIR SEAL MEMBRANE KEPT TIGHT TO DRAIN.
3. INSTALL SLOPED INSULATION AS PER TAPERED INSULATION PLAN.
4. SHAVE TOP SURFACE OF COVERBOARD TO ALLOW DRAIN FLANGE TO SIT SNUG AND LEVEL.
5. PRIME FLANGE AND SET IN MODIFIED SEALANT BEFORE FLASHING.
6. ENSURE PLUMBER'S PLUG IS IN PLACE AND DRAIN IS LEAK FREE UNTIL PLUMBING IS COMPLETED.
7. PROVIDE NEW PIPE AND INSULATION AND CONNECT TO EXISTING EXTERNAL DRAINAGE SYSTEM (BY SECTION 15000).

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**HALTON DISTRICT SCHOOL BOARD
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GEORGETOWN, ONTARIO**

PROJECT: BD8082

DATE: OCTOBER 2009

SCALE: NTS

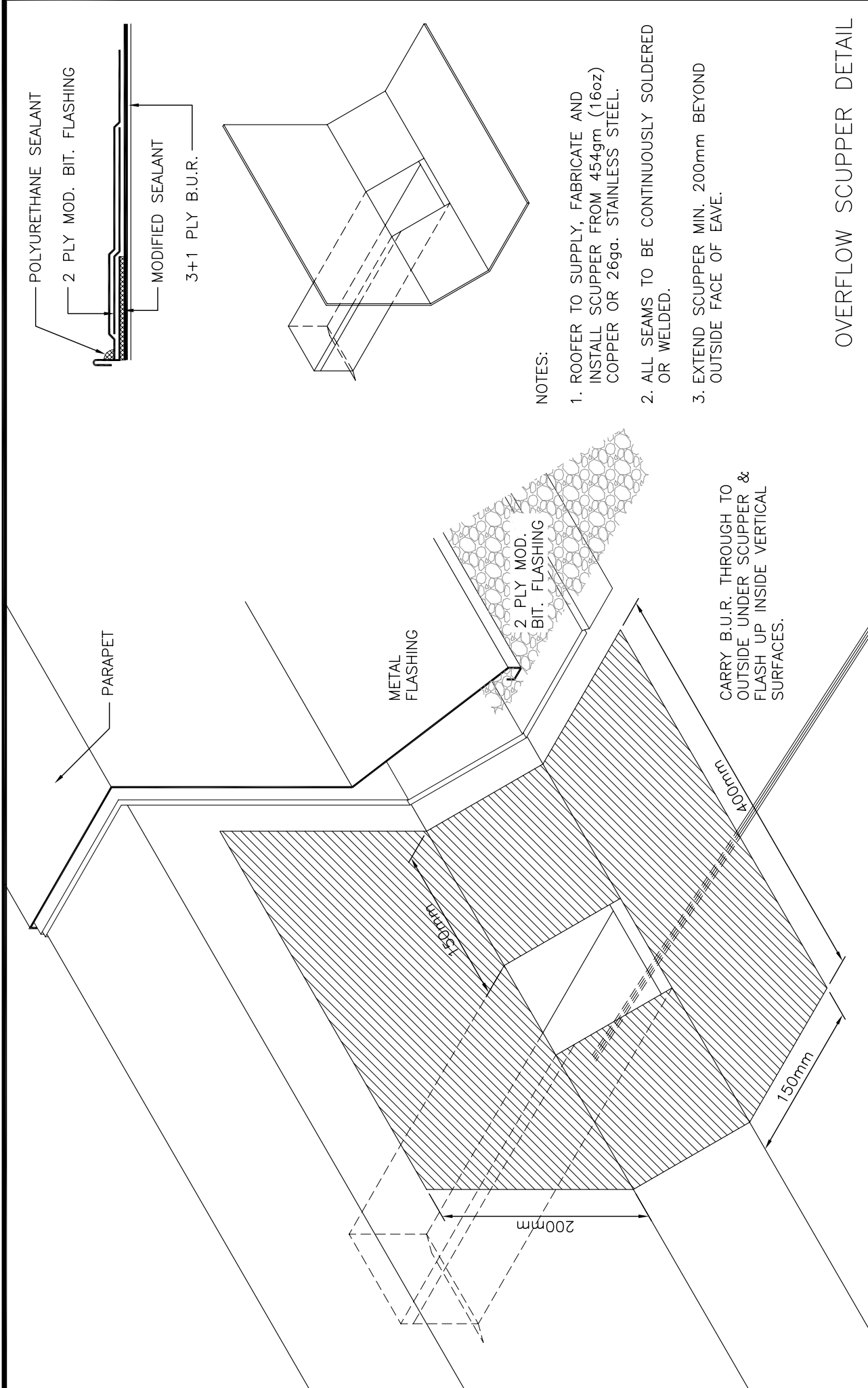
DRAWN BY: AC

FILE NAME: 8082D05A

DETAIL No.

5A

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009



NOTES:

1. ROOFER TO SUPPLY, FABRICATE AND INSTALL SCUPPER FROM 454gm (16oz) COPPER OR 26ga. STAINLESS STEEL.
2. ALL SEAMS TO BE CONTINUOUSLY SOLDERED OR WELDED.
3. EXTEND SCUPPER MIN. 200mm BEYOND OUTSIDE FACE OF EAVE.

OVERFLOW SCUPPER DETAIL

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PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	5B
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D05B	"ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009

HALTON DISTRICT SCHOOL BOARD
 GEORGETOWN H.S. ADDITION
 GEORGETOWN, ONTARIO

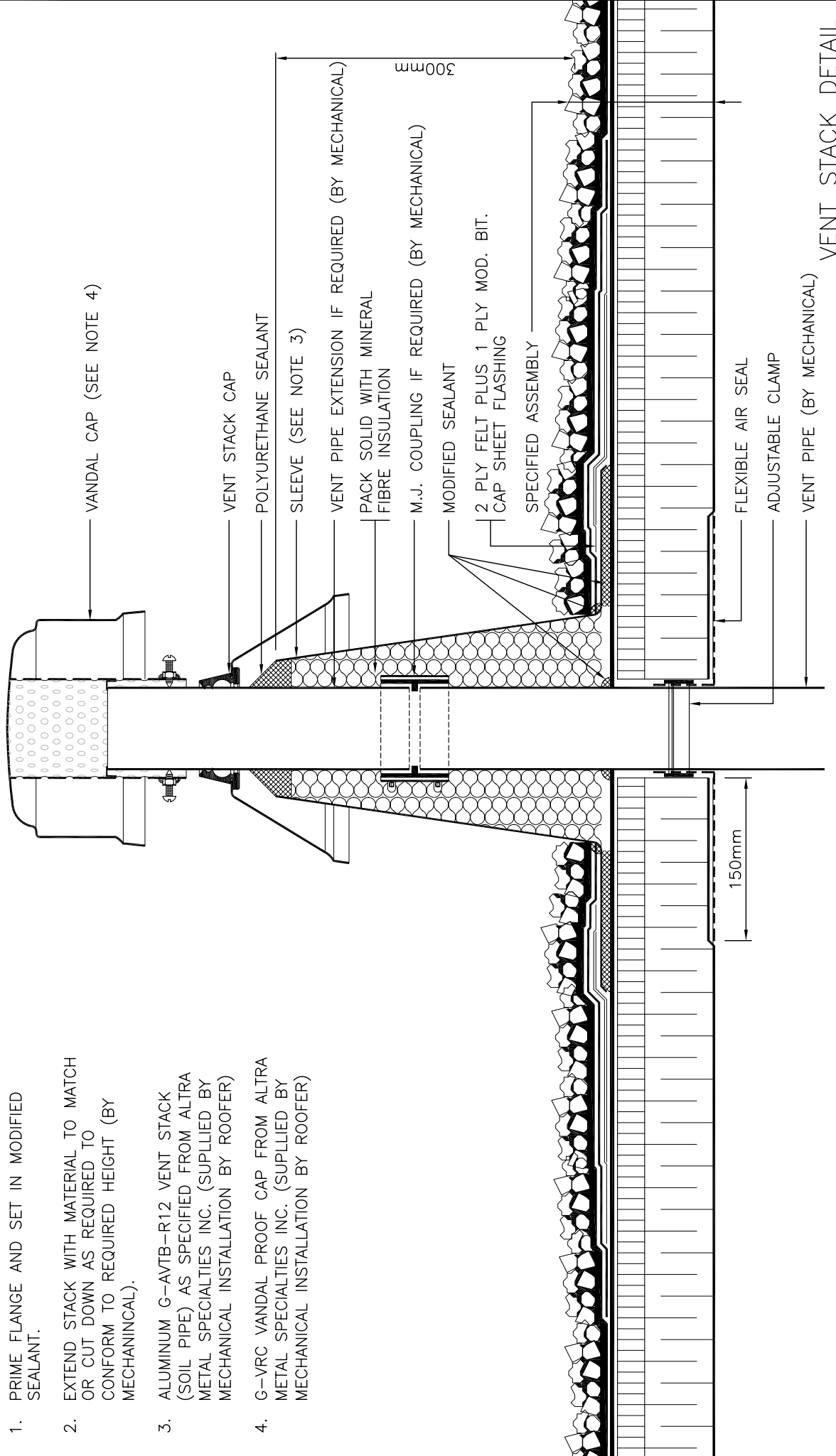
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NOTES:

1. PRIME FLANGE AND SET IN MODIFIED SEALANT.
2. EXTEND STACK WITH MATERIAL TO MATCH OR CUT DOWN AS REQUIRED TO CONFORM TO REQUIRED HEIGHT (BY MECHANICAL).
3. ALUMINUM G-AVTB-R12 VENT STACK (SOIL PIPE) AS SPECIFIED FROM ALTRA METAL SPECIALTIES INC. (SUPPLIED BY MECHANICAL INSTALLATION BY ROOFER)
4. G-VRC VANDAL PROOF CAP FROM ALTRA METAL SPECIALTIES INC. (SUPPLIED BY MECHANICAL INSTALLATION BY ROOFER)

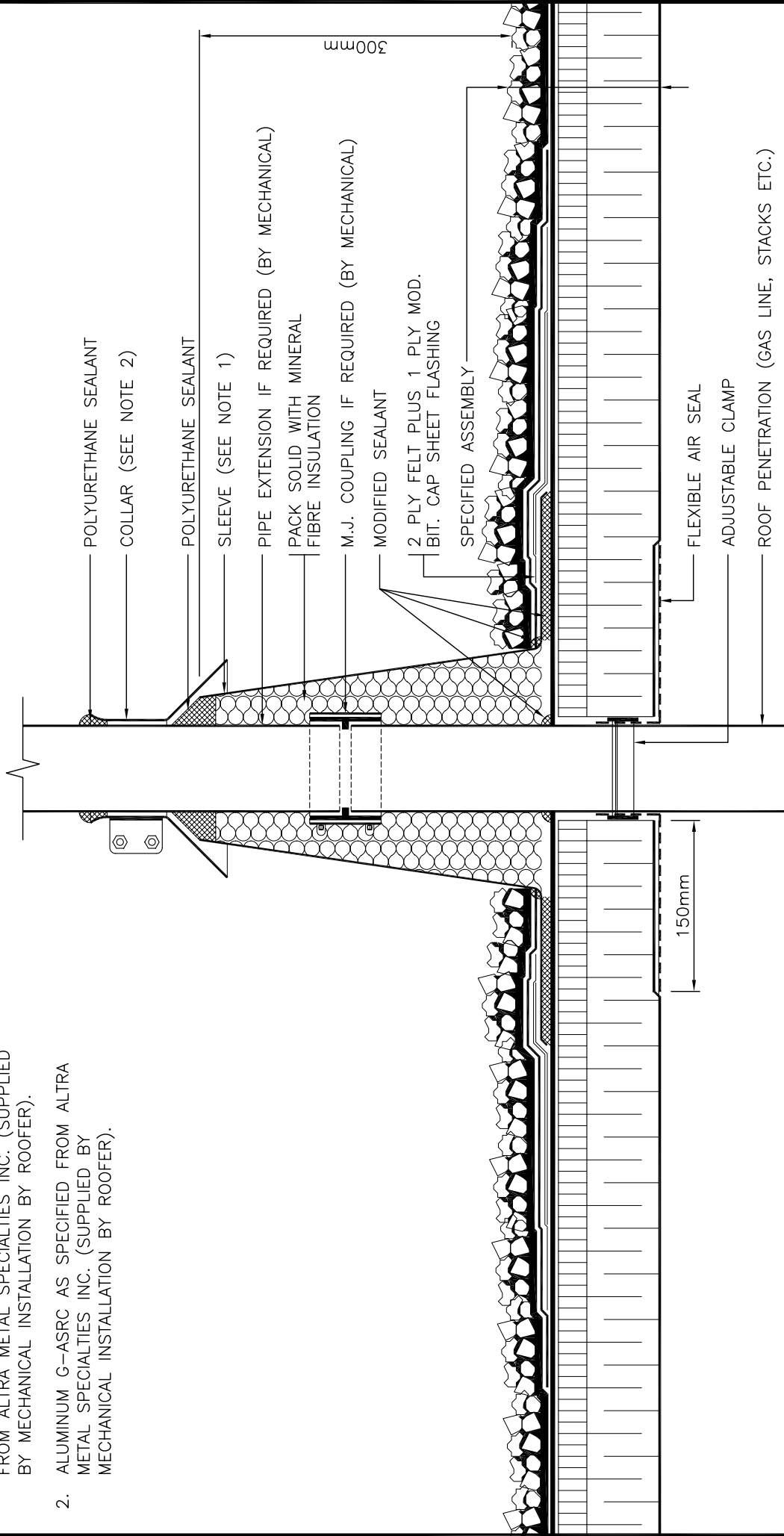


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5045	Building SCIENCES GROUP Inc. PHONE: (888) 969-9970 PHONE: (905) 878-1282 FAX: (905) 878-2147	HALTON DISTRICT SCHOOL BOARD GEORGETOWN H.S. ADDITION GEORGETOWN, ONTARIO
PROJECT: BD8082 DATE: OCTOBER 2009 SCALE: NTS DRAWN BY: AC FILE NAME: 8082D06		DETAIL No. 6 "ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009

NOTES:

1. ALUMINUM G-ATS-12 SLEEVE AS SPECIFIED FROM ALTRA METAL SPECIALTIES INC. (SUPPLIED BY MECHANICAL INSTALLATION BY ROOFER).
2. ALUMINUM G-ASRC AS SPECIFIED FROM ALTRA METAL SPECIALTIES INC. (SUPPLIED BY MECHANICAL INSTALLATION BY ROOFER).



SLEEVE AND COLLAR DETAIL

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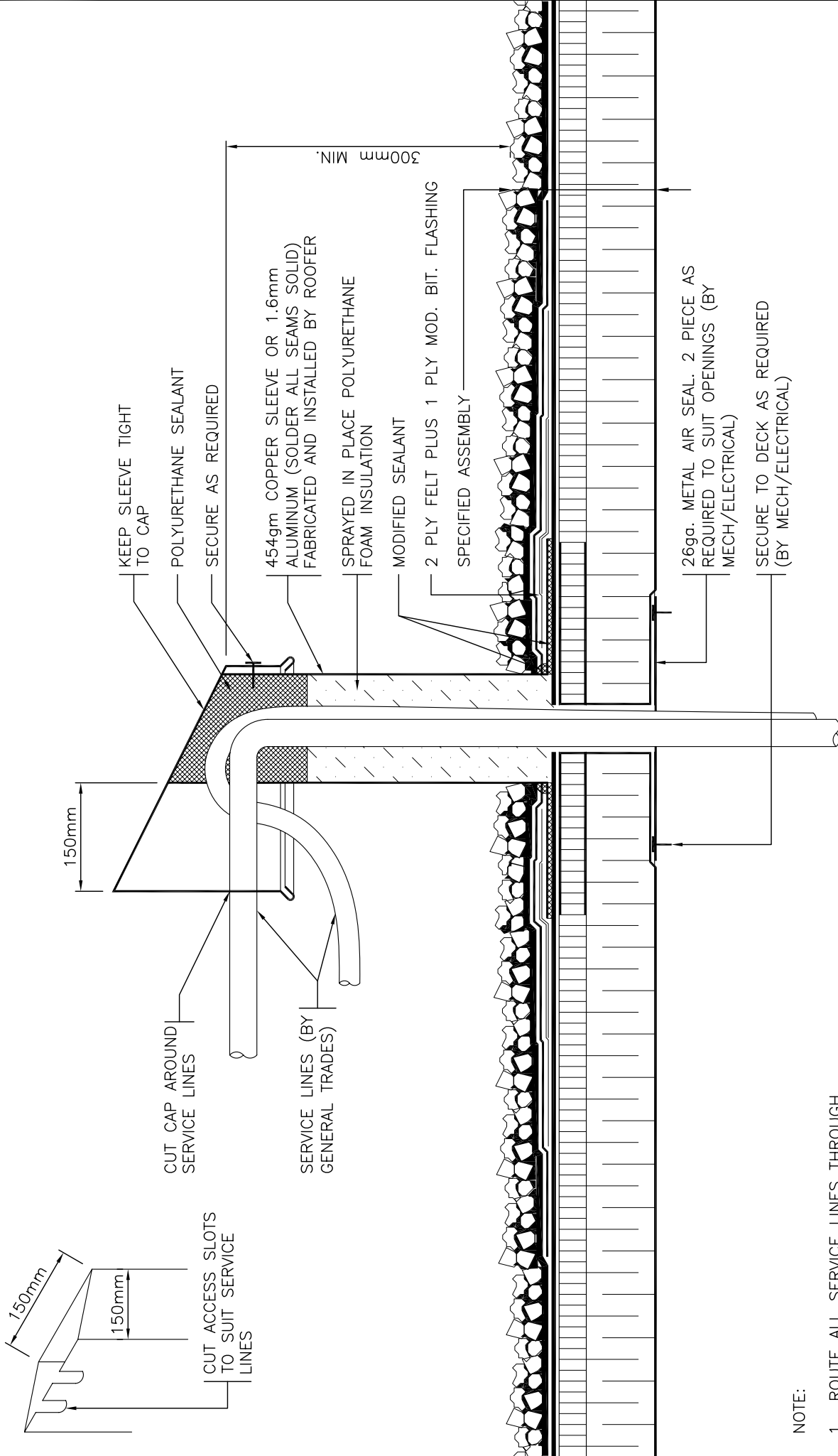
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**HALTON DISTRICT SCHOOL BOARD
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PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	7
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D07	

"ISSUED FOR BIDS (PHASE 2)",
DATE: OCT 15, 2009



NOTE:

1. ROUTE ALL SERVICE LINES THROUGH ONE SLEEVE.

SERVICE LINES DETAIL

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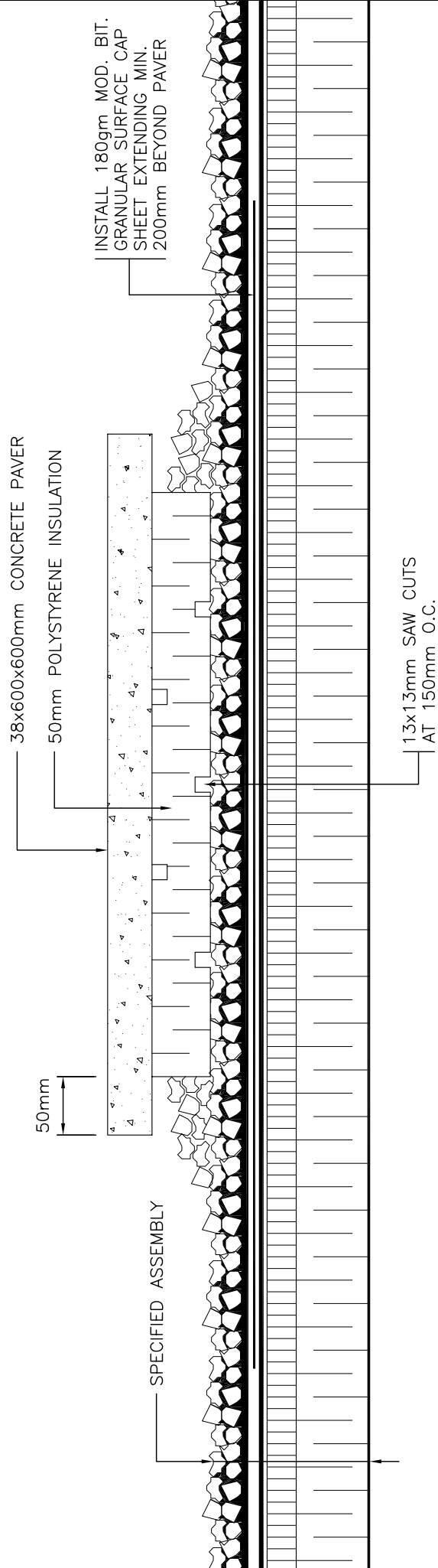
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**HALTON DISTRICT SCHOOL BOARD
GEORGETOWN H.S. ADDITION
GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	7A
SCALE: NTS	"ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009
DRAWN BY: AC	
FILE NAME: 8082D07A	

NOTE:

1. SUPPLY AND INSTALLATION BY ROOFER FOR TRAFFIC AREAS, AT LADDERS AND AROUND ROOFTOP EQUIPMENT.



CONCRETE PAVER DETAIL

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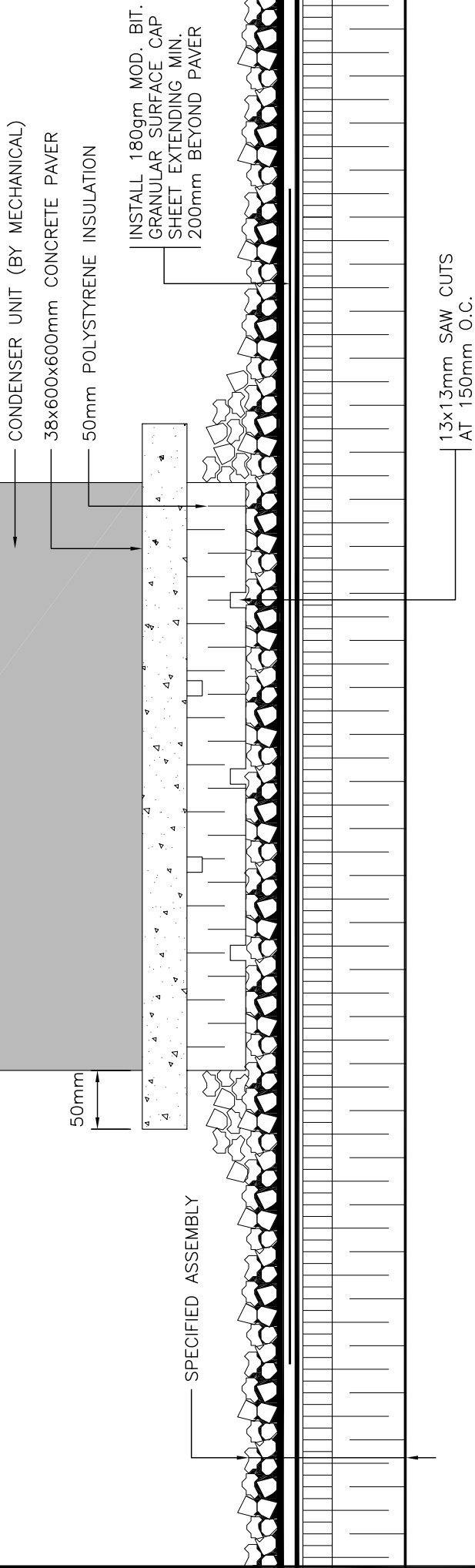
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GEORGETOWN H.S. ADDITION
GEORGETOWN, ONTARIO**

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	8
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D08	

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009

NOTE:

1. SUPPLY AND INSTALLATION OF PAVERS AND CONDENSER UNIT BY MECHANICAL.



CONDENSER ON PAVER DETAIL

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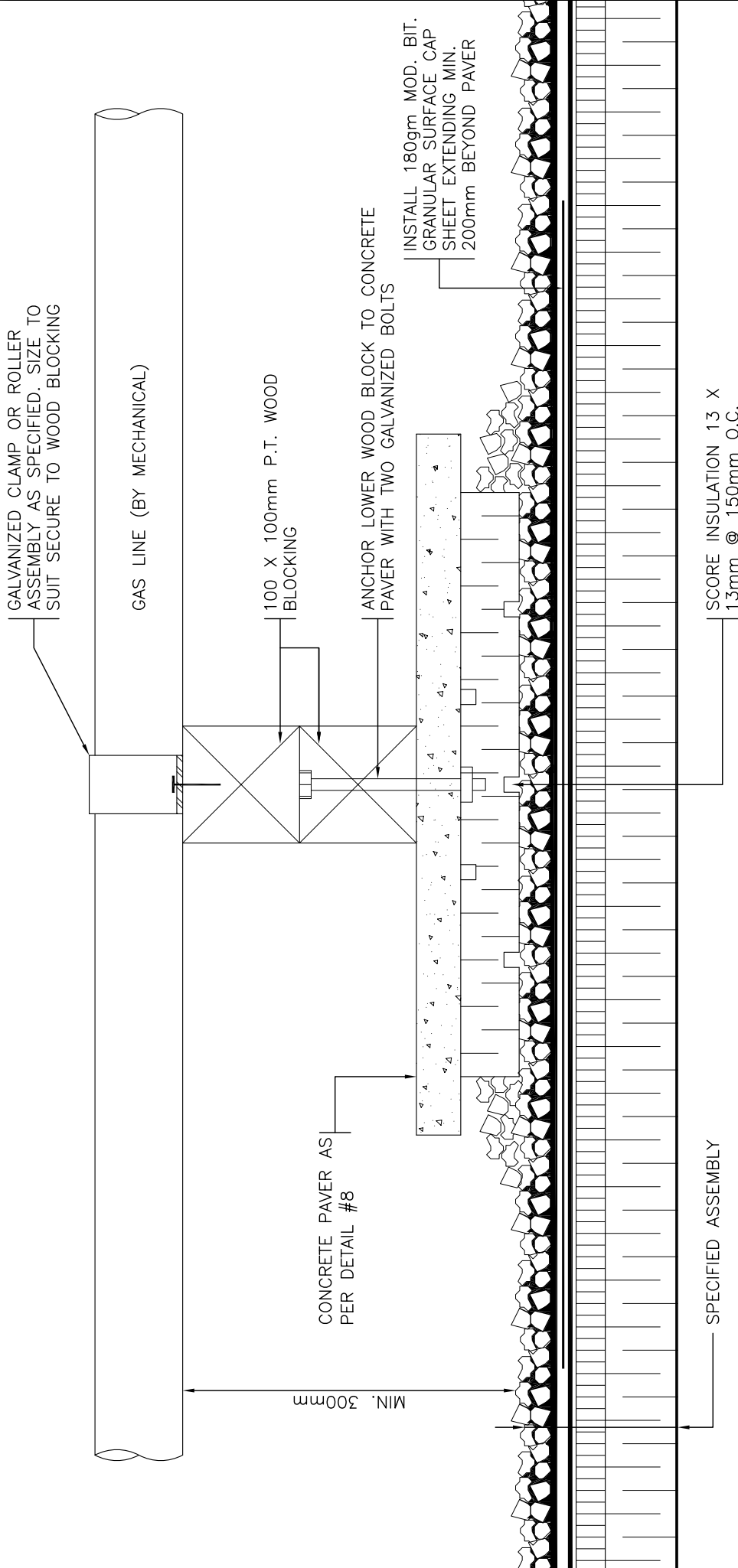
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HALTON DISTRICT SCHOOL BOARD
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 GEORGETOWN, ONTARIO

PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	8A
SCALE: NTS	
DRAWN BY: AC	"ISSUED FOR BIDS (PHASE 2)", DATE OCT 15, 2009
FILE NAME: 8082D08A	

NOTE:

- SUPPLY AND INSTALLATION OF PAVERS, SUPPORTS AND CLAMPS BY MECHANICAL.



PIPE SUPPORT DETAIL

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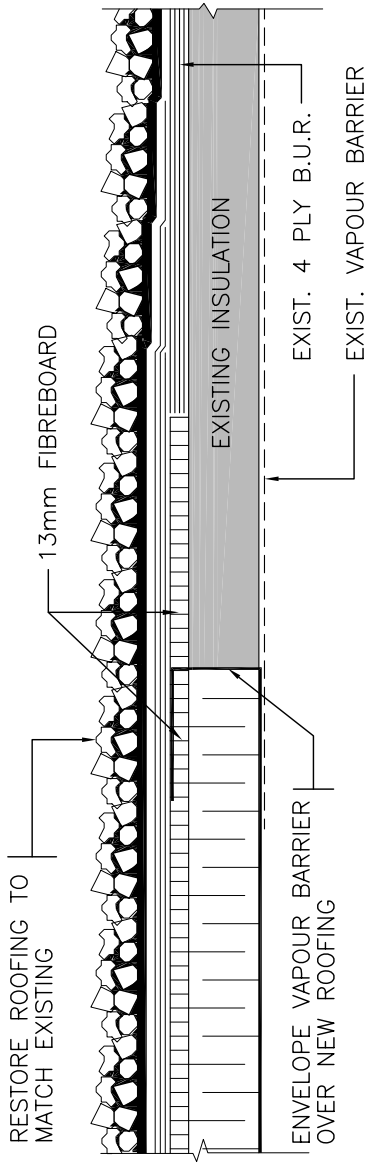
PROJECT: BD8082	DETAIL No.
DATE: OCTOBER 2009	8B
SCALE: NTS	
DRAWN BY: AC	
FILE NAME: 8082D08B	

"ISSUED FOR BIDS (PHASE 2)",
 DATE OCT 15, 2009

GENERAL NOTES

1. AT LOCATIONS SPECIFIED, SHOWN OR AS OTHERWISE REQUIRED, PREPARE BITUMEN MEMBRANE FOR REPAIR BY REMOVING GRAVEL AND BITUMEN POUR A MINIMUM OF 600mm ON EITHER SIDE OF THE PROPOSED TIE-IN AREA.
2. LEAVE FELTS FREE OF GRAVEL AND CLEAN OFF DUST AND DEBRIS. DISPOSE OF CHIPPINGS AND DEBRIS AWAY FROM SITE.
3. TORCH EXPOSED MEMBRANE TO FLOW BITUMEN TO AN EVEN BLACK SURFACE. PRIOR TO REPAIR TO IMPROVE ADHESION AT POINTS OF CONTACT.
4. REPAIR ALL DAMAGED ROOFING CAUSED BY THIS OPERATION WITH MATERIAL AND FINISH TO MATCH THE ORIGINAL.
5. REMOVE EXISTING ROOFING DOWN TO DECK AT LOCATION SHOWN.
6. INSTALL NEW KRAFT VAPOUR BARRIER OVERLAPPING EXISTING MINIMUM 100mm EACH SIDE.
7. RESTORE WITH MATCHING THICKNESS OF INSULATION AND 13mm FIBREBOARD. CAP WITH NEW 4 PLY B.U.R. USING TYPE II ASPHALT. CARRY THE FIRST PLY OF FELT ONTO THE EXISTING MEMBRANE 150mm WITH EACH SUCCEEDING PLY EXTENDING 150mm FURTHER. INSTALL TWO ADDITIONAL PLIES OF FIBREGLASS FELT OVER SPLICE JOINT.
8. PROVIDE NEW BITUMEN AND GRAVEL POUR.

EXTEND 4 PLY B.U.R. AND FEATHER ONTO EXISTING MEMBRANE, MIN. 600mm



NOTE:
ADJUST HEIGHT OF WOOD BLOCKING AND INSULATIONS TO MATCH HEIGHT OF EXISTING ASSEMBLIES.

TIE-IN DETAIL

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**HALTON DISTRICT SCHOOL BOARD
GEORGETOWN H.S. ADDITION
GEORGETOWN, ONTARIO**

PROJECT: BD8082

DATE: OCTOBER 2009

SCALE: NTS

DRAWN BY: AC

FILE NAME: 8082D09

DETAIL No.

9

"ISSUED FOR BIDS (PHASE 2)",
DATE OCT 15, 2009

1 General

1.1 SECTION INCLUDES

- .1 Standard hollow metal frames, non-rated and fire rated types.
- .2 Thermally-broken hollow metal frames, non-rated type.
- .3 Double egress hollow metal frames, non-rated and fire rated types.

1.2 RELATED SECTIONS

- .1 Section 04 05 10 - Masonry Mortaring and Grouting: mortar fill of frames.
- .2 Section 07 92 00 - Joint Sealants.
- .3 Section 08 13 13 - Hollow Metal Doors.
- .4 Section 08 14 00 - Wood Doors.
- .5 Section 08 71 00 - Door Hardware.
- .6 Section 08 80 00 - Glazing: glazing of hollow metal screens.
- .7 Section 09 90 00 - Painting and Coating: site finishing of frames.

1.3 REFERENCES

- .1 ASTM A653/A653M-09: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian Steel Door Manufacturer's Association: Recommended Dimensional Standard for Steel Doors and Frames.
- .3 Canadian Steel Door Manufacturer's Association: Recommended Specifications for Commercial Steel Door and Frame Products.
- .4 Canadian Steel Door Manufacturer's Association: Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.
- .5 Canadian Steel Door Manufacturer's Association: Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction).
- .6 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding).
- .7 CAN/CGSB-1.40-97: Anticorrosive Structural Steel Alkyd Primer.
- .8 NAAMM HMMA 802-07: Manufacturing of Hollow Metal Doors and Frames.
- .9 NAAMM HMMA 840-07: Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.
- .10 NFPA 80-2007: Fire Doors and Other Opening Protectives.
- .11 Underwriters Laboratories of Canada: List of Equipment and Materials.

1.4 SUBMITTALS

- .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
- .2 Shop Drawings: Indicate frame configuration, anchor types and spacings, location of cut outs for hardware, reinforcement, and finish.

- .3 Product Data: manufacturer's standard data sheets illustrating standard frame construction and knock down frames.
- 1.5 QUALITY ASSURANCE
- .1 Conform to Canadian Steel Door Manufacturers Association standards.
 - .2 Welding: to CSA W59.
 - .3 Fire Rated Frame Assemblies: conform to National Fire Protection Association standards for fire rated class indicated in schedule.
- 1.6 DELIVERY, STORAGE AND HANDLING
- .1 Refer to Section 01 60 00.
 - .2 Store hollow metal frames to HMMA 840.
- 2 Products
- 2.1 MANUFACTURERS
- .1 Manufacturers of hollow metal frames having Product considered acceptable for use:
 - .1 Artek Door Limited.
 - .2 Baron Metal Industries.
 - .3 Daybar.
 - .4 Fleming Door Products Ltd.
 - .5 Metal Door Limited.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 MATERIALS
- .1 Standard Hollow Metal Frame: 1.6 mm thick, cold-rolled commercial quality steel; paintable galvaneal finish; fire rating as scheduled; sizes as indicated on Drawings; eg. F-Series Frame by Fleming Door Products Ltd.
 - .2 Double Egress Hollow Metal Frame: 1.6 mm thick, cold-rolled commercial quality steel; paintable galvaneal finish; fire rating as scheduled; sizes as indicated on Drawings; eg. DE-Series Frame by Fleming Door Products Ltd.
 - .3 Thermally-Broken Hollow Metal Frame: 1.6 mm thick, cold-rolled commercial quality steel; paintable galvaneal finish; sizes as indicated on Drawings; eg. Therma-Series Frame by Fleming Door Products Ltd.
 - .4 Infill Panels: 1.6 mm thick, steel panels on both sides of a 16 mm thick fire-rated gypsum board core; adequate to provide a 1 hour fire rating; paintable galvaneal finish.
 - .5 Reinforcements: regular galvaneal steel, thicknesses as follows:
 - .1 Flush Bolt, Lock and Strike Reinforcement: 1.6 mm
 - .2 Hinge Reinforcements: 3.5 mm.
 - .3 Door Closer and Holder Reinforcements: 2.8 mm.
 - .6 Anchors: regular galvaneal steel, as follows:
 - .1 T-Strap Type: 1.2 mm thick.
 - .2 Stirrup-strap Type: 50 x 250 mm size, 1.6 mm thick.
 - .3 Jamb Floor Type: 1.6 mm thick.
 - .4 Stud Type: 1.0 mm thick.
 - .7 Jamb Spreaders: regular galvaneal steel, 1.0 mm thick.

- .8 Mortar Guard Boxes: regular galvalneal steel, 0.8 mm thick.
- .9 Glazing Stops: rolled steel channel shape, butted corners; prepared for countersink style tamper-proof screws.
- .10 Bumpers: resilient rubber.
- .11 Bituminous Coating: fibrous asphalt emulsion.
- .12 Thermal Break: rigid neoprene or polyvinyl chloride (PVC) extrusion.
- .13 Joint Sealer: as specified in Section 07 92 00.

2.3 FABRICATION

- .1 Fabricate frames as welded unit, for knock down field assembly or for drywall slip-on type, as situation requires.
- .2 Conform to HMMA 802.
- .3 Fabricate frames with fixed mullions, to profiles shown, with hardware reinforcement plates welded in place. Conform to standards and specifications published by the Canadian Steel Door Manufacturer's Association.
- .4 Welding: to CSA W59. Grind exposed welds smooth and flush. Fill open joints, seams, and depressions with filler or by continuous brazing or welding. Grind smooth to true sharp arrises and profiles. Sand to a smooth, true, uniform finish.
- .5 Mitre corners of frames. Cut frame mitres accurately and weld continuously on inside of frame.
- .6 Protect strike and hinge reinforcements and other openings with mortar guard boxes welded to frame.
- .7 Reinforce frames wider than 1.2 metres with roll formed steel channels fitted tightly into frame head, flush with top.
- .8 Fit frames with channel or angle spreaders, minimum two per frame, to ensure proper frame alignment. Install stiffener plates to spreaders between frame trim where required to prevent bending of trim and to maintain alignment when setting and during construction.
- .9 Provide adjustable T-strap anchors in frames to be installed in masonry openings, spaced at 600 mm OC.
- .10 Where floor finish allows, fabricate frames to extend at least 38 mm below finished floor.
- .11 Where frames are required to terminate at finished floor, Provide plates for anchorage to floor slab.
- .12 Prepare interior door frames for single stud door silencers, 3 for single door frames and 2 for double door frames.
- .13 Fabricate fire-rated door frames in accordance with CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.
- .14 Fabricate doors and screens to accommodate scheduled glazing. Secure glazing stops to frames with counter sunk oval head sheet metal screws.
- .15 Preparation for Hardware:
 - .1 Prepare frames for heavy weight oversize butt hinges, cylindrical locksets, rim and concealed vertical rod / mortise lock case exit devices, magnetic locks, surface door closers and concealed overhead stops.
 - .2 Conform to approved finish hardware schedule.

- .3 Blank, mortise, reinforce, drill and tap frames to receive templated hardware, as required. Coordinate with Section 08 71 00.

.16 Thermally-Broken Frames:

- .1 Provide wall and floor anchors suitable for installation, purpose made not to permit thermal conductivity.
- .2 Do not fix sections together with screws, grommets or other thermally conductive fastening device.
- .3 Provide full frame width drip caps.
- .4 Conform to accepted Shop Drawings.

2.4 FINISHING

- .1 Paintable Galvanneal Coating: streak-free matte grey appearance, to ASTM A653/A653M, ZF120 coating designation, minimum 120 g/m² zinc-iron coating.
- .2 Regular Galvanneal Coating: streak-free matte grey appearance, to ASTM A653/A653M, ZF75 coating designation, minimum 75 g/m² zinc-iron coating.
- .3 Shop Primer: to CAN/CGSB-1.40.

3 Execution

3.1 INSTALLATION

- .1 Install frames plumb, square, aligned, without twist at correct elevation, to HMMA 840.
- .2 Coordinate with masonry and wallboard construction for anchor placement.
- .3 Fill frames solid with non-shrink grout or mortar as specified in Section 04 05 10.
- .4 Seal openings between frames and walls as specified in Section 07 92 00.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Hollow metal doors, non-rated and fire rated types.

1.2 RELATED SECTIONS

- .1 Section 08 11 13 - Hollow Metal Frames.
.2 Section 08 71 00 - Door Hardware.
.3 Section 08 80 00 - Glazing.
.4 Section 09 90 00 - Painting and Coating.

1.3 REFERENCES

- .1 ANSI/DHI A115.IG-1994: Installation Guide for Doors and Hardware.
.2 ASTM A653/A653M-09: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.3 Canadian Steel Door Manufacturer's Association: Recommended Dimensional Standard for Steel Doors and Frames.
.4 Canadian Steel Door Manufacturer's Association: Recommended Specifications for Commercial Steel Door and Frame Products.
.5 Canadian Steel Door Manufacturer's Association: Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.
.6 Canadian Steel Door Manufacturer's Association: Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction).
.7 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding).
.8 CAN/CGSB-1.40-97: Anti-corrosive Structural Steel Alkyd Primer.
.9 NAAMM HMMA 802-07: Manufacturing of Hollow Metal Doors and Frames.
.10 NAAMM HMMA 840-07: Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.
.11 NFPA 80-2007: Fire Doors and Other Opening Protectives.
.12 CAN/ULC-S702-09: Standard for Mineral Fibre Thermal Insulation for Buildings.
.13 Underwriters Laboratories of Canada: List of Equipment and Materials.

1.4 SUBMITTALS

- .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
.2 Shop Drawings: Indicating door elevations, internal reinforcement, closure method, location of cut outs for hardware, glazing and louvres, and finish.
.3 Product Data: manufacturer's standard data sheet illustrating standard door construction.

1.5 QUALITY ASSURANCE

- .1 Conform to Canadian Steel Door Manufacturers' Association standards.
.2 Welding: to CSA W59.

- .3 Fire Rated Door Assembly: to National Fire Protection Association requirements for fire rated class indicated in schedule.
- 1.6 DELIVERY, STORAGE AND HANDLING
- .1 Refer to Section 01 60 00.
 - .2 Store hollow metal doors to HMMA 840.
- 2 Products
- 2.1 MANUFACTURERS
- .1 Manufacturers of hollow metal doors having Product considered acceptable for use:
 - .1 Artek Door Limited.
 - .2 Baron Metal Industries.
 - .3 Daybar.
 - .4 Fleming Door Products Ltd.
 - .5 Metal Door Limited.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 MATERIALS
- .1 Hollow Metal Doors - Exterior: 45 mm thick, constructed as follows:
 - .1 Door Faces: 1.6 mm thick commercial quality steel sheet faces, flush design, paintable galvanneal finish.
 - .2 Vertical Steel Stiffeners: 0.91 mm thick commercial quality steel profiles, interlocking design, regular galvanneal finish.
 - .3 Core: 45 mm thick semi-rigid mineral fibre insulation, to CAN/ULC-S702, Type 1; minimum RSI 0.68 per 25 mm of thickness.
 - .2 Hollow Metal Doors - Interior: 45 mm thick, fire rating as scheduled; constructed as follows:
 - .1 Door Faces: 1.6 mm thick commercial quality steel sheet faces, flush design, paintable galvanneal finish.
 - .2 Vertical Steel Stiffeners: 0.91 mm thick commercial quality steel profiles, interlocking design, regular galvanneal finish.
 - .3 Core: semi-rigid mineral fibre insulation, to CAN/ULC-S702, Type 1; minimum RSI 0.68 per 25 mm of thickness.
- 2.3 ACCESSORIES
- .1 Infill Panels: 1.6 mm thick, steel panels on both sides of a 16 mm thick fire-rated gypsum board core; adequate to provide a 1 hour fire rating; paintable galvanneal finish.
 - .2 Reinforcements: regular galvanneal steel, thicknesses as follows:
 - .1 Flush Bolt, Lock and Strike Reinforcement: 1.6 mm
 - .2 Hinge Reinforcements: 3.5 mm.
 - .3 Door Closer and Holder Reinforcements: 2.8 mm.
 - .3 Glazing Stops: Rolled steel channel shape, butted corners; prepared for countersink style tamper-proof screws.
 - .4 Bituminous Coating: Fibrous asphalt emulsion.
- 2.4 FABRICATION
- .1 Fabricate doors to HMMA 802, and to the standards and specifications published by the Canadian Steel Door Manufacturers' Association.

- .2 Provide continuous faces free from joints, tool markings and abrasions; with hardware reinforcement plates welded in place.
- .3 Welding: to CSA W59. Grind exposed welds smooth and flush. Fill open joints, seams, and depressions with filler or by continuous brazing or welding. Grind smooth to true sharp arrises and profiles. Sand to a smooth, true, uniform finish.
- .4 Fabricate fire-rated doors in accordance with CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.
- .5 Fabricate doors to accommodate scheduled glazing. Secure glazing stops to doors with counter sunk oval head sheet metal screws.
- .6 Prepare doors for heavy weight oversize butt hinges, cylindrical locksets, rim and concealed vertical rod / mortise lock case exit devices, magnetic locks, surface door closers and concealed overhead stops. Conform to approved finish hardware schedule.
- .7 Blank, mortise, reinforce, drill and tap doors to receive templated hardware, as required. Coordinate with Section 08 71 00.
- .8 Reinforce and stiffen doors with vertical steel stiffeners spaced at 152 mm OC, continuous for full height of door, spot welded to both door faces.
- .9 Completely fill door cores with specified core materials.
- .10 Reinforce door edges with channel reinforcing.
- .11 Continuously weld seam between faces and door edges. Bevel stiles minimum 3 mm.
- .12 Provide flush top edge and bottom closures on exterior doors, sealed watertight.

2.5 FINISHING

- .1 Paintable Galvanneal Coating: streak-free matte grey appearance, to ASTM A653/A653M, ZF120 coating designation, minimum 120 g/m² zinc-iron coating.
- .2 Regular Galvanneal Coating: streak-free matte grey appearance, to ASTM A653/A653M, ZF75 coating designation, minimum 75 g/m² zinc-iron coating.
- .3 Shop Primer: to CAN/CGSB-1.40.

3 Execution

3.1 INSTALLATION

- .1 Install doors to HMMA 840, ANSI/DHI A115.IG and Canadian Steel Door Manufacturers Association standards.

3.2 TOLERANCES

- .1 Maximum Diagonal Distortion After Installation: 1.5 mm measured with straight edge, corner to corner.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Wood doors.
- 1.2 RELATED SECTIONS
 - .1 Section 06 20 00 - Finish Carpentry.
 - .2 Section 06 24 00 - Laminated Plastics.
 - .3 Section 08 11 13 - Hollow Metal Frames.
 - .4 Section 08 71 00 - Door Hardware.
 - .5 Section 08 80 00 - Glazing.
 - .6 Section 09 90 00 - Painting and Coating: site finishing of wood doors.
- 1.3 REFERENCES
 - .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Architectural Woodwork Standards.
 - .2 ANSI A208.1-2009: Particleboard.
 - .3 ANSI/DHI A115.IG-1994: Installation Guide for Doors and Hardware.
 - .4 ANSI/NEMA LD 3-2005: High Pressure Decorative Laminates.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate door elevations, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts.
- 1.5 QUALITY ASSURANCE
 - .1 Conform to AWMAC Architectural Woodwork Standards, Institutional Grade.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Pile doors flat on level supports to prevent warping.
 - .3 Protect face of first door unit by placing plywood or cardboard between supports and door. Cover the top door unit in a similar manner.
 - .4 Store doors in a dry, well-ventilated area.
- 1.7 WARRANTY
 - .1 Provide a five year manufacturer's extended warranty in accordance with the General Conditions of the Contract.
 - .2 Extended Warranty: include coverage against warping beyond installation tolerances, and delamination or degradation of veneer.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of wood doors having Product considered acceptable for use:

- .1 Baillargeon.
- .2 Cambridge Door Co.
- .3 Door-Lam.
- .4 Weyerhaeuser.

.2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MANUFACTURED ITEMS

.1 Solid Core Flush Wood Doors - Non-Rated: to CAN/CSA-O132.2; 44 mm thick; constructed as follows:

- .1 Core - Non-Rated: AWMAC Particleboard Core Type; 448 kg/m³ solid particleboard core to ANSI A208.1; solid lumber stiles and rails bonded to core.
- .2 Face Assembly Adhesive: Type I - Waterproof.
- .3 Core Assembly Adhesive: Type II - Water-resistant.
- .4 Glass Stops: matching wood.
- .5 Door Faces: Standard decorative laminate to ANSI / NEMA LD 3, Grade VGS; 0.7 mm thick; colours and patterns as selected by Consultant from manufacturer's complete range.

.2 Solid Core Flush Wood Doors - Fire Rated: to CAN/CSA-O132.2; 44 mm thick; fire rating as scheduled; constructed as follows:

- .1 Core - Fire Rated: homogeneous incombustible mineral core; ULC labelled; solid lumber stiles and rails bonded to core.
- .2 Face Assembly Adhesive: Type I - Waterproof.
- .3 Core Assembly Adhesive: Type II - Water-resistant.
- .4 Glass Stops: matching wood.
- .5 Door Faces: Standard decorative laminate to ANSI / NEMA LD 3, Grade VGS; 0.7 mm thick; colours and patterns as selected by Consultant from manufacturer's complete range.

2.3 FABRICATION

.1 Provide doors with 13 mm thick edge strips of matching wood.

.2 Prepare doors with sufficient blocking and reinforcing to accommodate heavy weight oversize butt hinges, cylindrical locksets, rim and concealed vertical rod / mortise lock case exit devices, magnetic locks, surface door closers and concealed overhead stops. Coordinate with Section 08 71 00.

.3 Machine cut relief for hinges and closures and coring for handsets and cylinders.

.4 Provide and prepare openings for glazing.

.5 Apply laminate facings in accordance with AWMAC Architectural Woodwork Standards and as specified in Section 06 24 00.

3 Execution

3.1 INSTALLATION

.1 Install doors to ANSI/DHI A115.IG.

.2 Trim door width to a maximum of 5 mm.

.3 Trim door height by cutting equally on top and bottom edges to a maximum of 19 mm.

- .4 Prepare doors to receive finish hardware to AWMAC Architectural Woodwork Standards.
- .5 Arrange with Section 09 90 00 to finish the top, bottom and jamb edges, and glass stops to match door face.

3.2 TOLERANCES

- .1 Maximum Diagonal Distortion: 1.5 mm measured with straight edge, corner to corner.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Wall access panels, fire rated and non-rated types.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry.
 - .2 Section 09 21 16 - Gypsum Board Assemblies.
 - .3 Section 09 90 00 - Painting and Coating.
- 1.3 REFERENCES
 - .1 ASTM E119-07a: Standard Test Methods for Fire Tests of Building Construction and Materials.
 - .2 NFPA 80-2007: Fire Doors and Other Opening Protectives.
 - .3 Underwriters Laboratories of Canada: List of Equipment and Materials.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and certification reports as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate profiles, accessories, location, and dimensions.
 - .3 Fire Test Certification Report: certifying performance within specified fire rating requirements.
- 1.5 QUALITY ASSURANCE
 - .1 Installed access doors and panels to conform to National Fire Protection Association requirements for fire rated class indicated in schedule.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00
 - .2 Store Products in a dry, protected, well-vented area.
 - .3 Remove protective wrapping immediately after installation.
- 1.7 WARRANTY
 - .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
 - .2 Manufacturer's Extended Warranty: for a period of five years, covering parts against defects.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of wall access panels having Product considered acceptable for use:
 - .1 Acudor Access Doors.
 - .2 Bilco Canada.
 - .3 The Williams Brothers Corporation.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MANUFACTURED UNITS

- .1 Gypsum Board Wall Access Panel - Fire-Rated: 1-1/2 hour B-label with maximum temperature rise of 110 degrees C (250 degrees F); suitable for both horizontal or vertical installation; and meeting the following characteristics:
 - .1 Door: minimum 48 mm deep, fabricated from 1.2 m thick sheet steel, insulated.
 - .2 Insulation: non-rigid mineral fibre, from rock or slag, to CAN/ULC S702, Type 1; filling door cavity.
 - .3 Box Frame: minimum 1.5 mm thick sheet steel, complete 25 mm wide perforated flange of 0.61 mm thick galvanized steel for mounting purposes in gypsum board enclosures.
 - .4 Closer: Automatic, spring-type.
 - .5 Hinge: fully concealed, 170 degree opening pivot-type.
 - .6 Latch: self-latching direct action lock opposite hinge; lock designed to accept both key and knurled knob included with each door.
 - .7 Manufacturer and Product Name: eg. Model WB-FR Standard Fire Rated Access Door With Drywall Bead by The Williams Brothers Corporation.
- .2 Gypsum Board Wall Access Panel - Non-Rated: suitable for both horizontal or vertical installation in gypsum board partitions or bulkheads; and meeting the following characteristics:
 - .1 Door: 1.9 mm thick sheet steel.
 - .2 Box Frame: minimum 1.5 mm thick sheet steel, complete 25 mm wide perforated flange of 0.61 mm thick galvanized steel for mounting purposes in gypsum board enclosures.
 - .3 Hinge: fully concealed, piano type.
 - .4 Latch: flush, stainless steel cam designed to be operated with a screwdriver.
 - .5 Manufacturer and Product Name: eg. Model WB-DW Access Door for Drywall Surfaces by The Williams Brothers Corporation.
- .3 Masonry Wall Access Panel - Fire-Rated: 1-1/2 hour B-label with maximum temperature rise of 110 degrees C (250 degrees F); suitable for both horizontal or vertical installation; and meeting the following characteristics:
 - .1 Door and Trim: minimum 48 mm deep, fabricated from 1.9 m thick sheet steel, insulated; with rolled safety edge on inside of door.
 - .2 Insulation: non-rigid mineral fibre, from rock or slag, to CAN/ULC S702, Type 1; sandwiched between two layers of 0.76 mm thick steel.
 - .3 Return Frame: minimum 1.5 mm thick sheet steel, complete with four masonry strap anchors for mounting purposes in masonry enclosures.
 - .4 Closer: Automatic, spring-type.
 - .5 Hinge: Continuous piano hinge, 180 degree opening.
 - .6 Latch: self-latching keyed cylinder paddle latch, opposite hinge.
 - .7 Manufacturer and Product Name: eg. Model WB-FR Premium Ultra Fire-Rated Access Door by The Williams Brothers Corporation.
- .4 Masonry Wall Access Panel - Non-Rated: suitable for both horizontal or vertical installation in masonry or concrete partitions or bulkheads; and meeting the following characteristics:
 - .1 Door: 1.9 mm thick sheet steel.
 - .2 Return Frame: minimum 1.2 mm thick sheet steel, complete with minimum 4 masonry anchor straps.
 - .3 Hinge: fully concealed, piano type.
 - .4 Latch: flush, stainless steel cam designed to be operated with a screwdriver.
 - .5 Manufacturer and Product Name: eg. Model WB-GP Premium General Purpose Access Door by The Williams Brothers Corporation.

2.3 FINISHES

- .1 Aluminum: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.
- .2 Steel: electrostatically applied baked grey enamel primer over rust-inhibiting phosphate treatment.

3 Execution

3.1 PREPARATION

- .1 Coordinate installation of masonry wall access panels with Section 04 22 00.
- .2 Coordinate installation of gypsum board wall access panels with Section 09 21 16.
- .3 Coordinate locations of access panels with mechanical and electrical Subcontractors.

3.2 INSTALLATION

- .1 Install Product in accordance with manufacturer's instructions.
- .2 Install Product for long life under hard use.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Aluminum doors and frames.
- 1.2 RELATED SECTIONS
 - .1 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders: perimeter air and vapour seals between glazing system and adjacent construction.
 - .2 Section 07 92 00 - Joint Sealants.
 - .3 Section 08 44 13 - Glazed Aluminum Curtain Wall.
 - .4 Section 08 51 13 - Aluminum Windows.
 - .5 Section 08 71 00 - Door Hardware.
 - .6 Section 08 80 00 - Glazing.
- 1.3 REFERENCES
 - .1 AAMA 2605-05: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - .2 ASTM A269-07: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM B209M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .4 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes (Metric).
 - .5 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
 - .3 Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details and thermal break details.
- 1.5 QUALITY ASSURANCE
 - .1 Fabricator: a company specializing in the work of this Section, with a minimum of five years documented experience.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Take precautionary measures and adequately protect aluminum and aluminum finishes to prevent damage thereto during fabrication, storage, shipping, handling and installation.
 - .3 Deliver, handle and store units by methods approved by manufacturer. Protect from damage and staining.

1.7 WARRANTY

- .1 Submit an extended manufacturer's and installer's warranties in accordance with the General Conditions of the Contract.
- .2 Manufacturer's Warranty: ten (10) year extended warranty, commencing on the date of Substantial Performance of the Work, and covering the following:
 - .1 Finish: replace any window unit whose finish shows defects such as but not limited to delamination, blistering or excessive fading.
 - .2 Performance: replace or repair any window unit with air leakage, water leakage, defects or malfunctions under normal usage.
- .3 Installer's Warranty: protecting against leakage, operational defects and malfunction under normal usage for a period of two (2) years, commencing on the date of Substantial Performance of the Work.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of aluminum doors and frames having Product considered acceptable for use:
 - .1 Alumicor.
 - .2 Commdoor.
 - .3 Kawneer.
 - .4 Oldcastle Glass.
 - .5 United States Aluminum.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 SYSTEM DESCRIPTION

- .1 Aluminum entrance system, including tubular aluminum sections, factory prefinished, vision glass, related flashings, door hardware, anchorage and attachment devices.

2.3 DESIGN REQUIREMENTS

- .1 Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated to requirements of the building code.
- .2 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

2.4 MATERIALS

- .1 Extruded Aluminum: to ASTM B221M, 6063 alloy, T54 temper.
- .2 Sheet Aluminum: to ASTM B209M, 3003 alloy, H14 temper.
- .3 Sheet Steel: galvanized to CAN/CSA-G164-M.
- .4 Steel Sections: shaped to suit mullion sections.
- .5 Fasteners: stainless steel.
- .6 Thermal Break: rigid polyvinyl chloride.
- .7 Touch-Up Primer: Zinc rich type.

2.5 COMPONENTS

- .1 Thermally-Broken Frame: extruded aluminum sections, 44.5 x 114.3 mm nominal dimension; thermally broken with interior tubular section insulated from exterior; flush glazing stops; drainage holes; internal weep drainage system; eg. Kawneer Tri-Fab VG 451T.
- .2 Thermally-Broken Doors: extruded aluminum sections, 57.2 mm thick, 88.9 mm wide top rail, 127 mm wide vertical stiles, 209.6 mm centre rail, 190.5 mm wide bottom rail; thermally broken with interior tubular section insulated from exterior; rectangular glazing stops; eg. Kawneer 560 Insulclad.
- .3 Flashing: 2.0 mm thick aluminum, finish to match mullion sections where exposed.
- .4 Glass and Glazing Materials: as specified in Section 08 80 00.
- .5 Sealant and Backing Materials: as specified in Section 07 92 00.

2.6 HARDWARE

- .1 Push / Pull Handles: 25 mm OD stainless steel, straight D-wrap style, 230 mm centres.
- .2 Hinges: 114.3 x 101.6 mm size, commercial quality steel, radius corner standard template butt style, 5 knuckle construction with two stainless steel ball bearings and non-rising removable pin; 1-1/2 pairs per door leaf.
- .3 Push Bars: 25 mm OD stainless steel, double bend, 57 mm from face of door.
- .4 Drop Arm Holder: cast aluminum, surface-mounted, pivoting rubber-tipped holder-arm; No. 28 finish.
- .5 Weatherstripping, Sill Sweep Strips, Thresholds: Manufacturers standard type to suit application, finish to match door and frame.
- .6 All other finish hardware is specified in Section 08 71 00. This may include panic hardware, closers, automatic door operators, locks and cylinders.

2.7 FABRICATION

- .1 Fabricate components with minimum clearances and shim spacing around perimeter of assembly.
- .2 Make joints flush, hairline, and weatherproof.
- .3 Arrange fasteners and attachments to conceal from view.
- .4 Prepare components with internal reinforcement for door hardware and door operator hinge hardware.
- .5 Prepare doors and frames for heavy weight oversize butt hinges, cylindrical locksets, rim and concealed vertical rod / mortise lock case exit devices, magnetic locks, surface door closers and concealed overhead stops. Conform to approved finish hardware schedule. Blank, mortise, reinforce, drill and tap doors to receive templated hardware, as required. Coordinate with Section 08 71 00.

2.8 FINISHES

- .1 Aluminum: Painted to AAMA 2605, three-coats of thermosetting fluoropolymer coating, minimum 0.04 mm thick; eg. PPG Duranar XL, colour as selected by Consultant.
- .2 Stainless Steel Tubing: to US32D Rubbed finish.
- .3 Concealed Steel Items: Galvanized to CAN/CSA-G164-M; 610 g/m² zinc coating.

3 Execution

3.1 INSTALLATION

- .1 Install doors and frames in accordance with manufacturer's instructions.
- .2 Permanently fasten frames to building structure.
- .3 Align assembly plumb and level, free of warp or twist.
- .4 Maintain assembly dimensional tolerances, aligning with adjacent work.
- .5 Coordinate attachment and seal of perimeter air and vapour barrier materials.
- .6 Install hardware using templates provided.
- .7 Install glass and infill panels as specified in Section 08 80 00, to exterior wet/dry method.
- .8 Provide perimeter sealant as specified in Section 07 92 00.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Shop fabricated aluminum curtain wall with fixed and operable sashes, site glazed.
- 1.2 RELATED SECTIONS
 - .1 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders: connection to building air and vapour retarder system.
 - .2 Section 07 92 00 - Joint Sealers.
 - .3 Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
 - .4 Section 08 51 13 - Aluminum Windows.
 - .5 Section 08 80 00 - Glazing.
- 1.3 REFERENCES
 - .1 AAMA Aluminum Curtain Wall Design Guide Manual.
 - .2 AAMA/WDMA/CSA 101/I.S. 2/A440-08: North American Fenestration Standard / Specification for Windows, Doors and Skylights.
 - .3 AAMA 2605-05: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels.
 - .4 ASTM B209M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .5 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .6 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .7 CSA S157-05: Strength Design in Aluminum.
 - .8 CAN/CGSB-79.1-M91: Insect Screens.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Submit authentic original documentation verifying that the curtain wall assemblies conform to AAMA/WDMA/CSA 101/I.S. 2/A440.
 - .3 Show detailed curtain wall assembly, including:
 - .1 large scale details of members and materials, of brackets and anchorage devices and of connection and jointing details;
 - .2 fully dimensioned layouts for positioning of brackets and anchorage devices to structures;
 - .3 dimensions, gauges, thicknesses;
 - .4 glazing details, description of materials including catalogue numbers, products and manufacturer's names;
 - .5 aluminum alloy and temper designations, finish specifications and all other pertinent data.

- .4 Submit documentation of:
 - .1 thicknesses, profiles and descriptions of all components used in the curtain walls assembly;
 - .2 engineering calculations verifying the curtain wall assembly has been designed, constructed and attached to withstand all forces anticipated for this Project as required by applicable codes. Calculations must be stamped, dated and signed by a professional engineer licensed to practice in the Place of the Work.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit maintenance data as specified in Section 01 78 00.
- .2 Maintenance Data: including information pertaining to the cleaning and maintenance of the curtain wall assemblies for inclusion in the operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- .1 Fabricator: a company specializing in the work of this Section, with a minimum of five years documented experience.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Take precautionary measures and adequately protect aluminum and aluminum finishes to prevent damage thereto during fabrication, storage, shipping, handling and installation.
- .3 Deliver, handle and store units by methods approved by manufacturer. Protect from damage and staining.

1.8 WARRANTY

- .1 Submit an extended manufacturer's and installer's warranties in accordance with the General Conditions of the Contract.
- .2 Manufacturer's Warranty: ten (10) year extended warranty, commencing on the date of Substantial Performance of the Work, and covering the following:
 - .1 Finish: replace any window unit whose finish shows defects such as but not limited to delamination, blistering or excessive fading.
 - .2 Performance: replace or repair any window unit with air leakage, water leakage, defects or malfunctions under normal usage.
- .3 Installer's Warranty: protecting against leakage, operational defects and malfunction under normal usage for a period of two (2) years, commencing on the date of Substantial Performance of the Work.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of glazed aluminum curtain wall having Product considered acceptable for use:
 - .1 Aerloc.
 - .2 Alumicor.
 - .3 Commdoor.
 - .4 Kawneer.
 - .5 Oldcastle Glass.
 - .6 Sherwood Windows.
 - .7 United States Aluminum.
 - .8 Windspec.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 SYSTEM DESCRIPTION

- .1 Curtain Walls: extruded aluminum frame and sash sections, shop fabricated, vision glass, metal and glass insulated spandrel panels, door adapters, related flashings, anchorage and attachment devices.
- .2 Configuration: as indicated on the Window Schedule.
- .3 Performance Requirements:
 - .1 Air Tightness: to AAMA/WDMA/CSA 101/I.S. 2/A440, as follows:
 - .1 Fixed Sash: Class Fixed.
 - .2 Operable Sash: Class A3.
 - .2 Water Tightness: to AAMA/WDMA/CSA 101/I.S. 2/A440, Class B7.
 - .3 Wind Load Resistance: to AAMA/WDMA/CSA 101/I.S. 2/A440, Class C5.
 - .4 Condensation Resistance Temperature Index: to AAMA/WDMA/CSA 101/I.S. 2/A440, Class I_c=55.
 - .5 Screen Strength: to AAMA/WDMA/CSA 101/I.S. 2/A440, heavy duty type.
 - .6 Forced Entry: to AAMA/WDMA/CSA 101/I.S. 2/A440, Class F2.
 - .7 Drain water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .4 Design Requirements
 - .1 Design intermediate members within units to be either solid or tubular design to suit wind loading, weight carrying requirements and wind deflection limitations.
 - .2 Design coupling mullions to permit unit module construction and provide for thermal expansion. When required reinforce wind load carrying members with steel reinforcement suitably treated to prevent electrolytic action.
 - .3 Design light gauge aluminum products to CSA S157.
 - .4 Mullion Deflection Limits: maintain integrity of glass and seals at design loading. Prevent permanent deformation of members caused by applied loads. Prevent deflection that could result in noise, breaking of adhesives or sealants, to cause them to touch other building components, or to break the integrity of the insulation thermal blanket or air/vapour barrier seal.
 - .5 Design anchors, fasteners and braces so as to limit their structural stress to not more than 50 percent of the allowable stress when maximum load conditions are applied.
 - .6 Design glass not to exceed a statistical probability of failure of 8 units per 1000 units representing a safety factor of 2.5.
 - .7 Design frames so that edges of inner pane of insulating glass units do not fall more than 8 degrees C below the temperature of the centre of the inner pane.
 - .8 Design operable vents to have a restricted opening not to project beyond face of masonry veneer on Ground Floor and not to exceed 100 mm on Second Floor.
 - .9 Design and supply floor edge angles for support of curtain wall mullions and provide the necessary anchorage to support eccentric loads on the angle. Arrange for angles to be cast in to the floor slabs. Submit a fully dimensioned plan drawing to locate angles.

2.3 MATERIALS

- .1 Extruded Aluminum: to ASTM B221M, 6063 alloy, T54 temper.
- .2 Sheet Aluminum: to ASTM B209M, 3003 alloy, H14 temper.
- .3 Sheet Steel: galvanized to CAN/CSA-G164-M.
- .4 Steel Sections: shaped to suit mullion sections.
- .5 Fastener: 300 series stainless steel.
- .6 Mesh: 18/16 aluminum mesh, Black colour.
- .7 Bituminous Coating: fibred asphalt emulsion.

- .8 Thermal Break: rigid polyvinyl chloride.
- .9 Touch-Up Primer: Zinc rich type.

2.4 COMPONENTS

- .1 Mullions: 2.5 mm thick extruded aluminum, width as indicated on Drawings; thermally broken with interior tubular section insulated from exterior; applied pressure plates; drainage holes; internal weep drainage system; continuous aluminum mounting flange; special corner adapters as necessary; of adequate depth to accommodate design loads or as indicated on Drawings, whichever is greater.
- .2 Caps: 2.5 mm thick extruded aluminum; 19 mm deep, width to match mullions; snap-on type.
- .3 Sills: extruded aluminum, purpose made design complete with pre-formed clip anchor; sufficient depth to extend beyond wall face, longest pieces possible to minimize joints; complete with drip edge profile or deflectors and end dam deflectors.
- .4 Flashings: 2.0 mm thick aluminum, finish to match mullion sections where exposed.
- .5 Door Adapters: as recommended by manufacturer.
- .6 Vapour Retarder: as specified in Section 07 26 00.
- .7 Air Barrier: as specified in Section 07 26 00.
- .8 Foam Sealant: as specified in Section 07 26 00.
- .9 Glass and Glazing Materials: Sealed insulated units and glass spandrel units as specified in Section 08 80 00.
- .10 Sealant and Backing Materials: as specified in Section 07 92 00.
- .11 Operable Vent Hardware:
 - .1 Top-Hinged Project-Out Vents: extruded aluminum hinges with stainless steel pins, two solid bronze claw handles, Roto-Lever operator with round knob in lieu of cranks, by Truth Hardware.
 - .2 Weatherstripping: Manufacturers standard type to suit application, finish to match frame.

2.5 FABRICATION

- .1 Fabricate framing, mullions and sashes to AAMA/WDMA/CSA 101/I.S. 2/A440.
- .2 Fabricate components with minimum clearances and shim spacing around perimeter of assembly.
- .3 Make joints flush, hairline, and weatherproof.
- .4 Arrange fasteners and attachments to conceal from view.
- .5 Prepare components with internal reinforcement for operating hardware.
- .6 Overlap and seal glazing flanges of abutting members for the entire depth and width of the flanges to provide a solid unbroken water barrier. Glass stops shall be screwless, lock-in type.
- .7 Provide fully resilient settings for glass and panels by use of EPDM elastomeric glazing gaskets on both sides of glass installed in curtain wall frames.
- .8 Fabricate screens of tubular extruded aluminum, to CAN/CGSB-79.1-M.
- .9 Secure mesh to prefinished frame with a removable polyethylene spline.

- .10 Secure screens to frames with approved fasteners as required by authorities having jurisdiction.
- 2.6 SOURCE QUALITY CONTROL
 - .1 Perform shop inspection and testing as specified in Section 01 40 00.
 - .2 Shop Inspection and Testing: random tests of the fabricated curtain wall framing at point of manufacture, to verify compliance with the specified performance requirements, conducted by an independent testing agency.
- 2.7 SHOP FINISHING
 - .1 Aluminum: Painted to AAMA 2605, three-coats of thermosetting fluoropolymer coating, minimum 0.04 mm thick; eg. PPG Duranar XL, colour as selected by Consultant.
 - .2 Galvanizing: to CAN/CSA-G164-M, hot dipped method, minimum 610 g/m² zinc coating.
- 3 Execution
 - 3.1 EXAMINATION
 - .1 Refer to Section 01 71 00.
 - .2 Verify adjoining air and vapour seal materials are ready to receive work of this Section.
 - 3.2 PREPARATION
 - .1 Apply a heavy coat of bituminous paint on surfaces of aluminum placed in contact with concrete, mortar, plaster, or dissimilar metals.
 - .2 Supply fastenings and anchors required to be built-in to adjacent work to other Sections.
 - 3.3 INSTALLATION
 - .1 Securely install curtain wall in correct location, level, square, plumb, free from distortion, properly aligned and at proper elevations.
 - .2 Make joints neat, fine and weather tight. Provide additional mouldings and closures necessary.
 - .3 Use appropriate fastening components compatible with the material of the supporting sub-structure.
 - .4 Install framing, glazing and spandrel panels in accordance with AAMA Aluminum Curtain Wall Design Guide Manual.
 - .5 Install glazing and spandrel panels as specified in Section 08 80 00, exterior wet/dry method..
 - .6 Install Products with clean cut edges, leaving spaces for expansion and contraction between edge of material and inside of frame as recommended by manufacturer.
 - .7 Connect air barrier flange to building envelope air barrier membrane.
 - .8 Seal gaps between frame and wall assembly with post-expanding foam sealant as specified in Section 07 26 00.
 - .9 Provide sills in place with anchoring devices located at ends and evenly spaced at 600 mm OC. Fasten expansion joint cover plates and drip deflectors with self-tapping stainless steel screws.

- .10 Maintain a 6 to 9 mm space between butted ends of continuous sills. For sills over 1.2 metres in length, maintain a 3 to 6 mm space at each end.
 - .11 Install end dams at each sill.
 - .12 Grind smooth exposed edges of aluminum sills, ensuring no sharp edges.
 - .13 Install perimeter sealant, backing materials, and installation criteria as specified in Section 07 92 00.
- 3.4 FIELD QUALITY CONTROL
- .1 Perform field inspection and testing as specified in Section 01 40 00.
 - .2 Field Inspection and Testing: random tests of the installed curtain wall to verify compliance with the specified performance requirements by an independent testing agency.
 - .3 Make Good Products not meeting specified requirements.
 - .4 Re-test replacement Products at no additional cost to Owner.
- 3.5 CLEANING
- .1 Refer to Section 01 74 00.
 - .2 Clean glass and aluminum surfaces.
 - .3 Do not scratch or damage surfaces.
 - .4 Do not remove protective cover from framing until final cleaning operations.
- 3.6 PROTECTION
- .1 Refer to Section 01 76 00.
 - .2 Provide protective coatings on surfaces subject to damage.
 - .3 Mark glass with white washable paint.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Aluminum windows, shop fabricated; fixed and operating sash, site-glazed.
- 1.2 RELATED SECTIONS
 - .1 Section 04 05 00 - Common Work Results for Masonry: masonry openings and lintels.
 - .2 Section 07 26 00 - Self-Adhered Membrane Air and Vapour Retarders: connection to building air/vapour barrier envelope.
 - .3 Section 07 92 00 - Joint Sealants.
 - .4 Section 08 44 13 - Glazed Aluminum Curtain Wall.
 - .5 Section 08 80 00 - Glazing: site glazing.
- 1.3 REFERENCES
 - .1 AAMA/WDMA/CSA 101/I.S. 2/A440-08: North American Fenestration Standard / Specification for Windows, Doors and Skylights.
 - .2 ASTM B209M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .3 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .4 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .5 CAN/CGSB-79.1-M91: Insect Screens.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Submit authentic original documentation verifying that the window assemblies meet AAMA/WDMA/CSA 101/I.S. 2/A440.
 - .3 Show detailed window assembly, including:
 - .1 large scale details of members and materials, of brackets and anchorage devices and of connection and jointing details;
 - .2 fully dimensioned layouts for positioning of brackets and anchorage devices to structures;
 - .3 dimensions, gauges, thicknesses;
 - .4 glazing details, description of materials including catalogue numbers, products and manufacturer's names;
 - .5 aluminum alloy and temper designations;
 - .6 finish specifications and all other pertinent data.
 - .4 Submit documentation of thicknesses, profiles and descriptions of all components used in the window assembly.
 - .5 Submit engineering calculations verifying the window assembly has been designed, constructed and attached to withstand all forces anticipated for this Project as required applicable codes. Calculations to be stamped, dated and signed by a professional engineer licensed to practice in the Place of the Work.
- 1.5 CLOSEOUT SUBMITTALS
 - .1 Submit maintenance data as specified in Section 01 78 00.

- .2 Maintenance Data: including information pertaining to the cleaning and maintenance of the window assemblies for inclusion in the operation and maintenance manuals.
- 1.6 QUALITY ASSURANCE
 - .1 Fabricator: a company specializing in the work of this Section, with a minimum of five years documented experience.
- 1.7 MOCK-UP
 - .1 Construct mock-ups as specified in Section 01 40 00.
 - .2 Mock-Up: Prior to production, submit one representative model and one corner cross section of each type of window, illustrating sill and jamb section, complete with thermal break, hardware, weatherstripping, glass, screen, finishes, etc.
- 1.8 CERTIFICATION REPORTS
 - .1 Submit test reports and certification reports as specified in Section 01 40 00.
 - .2 Test Reports: prepared by an independent testing agency, verifying compliance with the performance requirements specified above.
 - .3 Frame Certification: submit a certificate from the aluminum extruder that the aluminum alloys and tempers meet or exceed the specified types.
- 1.9 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Take precautionary measures and adequately protect frames and frame finishes to prevent damage thereto during fabrication, storage, shipping, handling and installation.
 - .3 Deliver, handle and store units by methods approved by manufacturer. Protect from damage and staining.
 - .4 Deliver and store units carefully to avoid damage to window frame, glazing and polyethylene wrap.
- 1.10 WARRANTY
 - .1 Submit an extended manufacturer's and installer's warranties in accordance with the General Conditions of the Contract.
 - .2 Manufacturer's Warranty: ten (10) year extended warranty, commencing on the date of Substantial Performance of the Work, and covering the following:
 - .1 Finish: replace any window unit whose finish shows defects such as but not limited to delamination, blistering or excessive fading.
 - .2 Performance: replace or repair any window unit with air leakage, water leakage, defects or malfunctions under normal usage.
 - .3 Installer's Warranty: protecting against leakage, operational defects and malfunction under normal usage for a period of two (2) years, commencing on the date of Substantial Performance of the Work.
- 2 Products
 - 2.1 MANUFACTURERS
 - .1 Manufacturers of glazed aluminum curtain wall having Product considered acceptable for use:
 - .1 Aerloc.
 - .2 Alumicor.

- .3 Commdoor.
- .4 Kawneer.
- .5 Oldcastle Glass.
- .6 Sherwood Windows.
- .7 United States Aluminum.
- .8 Windspec.

.2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 SYSTEM DESCRIPTION

- .1 Windows: extruded aluminum frame and sash sections, shop fabricated, vision glass, related flashings, anchorage and attachment devices.
- .2 Configuration: as indicated on the Window Schedule.

2.3 PERFORMANCE REQUIREMENTS

- .1 Air Tightness: to AAMA/WDMA/CSA 101/I.S. 2/A440, designated Class for the following configurations:
 - .1 Fixed Unit: Class Fixed.
 - .2 Operable Sash Unit: Class A3.
- .2 Water Tightness: to AAMA/WDMA/CSA 101/I.S. 2/A440, designated Class for the following configurations:
 - .1 Fixed Unit: Class B7.
 - .2 Operable Sash Unit: Class B3.
- .3 Wind Load Resistance: to AAMA/WDMA/CSA 101/I.S. 2/A440, designated Class for the following configurations:
 - .1 Fixed Unit: Class C4.
 - .2 Operable Sash Unit: Class C5.
- .4 Condensation Resistance Temperature Index: to AAMA/WDMA/CSA 101/I.S. 2/A440, Class I = 53 for glass and frame.
- .5 Screen Strength: to AAMA/WDMA/CSA 101/I.S. 2/A440, heavy duty type.
- .6 Forced Entry: to AAMA/WDMA/CSA 101/I.S. 2/A440, Class F2.
- .7 Drain water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system, to the exterior by a weep drainage network.

2.4 DESIGN REQUIREMENTS

- .1 Design intermediate members within units to be either solid or tubular design to suit wind loading, weight carrying requirements and wind deflection limitations.
- .2 Design coupling mullions to permit unit module construction and provide for thermal expansion. When required, reinforce wind load carrying members with steel reinforcement suitably treated to prevent electrolytic action.
- .3 Design operable vents to have a restricted opening not to project beyond face of masonry veneer on Ground Floor and not to exceed 100 mm on Second Floor.

2.5 MATERIALS

- .1 Extruded Aluminum: to ASTM B221M, 6063 alloy, T54 temper.
- .2 Sheet Aluminum: to ASTM B209M, AA1100 alloy.
- .3 Sheet Steel: galvanized to CAN/CSA-G164-M.

- .4 Steel Sections: shaped to suit mullion sections, hot dipped galvanized, strength as recommended by window fabricator.
- .5 Mesh: 18/16 aluminum mesh, colour to be black.
- .6 Bituminous Coating: fibred asphalt emulsion.
- .7 Thermal Break: rigid polyvinyl chloride.
- .8 Touch-Up Primer: Zinc rich type.
- .9 Fastener: Series 300 stainless steel.

2.6 COMPONENTS

- .1 Jamb Frame: 2.5 mm thick extruded aluminum; thermally broken with interior tubular section insulated from exterior; applied glazing stops; drainage holes; internal weep drainage system.
- .2 Mullion Frame: 2.5 mm thick extruded aluminum; thermally broken with interior tubular section insulated from exterior; applied glazing stops; drainage holes; internal weep drainage system.
- .3 Vents: 2.5 mm thick extruded aluminum; thermally broken; applied glazing stops.
- .4 Flashing: 2.0 mm thick sheet aluminum, finish to match mullion sections where exposed.
- .5 Sills: 3 mm thick extruded aluminum, sloped and shaped with drip edge along front face, complete with joint covers, drip deflectors, chairs, anchors, anchoring devices, closed ends and end dam deflectors.
- .6 Steel Screen Reinforcing: to CSA G40.2, Class H.
- .7 Exterior Panning: 2.0 mm thick extruded aluminum, designed to lock into window frame.
- .8 Interior Panning: 2.0 mm thick extruded aluminum, designed to lock into window frame.
- .9 Sealant: as specified in Section 07 92 00.
- .10 Foam Sealant: as specified in Section 07 26 00.
- .11 Operable Vent Hardware:
 - .1 Top-Hinged Project-Out Vents: extruded aluminum hinges with stainless steel pins, two solid bronze claw handles, Roto-Lever operator with round knob in lieu of cranks, by Truth Hardware.
 - .2 Weatherstripping: Manufacturers standard type to suit application, finish to match frame.
- .12 Vapour Retarder: as specified in Section 07 26 00.
- .13 Air Barrier: as specified in Section 07 26 00.
- .14 Glass and Glazing Materials: Sealed insulated glass units as specified in Section 08 80 00.

2.7 FABRICATION

- .1 Fabricate framing, mullions and sashes to AAMA/WDMA/CSA 101/I.S. 2/A440.
- .2 Fabricate components with minimum clearances and shim spacing around perimeter of assembly.
- .3 Make joints flush, hairline, and weatherproof.
- .4 Arrange fasteners and attachments to conceal from view.
- .5 Prepare components with internal reinforcement for operating hardware.

- .6 Overlap and seal glazing flanges of abutting members for the entire depth and width of the flanges to provide a solid unbroken air and water barrier. Glass stops shall be screwless, lock-in type.
- .7 Double weatherstrip window units at sash perimeters. Conceal weatherstripping to prevent accumulation of foreign matter. Install weatherstripping in specially extruded ports and secure to prevent shrinkage, movement or loss.
- .8 Provide fully resilient settings for glass and panels by use of EPDM elastomeric glazing gaskets on both sides of glass installed in window frames.
- .9 Provide an aluminum air barrier flange or membrane around the perimeter of each unit to accommodate attachment to wall assembly air envelope membrane.
- .10 Fabricate screens of tubular extruded aluminum to CAN/CGSB-79.1-M.
- .11 Secure mesh to prefinished frame with a removable polyethylene spline; designed to allow screen removal only from the interior.
- .12 Secure screens to frames with approved fasteners as required by authorities having jurisdiction.

2.8 SOURCE QUALITY CONTROL

- .1 Perform shop inspection and testing as specified in Section 01 40 00.
- .2 Shop Inspection and Testing: random tests of the fabricated window framing at point of manufacture, to verify compliance with the specified performance requirements, conducted by an independent testing agency.

2.9 SHOP FINISHING

- .1 Aluminum: Painted to AAMA 2605, three-coats of thermosetting fluoropolymer coating, minimum 0.04 mm thick; eg. PPG Duranar XL, colour as selected by Consultant.
- .2 Galvanizing: to CAN/CSA-G164-M, hot dipped method, minimum 610 g/m² zinc coating.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.

3.2 PREPARATION

- .1 Apply a heavy coat of bituminous paint on surfaces of aluminum placed in contact with concrete, mortar, plaster, or dissimilar metals.
- .2 Provide fastenings and anchors required to be built in to adjacent work to other Sections.

3.3 INSTALLATION

- .1 Securely install windows in correct location, level, square, plumb, free from distortion, properly aligned and at proper elevations.
- .2 Make joints neat, fine and weathertight.
- .3 Allow for expansion and contraction of components.

- .4 Provide additional mouldings and closures necessary.
- .5 Use appropriate fastening components compatible with the material of the supporting sub-structure. Conceal all fasteners.
- .6 Connect air barrier flange to building envelope air barrier membrane.
- .7 Provide trim panning and flashings of sufficient size to neatly finish the window frame to the interior and exterior window opening.
- .8 Seal gaps between frame and wall assembly with foam sealant as specified in Section 07 26 00.
- .9 Install glass as specified in Section 08 80 00, exterior wet/dry method.
- .10 Provide sills in place with anchoring devices located at ends and evenly spaced at 600 mm OC. Fasten expansion joint cover plates and drip deflectors with self-tapping stainless steel screws.
- .11 Maintain a 6 to 9 mm space between butted ends of continuous sills. For sills over 1.2 metres in length, maintain a 3 to 6 mm space at each end.
- .12 Install end dams at each sill.
- .13 Grind smooth exposed edges of aluminum sills, ensuring no sharp edges.
- .14 Seal joints between flashings, trim panning, window frames and adjacent materials as specified in Section 07 92 00.

3.4 FIELD QUALITY CONTROL

- .1 Perform field inspection and testing as specified in Section 01 40 00.
- .2 Field Inspection and Testing: random tests of the installed windows to verify compliance with the specified performance requirements by an independent testing agency.
- .3 Make Good Products not meeting specified requirements.
- .4 Re-test replacement Products at no additional cost to Owner.

3.5 INSTALLATION TOLERANCES

- .1 Plumb and Level: 3 mm in 3.0 metres.

3.6 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Clean glass and aluminum surfaces.
- .3 Do not scratch or damage surfaces.
- .4 Do not remove protective cover from window units until after final cleaning operations have been completed.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Hardware for doors.
- 1.2 RELATED SECTIONS
 - .1 Section 08 11 13 - Hollow Metal Frames.
 - .2 Section 08 13 13 - Hollow Metal Doors.
 - .3 Section 08 14 00 - Wood Doors.
 - .4 Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
- 1.3 REFERENCES
 - .1 ANSI/DHI A115.IG-1994: Installation Guide for Doors and Hardware.
 - .2 Door and Hardware Institute (DHI) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.
 - .3 Door and Hardware Institute (DHI) - Recommended Locations for Architectural Hardware for Flush Wood Doors.
 - .4 Door and Hardware Institute (DHI) - Sequence and Format for the Hardware Schedule.
 - .5 Door and Hardware Institute (DHI) - Keying Systems and Nomenclature.
 - .6 Door and Hardware Institute (DHI) - Abbreviations and Symbols.
 - .7 Canadian Steel Door Manufacturer's Association: Recommended Dimensional Standard for Steel Doors and Frames.
 - .8 Canadian Steel Door Manufacturer's Association: Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.
 - .9 Canadian Steel Door Manufacturer's Association: Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction).
 - .10 NFPA 80-2007: Fire Doors and Other Opening Protectives.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: including finish hardware schedule, keying schedule, and wiring diagrams, as follows:
 - .1 Finish Hardware Schedule, prepared by Architectural Hardware Consultant (AHC), in vertical format, to DHI Sequence and Format for the Hardware Schedule.
 - .2 Keying Schedule: prepared by Architectural Hardware Consultant (AHC), to DHI Keying Systems and Nomenclature, including all special keying notes and stamping instructions. Do not order locks and cylinders until the key schedule has been accepted by the Consultant.
 - .3 Wiring Diagrams: a written description of the functional use of all electrical hardware. Include door and frame elevations showing the location of each item of electrical hardware to be installed, including a diagram showing number and size of all conductors.
 - .3 Product Data: data sheets illustrating each specified piece of finish hardware.
 - .4 Submit templates to installer prior to installation of hardware commences.

1.5 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Samples: one sample of each hardware item complete with fasteners, clearly labeled with hardware schedule designation and manufacturers' name and model number.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit operating and maintenance data as specified in Section 01 78 00.
- .2 Operating and Maintenance Data: including maintenance instructions for each hardware item, catalogue cut sheets and Product data sheets for each Product, parts list for each Product, an updated copy of the finish hardware schedule illustrating actual Products installed, and a copy of the final keying schedule.

1.7 QUALITY ASSURANCE

- .1 Hardware Supplier: company specializing in supplying institutional door hardware with ten (10) years documented experience.
- .2 Hardware Supplier Personnel: employ a qualified Architectural Hardware Consultant (AHC) to supervise the work of this Section.

1.8 PRE-INSTALLATION MEETING

- .1 Refer to Section 01 31 00.
- .2 Prior to installation of hardware, arrange a meeting between Owner, Contractor, Consultant, manufacturer, hardware Supplier, Architectural Hardware Consultant, and installation Subcontractor to review materials, procedures and coordinate related work.

1.9 REGULATORY REQUIREMENTS

- .1 Conform to NFPA requirements for fire rated doors, frames and hardware.
- .2 Ensure that all fire exit requirements are met with regard to automatic closers, fusible links, positive latching, direction of travel, etc.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Package hardware separately for each opening in a package which contains all the hardware for that opening and is designated with applicable heading number, door number, and key-set symbol.
- .3 Store Products in a clean, dry and secure area, on adequate shelving to permit organization so item numbers are readily visible.
- .4 Supply Products complete with keys, templates and installation instructions, together with all required screws, expansion shields, anchors, jigs and other related accessories for satisfactory attachment and installation of hardware.

1.11 WARRANTY

- .1 Submit manufacturers' extended warranties for each of the following items, as follows:
 - .1 Butt Hinges: Lifetime,
 - .2 Pivot Sets: 2 years,
 - .3 Locks: 7 years,
 - .4 Keypad Locks: 1 year,
 - .5 Exit Devices: 3 years,
 - .6 Door Closers - Mechanical: 10 years,

- .7 Door Operators - Electro Mechanical: 2 years,
- .8 Door Hold-Open Devices - Electro Mechanical: 2 years,
- .9 Overhead Stops and Holders: 1 year,
- .10 Floor and Wall Stops: 1 year,
- .11 Electric Strikes, Key Switches and Power Supplies: 1 year, and
- .12 Electromagnetic Lock Coils: Lifetime.

1.12 EXTRA MATERIALS

- .1 Supply extra materials as specified in Section 01 78 00.
- .2 Extra Materials: clearly labeled to identify type of hardware, manufacturer name, model number, and finish; for each of the following:
 - .1 ten key lock cylinders for each master keyed group.
 - .2 three installation tools for passage sets, locksets and privacy sets.

2 Products

2.1 HINGES

- .1 Butt Hinges: concealed bearing hinges for all doors with door closers, non-ferrous with non-removable pins for exterior out-swing doors; 127 mm high hinges where door width exceeds 915 mm; supply two hinges for doors up to 1,525 mm high and an additional hinge for each 760 mm or fraction thereof in door height.
- .2 Continuous Hinges: full height, knuckle type with nylon bearings between each knuckle; steel for interior applications and stainless steel for exterior applications.

2.2 LOCKS AND LATCHSETS

- .1 Locks: supplied from factory with appropriate handing; as follows:
 - .1 Cylindrical Series: heavy duty cylindrical type, with 69 mm backset supplied with a 13 mm throw latch bolt; chassis to accommodate standard 161 cylindrical lock prep for 45 mm thick doors.
 - .2 Mortise Series: mortise type with three piece, bevelled, stainless steel latch bolts with 19 mm throw and equipped with an anti-friction latch; chassis designed to accommodate ANSI standard mortise lock prep with a 69 mm nominal backset for 45 mm thick doors.
 - .3 Automatic Deadbolts: stainless steel, 25 mm throw; 31 mm high, 16 mm thick; automatically project when door is in closed position.
 - .4 Unit Lock Series: heavy duty unit type, solid cast stainless steel latch assembly with a 13 mm throw deadlocking latch bolt and a 69 mm backset; secured with two stainless steel plates, integrated and through-bolted by the unit lock escutcheons for 45 mm thick doors.
 - .5 Levers: outside and inside levers operating independently of each other; use patented clutch mechanism to deter vandalism and maximize durability; designed not to allow latch bolt retraction from secure side while allowing emergency egress.
 - .6 Function: Classroom and Storeroom function, where outside lever is normally locked and inside lever is always free. Unit may be momentarily unlocked with approved Normal access credential, and may be maintained in an unlocked position by using a toggle access credential.
 - .7 Override: emergency mechanical key override utilizing 31 mm mortise cylinder with standard straight cam.

2.3 KEYING

- .1 Key exterior doors to Owner's existing system.
- .2 Provide new factory GMK or MK system as approved by Owner.
- .3 Each system to be construction master keyed (CMK), and supplied complete with three (3) keys per lock, five (5) master keys or grand master keys (GMK), ten (10) construction keys.

- .4 Provide visual key control (VKC) on the face of each cylinder and on all change keys.

2.4 EXIT DEVICES

- .1 Exit Devices: low profile push pad style devices; exterior trim of same trim design as locksets.
- .2 Exit hardware must have the correct life safety or fire rated labels attached to the active case.
- .3 Ensure actuating push pad covers one-half of door opening.
- .4 Provide dead latching bolts on exit devices for exterior doors to ensure tamper proof security.
- .5 Provide non-rated devices with key cylinder dogging operation.
- .6 Where pairs of doors are scheduled to receive two vertical rod exit devices, ensure no overlapping astragal is used by the door manufacturer.
- .7 Install exit devices with a gap of 25 mm at the end of the push bar to prevent having fingers pinched between the device and the frame.

2.5 DOOR CLOSERS

- .1 Door Closers: full adjustment features including back check, general speed, and latch speed control.
- .2 Provide interior door closers with reduced opening force spring power to meet the barrier free requirement of 22N.
- .3 Locate surface mounted door closers on the room side of the door whenever possible or as directed by the Consultant.
- .4 Provide mounting plates necessary for mounting closers on special door and frame conditions.
- .5 Provide full body covers on door closers, to match specified finishes.
- .6 Stop closers will only be accepted if the stop includes a coil spring mechanism.
- .7 Doors located in stairs and other interior high-traffic locations shall be supplied with a separate delay-action valve to slow the closing cycle and reduce the over-all door use. Delay-action door closers must have a pressure release valve if the door is pulled closed.

2.6 AUTOMATIC DOOR OPERATORS

- .1 Automatic Door Operators: include hydraulic door control features including back check and latch speed.
- .2 Connect wire runs and related releasing hardware, such as electric strikes.
- .3 Provide activating switches as scheduled.

2.7 PULLS AND PLATES

- .1 Pulls: flat plate hospital finger pulls, 150 mm wide and 200 mm high; mounted with spanner head security screws. When installed on doors with key cylinders, provide a cylinder cut out on the pull plate.
- .2 Kick Plates, Push Plates, and Bumper Plates: 1.27 mm thick, with bevelled sides and rounded corners with no sharp edges; c/w either tape mounting or counter sunk screw holes; Provide kickplates in widths as follows:
 - .1 Single Doors: door width less 38 mm, and
 - .2 Paired Double Doors: door width less 25 mm.

2.8 DOOR STOPS AND HOLDERS

- .1 Wall stops are only to be used on proper wall conditions such as block or masonry.
- .2 Provide floor stops with sufficient height to suit the floor condition or undercut of doors.
- .3 Overhead stops and holders will be surface mounted unless there is a conflict with door closers or other hardware. Provide door stays with friction action in locations that do not have door closers. Install all overhead stops and holders for 90 degree stop, unless otherwise specified.
- .4 Electronic Door Holder: to suit the specified voltage and connected to building fire alarm system to release the door when signalled.

2.9 DOOR SEALS

- .1 Perimeter Seals: sufficient to fully cover gaps between door, frame and floor condition to seal against weather, sound, or smoke.
- .2 Frame Gasket: pile type; ribbed extruded housing to prevent distortion during installation.
- .3 Door Bottoms: heavy-duty type, with an adjustment screw to ensure proper contact with floor; c/w correct drop insert to accommodate carpet flooring.
- .4 Thresholds: designed to ensure door bottom makes full contact; thermally broken for all exterior door openings.

2.10 SHOP FINISHES

- .1 Provide BHMA 626 - Brushed Chrome finish unless specified otherwise.
- .2 Other BHMA finishes are as follows:
 - .1 Hinges: 630 - satin stainless steel.
 - .2 Pivots: 689 - powder coat aluminum.
 - .3 Door Closer: 689 - powder coat aluminum.
 - .4 Door Pulls: 630 - satin stainless steel.
 - .5 Protective Plate: 630 - satin stainless steel.
 - .6 Overhead Door Stops and Holders: 630 - satin stainless steel.
 - .7 Thresholds: 628 - anodized aluminum.
 - .8 Weatherstrip: 628 - anodized aluminum.
 - .9 Signage: BLK - black plastic.
 - .10 Mullions: 628 - anodized aluminum.
 - .11 Key Switches: 630 - satin stainless steel.
 - .12 Electric Strikes: 630 - satin stainless steel.
 - .13 Magnetic Locks: 628 - anodized aluminum.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify that door and frame components are ready to receive work and dimensions are as indicated on the shop drawings and schedules.
- .3 Verify that power supply of 120 volts, 20 ampere, three phase, 60 Hertz is available to power operated devices.

3.2 INSTALLATION

- .1 Install hardware to ANSI/DHI A115.IG and in accordance with manufacturers' installation guidelines.
- .2 Use templates provided by hardware manufacturer.
- .3 Provide routing or mortising for hinges and other items required to be mortised or rebated or otherwise housed within material.
- .4 Install hardware at mounting heights specified in the manufacturers' templates or as indicated in hardware schedule.
- .5 Install hardware using only manufacturer-supplied and -approved fasteners, in strict accordance with manufacturers' published installation instructions. Provide suitable security-type fasteners as specified in the hardware sets.
- .6 Ensure locksets, latchsets and deadbolts are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.
- .7 Ensure exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. Handing is part of installation procedure.
- .8 Install head seal prior to installation of "PA"-parallel arm mounted door closers and push side mounted door stops and holders.
- .9 Counter sink through-bolt of door pull under push plate during installation.
- .10 Mount closers, automatic operators and hold-open devices with through bolts, as indicated in the finish hardware schedule. Install closers and exit devices on wood doors with through-bolt style fasteners.
- .11 Secure thresholds with machine screws and anchors.

3.3 FIELD QUALITY CONTROL

- .1 Examine all hardware after it has been installed and notify Consultant of any cases where it has been improperly installed, is defective or does not conform to the Contract Documents.
- .2 All work shall be of high standard to the approval of the Consultant.

3.4 ADJUSTING

- .1 Replace Products exhibiting scratched or damaged surfaces.
- .2 Properly tighten fasteners and ensure that fasteners are installed to the full required complement.
- .3 Adjustment is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.
- .4 Adjust delayed-action door operators and closers to forty-second delay to accommodate barrier-free access. Time period to be approved by Owner.

3.5 DEMONSTRATION

- .1 Demonstrate operation and maintenance of hardware items, including proper use, servicing, adjusting and lubrication procedures, as specified in Section 01 79 00.

3.6 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Cover surfaces with removable protective film until Substantial Performance of the Work.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Glass and glazing.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry: wall substrate.
 - .2 Section 07 21 00 - Thermal Insulation: spandrel panel insulation.
 - .3 Section 07 92 00 - Joint Sealants: glazing sealants.
 - .4 Section 08 11 13 - Hollow Metal Frames: site-glazed hollow metal frames.
 - .5 Section 08 13 13 - Hollow Metal Doors: site-glazed hollow metal doors.
 - .6 Section 08 14 00 - Wood Doors: site-glazed wood doors.
 - .7 Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: site-glazed aluminum doors and frames.
 - .8 Section 08 44 13 - Glazed Aluminum Curtain Wall: site-glazed curtain walls.
 - .9 Section 08 51 13 - Aluminum Windows: site-glazed aluminum windows.
 - .10 Section 09 21 16 - Gypsum Board Assemblies: wall substrate.
 - .11 Section 10 28 13 - Toilet Accessories: framed mirrors.
- 1.3 REFERENCES
 - .1 IGMAC (Insulated Glass Manufacturers Association of Canada) - Quality Standard Specification.
 - .2 FGMA (Fixed Glass Manufacturers Association) - Glazing Manual and Glazing Sealing Systems Manual.
 - .3 CAN/CGSB-12.1-M90: Tempered or Laminated Safety Glass.
 - .4 CAN/CGSB-12.2-M91: Glass, Sheet, Flat, Clear.
 - .5 CAN/CGSB-12.3-M91: Glass, Polished Plate or Float, Flat, Clear.
 - .6 CAN/CGSB-12.5-M86: Mirrors, Silvered.
 - .7 CAN/CGSB-12.8-97: Insulating Glass Units.
 - .8 CAN/CGSB-12.9-M91: Glass, Spandrel.
 - .9 CAN/CGSB-12.11-M90: Wired Safety Glass.
- 1.4 SUBMITTALS
 - .1 Submit Product data as specified in Section 01 33 00.
 - .2 Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.

- .2 Samples: Submit two samples 300 x 300 mm in size, illustrating glass units, colouration and design.

1.6 QUALITY ASSURANCE

- .1 Conform to glazing installation methods and quality standards specified in:
 - .1 FGMA Glazing Manual,
 - .2 IGMAC Quality Standard Specification, and
 - .3 IGMAC Glazing Recommendations for Sealed Insulated Glass Units.
- .2 Select glazing compounds and sealants in accordance with glass manufacturers' instructions.

1.7 WARRANTY

- .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
- .2 Extended Warranty: for a period of five years, including coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of glass having Product considered acceptable for use:
 - .1 AFG Glass Inc.
 - .2 Libbey-Owens Ford.
 - .3 PPG Industries
 - .4 Guardian Industries Corp.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 SYSTEM DESCRIPTION

- .1 Glass and glazing materials of this Section shall provide continuity of building enclosure vapour and air barrier.
- .2 Size of glass to withstand dead loads and positive and negative live loads acting normal to plane of glass.
- .3 Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

2.3 SINGLE PANE GLASS MATERIALS

- .1 Sheet Glass (Type FG-A): to CAN/CGSB-12.2-M; 3 mm thick, glazing quality.
- .2 Float Glass (Type FG-B): to CAN/CGSB-12.3-M; 5 mm thick, glazing quality.
- .3 Tempered Safety Glass (Type FG-C): to CAN/CGSB-12.1-M; clear float glass fully tempered horizontally to achieve a net strength of not less than 4 to 5 times greater than regular annealed glass; 6 mm thick.
- .4 Georgian Wired Glass (Type FG-D): to CAN/CGSB-12.11-M, Type 1, Transparent Style 1 - Square pattern; 13 x 13 mm wire mesh size, using 0.45 mm OD steel wire; 6 mm thick.
- .5 Standard Mirror Glass (Type FG-E): to CAN/CGSB-12.5-M; Type 18 float glass; 6 mm thick minimum; polished edges; sizes as scheduled or noted on Drawings.
- .6 Tempered Mirror Glass (Type FG-F): to CAN/CGSB-12.5-M; tempered glass; 6 mm thick minimum; polished edges; sizes as scheduled or noted on Drawings.

2.4 SEALED INSULATING GLASS MATERIALS

- .1 Sealed Glass Units (Type SG-A): to CAN/CGSB-12.8; double pane with dual seal edge; comprised as follows:
 - .1 Outer Pane: Clear tempered glass (FG-C); with Low-E coating on #2 surface;
 - .2 Inner Pane: Clear tempered glass (FG-C);
 - .3 Interpane Space: Argon gas;
 - .4 Overall Thickness: 25 mm;
 - .5 Visible Light Transmittance: 69 percent;
 - .6 Shading Coefficient: 0.44;
 - .7 Visible Light Reflectance: 12 percent;
 - .8 Manufacturer's Name and Product: eg. PPG Solarban 60 (2) Clear.

2.5 GLASS SPANDREL PANEL MATERIALS

- .1 Spandrel Glass Units (Type SP-A): to CAN/CGSB-12.9-M; single pane insulated infill panel; comprised as follows:
 - .1 Outer Pane: 6 mm thick tempered Clear glass (Type FG-C), with tinted opaque coating applied to #2 surface, eg. Opaci-Coat 300 by ICD High Performance Coatings, colour as selected by Consultant.
 - .2 Insulation: curtain wall mineral fibre insulation as specified in Section 07 21 00, completely filling cavity and securely held in place by mechanical fasteners;
 - .3 Inner Liner: 1.5 mm thick galvanized steel panel, sealed at edges, corners and fasteners.

2.6 GLAZING ACCESSORIES

- .1 Dual Seal: polyisobutylene primary seal with a secondary seal comprised of either silicone, butyl, polysulphide or urethane, as recommended by sealed insulating glass unit manufacturer for each particular glazing application.
- .2 Low-E Coating: sputtered coating; eg. PPG Solarban 60 Solar Control Low-E (Sputtered).
- .3 Sealant: as specified in Section 07 92 00.
- .4 Setting Blocks: neoprene, 80-90 Shore A durometer hardness.
- .5 Spacer Shims: neoprene, 50-60 Shore A durometer hardness.
- .6 Glazing Tape: preformed butyl compound with integral resilient tube spacing device.
- .7 Glazing Splines: resilient polyvinyl chloride extruded shape; black colour.
- .8 Mirror Attachment Accessories: stainless steel clips.
- .9 Mirror Adhesive: chemically compatible with mirror coating and wall substrate.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify that openings for glazing are correctly sized, within tolerance and clean.

3.2 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR - WET/DRY METHOD (PERFORMED TAPE AND SEALANT)

- .1 Cut glazing tape to length and set against permanent stops, 5 mm below sight line. Seal corners by butting tape and dabbing with sealant.
- .2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapour seal.
- .3 Place setting blocks at one-quarter points with edge block no more than 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- .5 Install removable stops, with spacer strips inserted between glazing and applied stops, 6 mm below sight line.
- .6 Place glazing tape on glazing pane or unit with tape flush with sight line.
- .7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 9 mm below sight line.
- .8 Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 INTERIOR - DRY METHOD (TAPE AND TAPE)

- .1 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .2 Place setting blocks at one-third points with edge block no more than 150 mm from corners.
- .3 Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- .4 Place glazing tape on free perimeter of glazing in same manner described above.
- .5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .6 Knife trim protruding tape.

3.5 MIRRORS

- .1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions.
- .2 Secure mirrors in place with clips.
- .3 Anchor mirrors rigidly to wall construction.
- .4 Place plumb and level.

3.6 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Remove glazing materials from finish surfaces.
- .3 Remove labels after Work is complete.
- .4 Clean glass and mirrors.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Metal framing, non-loadbearing type.
- .2 Gypsum board.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 - Rough Carpentry: wood blocking.
- .2 Section 06 16 43 - Gypsum Sheathing: exterior gypsum sheathing.
- .3 Section 07 92 00 - Joint Sealants: acoustic sealant.
- .4 Section 08 11 13 - Hollow Metal Frames.
- .5 Section 08 31 00 - Access Door and Panels.
- .6 Section 09 81 00 - Acoustic Insulation.
- .7 Section 09 90 00 - Painting and Coating: site finishing.

1.3 REFERENCES

- .1 ASTM C475/C475M-02(2007): Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .2 ASTM C514-04: Standard Specification for Nails for the Application of Gypsum Board.
- .3 ASTM C645-08a: Standard Specification for Nonstructural Steel Framing Members.
- .4 ASTM C840-08: Standard Specification for Application and Finishing of Gypsum Board.
- .5 ASTM C954-07: Standard 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.
- .6 ASTM C1047-09: Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .7 ASTM C1177/C1177M-08: Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .8 ASTM C1396/C1396M-06a: Standard Specification for Gypsum Board.
- .9 ASTM C1629/C1629M-06: Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
- .10 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
- .11 CGC Inc., CGC Gypsum Construction Handbook.
- .12 CAN/CGSB-71.25-M88: Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .13 Underwriters Laboratories of Canada: List of Equipment and Materials.

1.4 SUSTAINABLE DESIGN REQUIREMENTS

- .1 Target Recycled Content for Gypsum Board: minimum 5 percent post-consumer and 90 percent post-industrial.

1.5 QUALITY ASSURANCE

- .1 Applicators: company specializing in applying the work of this Section with a minimum of five years documented experience.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of gypsum board having Product considered acceptable for use:
 - .1 CertainTeed Gypsum, Canada Inc.
 - .2 CGC Inc.
 - .3 G-P Gypsum Corporation.

- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 FRAMING MATERIALS

- .1 Metal Studs and Tracks - Standard Duty: to ASTM C645, 0.48 mm thick galvanized sheet steel, 'C' shape, with serrated faces and knock-outs for electrical fitments; sizes as indicated on Drawings.
- .2 Metal Studs and Tracks - Heavy Duty: to ASTM C645, 0.914 mm thick galvanized sheet steel, 'C' shape, with serrated faces and knock-outs for electrical fitments; sizes as indicated on Drawings.
- .3 Metal Deflection Track: to ASTM C645, minimum 0.48 mm thick galvanized sheet steel, 'U' shape with long legs, designed to accommodate structural deflections; sizes as indicated on Drawings.
- .4 Meta Furring, Framing and Accessories: to ASTM C645, galvanized steel channel sections designed to perform their intended function; sizes as indicated on Drawings.

2.3 BOARD MATERIALS

- .1 Gypsum Board - Regular (GB-R): to ASTM C1396/C1396M; tapered edges, ivory faced; thicknesses as indicated on Drawings.
- .2 Gypsum Board - Fire-Rated (GB-FR): to ASTM C1396/C1396M, Type X; tapered edges, ivory faced, ULC labelled; thicknesses as indicated on Drawings.
- .3 Gypsum Board - Paperless Faced (GB-PF): 15 mm thick; tapered edges; to ASTM C1177/C1177M; silicone treated gypsum core, with coated glass mat facers both sides; DensArmor Plus Interior Guard by G-P Gypsum Corporation.
- .4 Gypsum Board - Abuse-Resistant (GB-AR): to ASTM C1629/C1629M, Type X; 15.9 mm thick; square edges.
- .5 Gypsum Board - Backing Board (GB-BB): to ASTM C1396/C1396M; 12.7 mm thick; square edges.
- .6 Gypsum Board - Soffit Board (GB-SB): to ASTM C1396/C1396M; 15 mm thick; square edges.

2.4 ACCESSORIES

- .1 Corner Beads, Casing Beads, Control Joints and Edge Trim: to ASTM C1047; zinc type.
- .2 Reveals and Trim Reglets: to ASTM C1047; aluminum; by Fry Reglet as follows:
 - .1 3 mm Z-Reveal: Model DRMZ-50-125.
 - .2 6 mm Z-Reveal: Model DRMZ-25-25.
 - .3 13 mm Z-Reveal: Model DRMZ-50-625.

- .4 3 mm Hat-Shape Reveal: Model DRM-50-125.
- .5 6 mm Hat-Shape Reveal: Model DRM-50-25.
- .6 16 mm Hat-Shape Reveal: Model DRM-50-625.
- .7 10 mm Corner Trim: Model DMCT-375.
- .8 31 mm Corner Trim: Model DMCT-1250.
- .9 3 mm F-Reveal: Model DRMF-50-125.
- .10 6 mm F-Reveal: Model DRMF-50-25.
- .11 16 mm F-Reveal: Model DRMF-50-625.

- .3 Nail Fasteners: galvanized steel; to ASTM C514.
- .4 Steel Drill Screws: galvanized steel; to ASTM C954.
- .5 Adhesive: to CAN/CGSB-71.25-M.
- .6 Joint Materials: to ASTM C475/C475M; reinforcing tape, joint compound, adhesive, water, fasteners.
- .7 Acoustic Insulation: mineral fibre acoustical batt insulation, Type INS-5, as specified in Section 09 81 00.
- .8 Sealant: acoustical sealant, as specified in Section 07 92 00.

3 Execution

3.1 METAL STUD AND FURRING INSTALLATION

- .1 Install stud framing to ASTM C840, and in accordance with manufacturer's instructions.
- .2 Metal Stud Spacing: typical 400 mm OC.
- .3 Partition Heights: Full height to floor or roof construction above, complete with deflection track. Provide additional bracing for partitions extending above ceilings.
- .4 Erect furring for direct attachment to concrete block walls and concrete walls, ceilings and soffits.
- .5 Install furring as required for fire resistance ratings indicated.

3.2 CEILING FRAMING INSTALLATION

- .1 Install ceiling framing to ASTM C840, and in accordance with manufacturer's instructions
- .2 Install ceiling framing independent of walls, columns, and above ceiling work.
- .3 Laterally brace entire suspension system.

3.3 ACOUSTICAL ACCESSORIES INSTALLATION

- .1 Install resilient channels at maximum 600 mm OC.
- .2 Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- .3 Install acoustical sealant within partitions in accordance with manufacturer's instructions

3.4 BOARD INSTALLATION

- .1 Install wall and ceiling board Products to ASTM C840, and in accordance with manufacturer's instructions.

- .2 Install gypsum ceiling and soffit board perpendicular to supports.
- .3 Screw fasten boards to furring or framing.
- .4 Double Layer Applications: Use gypsum backing board for first layer, place perpendicular to framing or furring members. Place second layer perpendicular to first layer.
- .5 Place corner beads at external corners. Place edge trim where gypsum board abuts dissimilar materials. Fasten with nail attachment, unless specified otherwise.
- .6 Finished work shall be plane and free from all depressions, ready to receive paint finish by others.
- .7 Provide bulkheads where changes of ceiling or height occur. Include all necessary channel framing, etc.
- .8 Provide all furring required by the drawings or any furring necessary to conceal exposed pipes or ducts. Refer to mechanical and electrical drawings to determine extent of work necessary.
- .9 Install access panels when and where directed by affected Subcontractors. Refer to Section 08 31 00.

3.5 BOARD FINISHING

- .1 Tape, fill, and sand exposed joints, edges, and corners to a smooth surface.
- .2 Apply a skim coat of joint compound, mixed thinner than used for jointing compound, over gypsum board surfaces. Lightly cover gypsum board surface to a smooth, even texture.
- .3 Remove excess skim coat material immediately from surfaces.
- .4 Allow skim coat to dry, then lightly sand surfaces to remove ridges, bumps and other irregularities.
- .5 Leave finished surfaces smooth, even, plumb and true, ready to receive final finishing by others.

3.6 CONTROL JOINTS

- .1 Provide control joints in accordance with manufacturer's instructions; where indicated on Drawings and where:
 - .1 ceiling, partition or furring abuts a structural element,
 - .2 ceiling, partition or furring abuts dissimilar construction,
 - .3 construction changes within plane of the partition or ceiling,
 - .4 partition or furring run exceeds 9.0 metres,
 - .5 ceiling dimensions exceed 15.0 metres in either direction,
 - .6 wings of "L-", "U-" and "T"-shaped ceiling areas are joined, and
 - .7 expansion or control joints occur in the structural elements of the building.
- .2 Break continuity of gypsum board and framing system at control joints.
- .3 Provide continuous control joint profile.

3.7 RELIEF JOINTS

- .1 Provide relief joints where indicated on the Drawings and where gypsum board assemblies abut dissimilar construction.
- .2 Stop gypsum board 6 mm from abutting construction at dissimilar building elements, unless indicated otherwise.
- .3 Provide a thermal break where gypsum board comes into contact with frames. Adhere self-adhering tape to casing bead and compress during installation of gypsum board.

- .4 Provide reveal mouldings where gypsum board ceilings meet curved wall surfaces, and where indicated on the Drawings.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Tile floors.
 - .2 Tile walls.
 - .3 Tile stair treads and risers.
- 1.2 RELATED SECTIONS
 - .1 Section 03 35 00 - Concrete Finishing.
 - .2 Section 03 41 13 - Precast Concrete Hollow-Core Planks.
 - .3 Section 04 22 00 - Concrete Unit Masonry.
 - .4 Section 05 51 00 - Metal Stairs.
 - .5 Section 09 21 16 - Gypsum Board Assemblies.
- 1.3 REFERENCES
 - .1 ANSI A108.4-2005: Ceramic Tile Installed with Water-Resistant Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
 - .2 ANSI A108.5-2005: Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - .3 ANSI A108.10-2005: Installation of Grout in Tilework.
 - .4 ANSI A118.1-2005: Dry-Set Portland Cement.
 - .5 ANSI A118.4-2005: Latex-Portland Cement Mortar.
 - .6 ANSI A118.6-2005: Ceramic Tile Grouts.
 - .7 ANSI A136.1-2005: Organic Adhesive.
 - .8 ASTM C144-04: Standard Specification for Aggregate for Masonry Mortar.
 - .9 ASTM C207-06: Standard Specification for Hydrated Lime.
 - .10 ASTM C627-93(2007): Standard test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester.
 - .11 ASTM C847-06: Standard Specification for Metal Lath.
 - .12 CAN/CSA-A3001-03: Cementitious Materials for Use in Concrete.
 - .13 CAN/CGSB-25.20-95: Surface Sealer for Floors.
 - .14 CAN/CGSB-75.1-M88: Tile, Ceramic.
 - .15 Terrazzo Tile & Marble Association of Canada (TTMAC): Specification Guide 09 30 00 - Tile Installation Manual 2006-2007.
- 1.4 SUSTAINABLE DESIGN REQUIREMENTS
 - .1 Target Recycled Content for Ceramic Wall Tile: minimum 0 percent post-consumer and 35 percent post-industrial.

1.5 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Verification Samples: 300 x 300 mm size panel c/w approved grout colour; mounted to 19 mm thick plywood backer.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals as specified in Section 01 78 00.
- .2 Closeout Submittals: duplicate copies of the latest edition of the TTMAC Maintenance Guide.

1.7 QUALITY ASSURANCE

- .1 Employ skilled mechanics trained and experienced in tile work, and registered as members of the Terrazzo Tile and Marble Association of Canada.
- .2 Install Products to TTMAC Specification Guide 09 30 00.

1.8 MOCK-UP

- .1 Construct a jobsite mock-up as specified in Section 01 40 00.
- .2 Mock-Up: illustrating typical wall and floor tile applications for each tile type and colour.
 - .1 Locate mock-ups in areas designated by Consultant.
 - .2 Incorporate borders or accent tiles as designated by Consultant.
 - .3 Illustrate transitions to adjacent materials. Include proposed transition strips.
 - .4 Accepted mock-ups will remain as part of the completed Work. Protect from damage or disfigurement until Substantial Performance of the Work.

1.9 ENVIRONMENTAL CONDITIONS

- .1 Do not install tiles at temperatures less than 12 degrees Celsius.
- .2 Maintain temperatures at or above 12 degrees Celsius until cementitious materials have fully cured.

1.10 DELIVERY STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Store Products in a dry area, protected from freezing, staining and damage.
- .3 Store cementitious materials on a dry surface.

1.11 EXTRA MATERIALS

- .1 Supply extra materials as specified in Section 01 78 00.
- .2 Extra Materials: 4 m² or 2 percent, whichever is the greater, of each type and colour of tile; clearly marked to identify:
 - .1 Manufacturer's name,
 - .2 Product's name,
 - .3 Product colour and pattern.
- .3 Package tile products neatly in original containers, to prevent damage.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of grout and adhesive having Product considered acceptable for use:
 - .1 Realta Mapei.
 - .2 Laticrete.
 - .3 Flextile.
- .2 Manufacturers of tile setting accessories having Product considered acceptable for use:
 - .1 Schlüter Systems (Canada) Inc.; as distributed by Centura.
- .3 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 DESIGN REQUIREMENTS

- .1 Traffic Level Performance: floor tiles to meet Moderate Class, passing ASTM C627, cycles 1 through 10, as described in TTMAC Specification Guide 09 30 00.

2.3 TILE MATERIALS

- .1 Porcelain Floor Tile (CET-1): 300 x 600 mm size, matte finish porcelain; to CAN/CGSB-75.1-M, Type 4, Class MR2; premium colours as selected by Consultant from one of the following schemes:
 - .1 Scheme A: Amore 30cm x 60 cm by Stonetile,
 - .2 Scheme B: Evolution Series 12 x 24 by Olympia Tile, or
 - .3 Scheme C: SK Series 60cm x 30cm by G. E. Shnier.
- .2 Ceramic Wall Tile (CET-2): to CAN/CGSB-75.1-M, Type 1, Class MR2; unglazed or matte finish; premium colours as selected by Consultant from one of the following Schemes:
 - .1 Scheme A: Progetto Ceramiche 10cm x 40 cm by Stonetile,
 - .2 Scheme B: Mikado Series 6" x 24" by Olympia Tile, or
 - .3 Scheme C: Woods from Marazzi Casa Roma 100 x 600 by G. E. Shnier.
- .3 Tile Base: coved; cut from porcelain floor tile specified above, 100 mm high, 600 mm long.

2.4 MORTAR MATERIALS

- .1 Portland Cement: to CAN/CSA-A3001, Type GU.
- .2 Hydrated Lime: to ASTM C207, Type N-Normal.
- .3 Sand: to ASTM C144, passing 16 mesh.
- .4 Dry-Set Portland Cement Mortar: to ANSI A118.1.
- .5 Latex-Portland Cement Mortar: to ANSI A118.4.

2.5 GROUT MATERIALS

- .1 Floor Grout: to ANSI A118.6; polymer-modified sanded grout; eg. Mapei Keracolor S, multiple colours up to maximum of 2 colours per room, as selected by Consultant.
- .2 Base and Wall Grout: to ANSI A118.6; polymer-modified unsanded grout; eg. Mapei Keracolor U, multiple colours up to maximum of 2 colours per room, as selected by Consultant.

2.6 ACCESSORIES

- .1 Metal Lath: galvanized type, 1.4 kg/m², to ASTM C847.
- .2 Reinforcing Mesh: 50 x 50 mm size; 1.6 mm thick steel wire mesh; welded fabric, galvanized.
- .3 Tape: 50 mm fibre mesh tape, as recommended by backer board manufacturer.

- .4 Organic Adhesive: to ANSI A136.1, Type 1 for wet areas and Type 2 for dry areas.
- .5 Latex Additive: formulated for use in portland cement mortars and grout.
- .6 Water: clean, cold and potable.
- .7 Joint Sealant: as specified in Section 07 92 00.
- .8 Sealer: to CAN/CGSB-25.20, Type 1 - Penetrating; as recommended by tile manufacturer.

2.7 MANUFACTURED COMPONENTS AND ACCESSORIES

- .1 Tile Edge and Transition Strips: Roll-formed stainless steel edge strips, 3 mm wide at top edge; height as indicated; with integral perforated anchoring leg for setting the strip into the setting material; height as required to suit application; eg. Schlüter®-SCHIENE-E.
- .2 Tile Transition Joint Strips: Roll-formed stainless steel transition strips; profile and height as indicated; with integral perforated anchoring leg for setting the strip into the setting material; sloped transition and decorative edge strip for transition from tile to lower finish; eg. Schlüter®-RENO-EU.
- .3 Tile Expansion and Control Joints for Thin-Set Applications: Roll formed stainless steel profiles joined by a soft CPE movement joint material, with integral perforated anchoring legs for setting the joint into the setting bed; height as required to suit application; insert colour as selected by Consultant from manufacturer's standard range; eg. Schlüter®-DILEX-EKSN.
- .4 Tile Decorative Wall Corner Trim: Roll formed stainless steel profile, decorative outside wall corner trim, with integral perforated anchoring leg for setting the strip into the setting material; height and material/finish as indicated; height as required; pre-formed inside corners, pre-formed outside corners; colour to match profile colour; eg. Schlüter®-RONDEC-E.
- .5 Uncoupling Membrane: rigid polyethylene membrane with 4 mm high corrugated ribs cut back in dovetail configuration; scrim laminated to underside; Schlüter®-DITRA.

2.8 MIXES

- .1 Scratch Coat (by volume): 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used per manufacturer's instructions. Adjust water volume depending on moisture content of sand to obtain consistency and workability.
- .2 Slurry Bond Coat: mix Portland cement and water to a creamy paste consistency. Include latex additive where required by TTMAC Detail.
- .3 Mortar Bed for Walls (by volume): 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used per manufacturer's instructions. Adjust water volume depending on moisture content of sand to obtain consistency and workability.
- .4 Levelling Coat (by volume): 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used per manufacturer's instructions.
- .5 Mortar Bed for Floors: 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used per manufacturer's instructions. Adjust water volume depending on moisture content of sand to obtain consistency and workability. When mixed with water the mortar bed shall be of such a consistency and workability that will allow maximum compaction during tamping of the mortar bed, and achieve a minimum compressive strength of 21 MPa after 28 days.

2.9 MIXING

- .1 Mix commercial mortars and grouts strictly in accordance with manufacturer's recommendations.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Ensure substrate surfaces are clean, dimensionally stable, cured and free of contaminants such as oil, sealers and curing compounds.
- .3 Ensure that concrete has been allowed to cure for a minimum of 28 days.
- .4 Ensure concrete floors have not been treated with proprietary curing compounds.
- .5 Ensure concrete floors scheduled to receive thin-set applied tile or cleavage membranes are steel trowelled to a fine broom finish. Ensure concrete slabs have been finished with a maximum permissible variation of 3 mm in 3 metres from the required plane and not more than 1.5 mm in 305 mm when measured from high points in the surface.
- .6 Ensure concrete floors scheduled to receive tile applied over a bonded mortar bed have been screed finished. Verify substrate surface variation does not exceed 6 mm in 3 metres.

3.2 PREPARATION

- .1 Protect surrounding work from damage or disfiguration.
- .2 Thoroughly clean existing surfaces which are to receive tile finish to ensure the removal of all grease, oil or dust film.
- .3 Apply a latex modified cementitious levelling coat wherever a slight substrate irregularity exists. Limit levelling coat thickness to less than 8 mm where thin-set tile methods are to be used. Install a levelling coat in excess of 8 mm when setting tile with a mortar bed method.
- .4 Install uncoupling membrane over structural concrete slab. If an uncoupling membrane is being applied over a rough surface, apply a 6 mm thick sand-bed under the membrane.
- .5 Cover backer board joints with fibre mesh tape set in latex-Portland cement mortar.

3.3 INSTALLATION

- .1 Install Products to TTMAC Specification Guide 09 30 00, as scheduled below.
- .2 Apply tile using water-resistant organic adhesives to ANSI A108.4.
- .3 Apply tile in dry-set Portland cement mortar or latex-Portland cement mortar beds to ANSI A108.5.
- .4 Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance.
- .5 Make cut edges smooth, even and free from chipping. Do not split tile.
- .6 Lay out tiles so that perimeter and cut tiles are no less than half size. Refer to Drawings for specific floor patterns.
- .7 Set tiles in place while bond coat is wet and tacky, prior to skinning over. Slide tile back and forth to ensure a proper bond and level surface. Avoid lippage.

- .8 Clean backs of tiles and back butter tiles to ensure a 95 percent bond coverage.
- .9 Clean excess mortar from surface prior to final set.
- .10 Sound tiles after setting materials have cured and replace hollow sounding tile before grouting.
- .11 Exterior Surfaces and Wet Areas (Thin Set Method)
 - .1 Notch adhesive in straight lines, backbutter tile and set on freshly trowelled thin-set mortar.
 - .2 Move tile back and forth perpendicular to notches.
- .12 Ungauged Slate, Marble, Stone and Large Ceramics
 - .1 Immediately prior to setting, backbutter tile through a push box or box screed to achieve a uniform thickness of tile and mortar.
- .13 Keep two-thirds the depth of grout joints free of setting material.

3.4 MOVEMENT JOINTS

- .1 Install control joints and expansion joints in tile work in accordance with TTMAC Detail 301MJ.
- .2 Keep all control and expansion joints free of setting materials.

3.5 TILE-SETTING ACCESSORIES INSTALLATION

- .1 Install tile-setting accessories in continuous lengths, to level straight lines by pressing the perforated anchoring leg of the accessory solidly into the tile setting adhesive.
- .2 Butt ends of units tightly together with hairline joint. Trowel an additional layer of tile setting material over the anchored leg of the accessory prior to placement of tiles.
- .3 Unless specified otherwise, solidly embed tiles over anchoring leg of installed trim with surface of tile flush with top of tile-setting accessories.
- .4 Leave 3 mm joint between tile and tile-setting accessories for filling with grout.
- .5 Install pre-formed end-caps and trim at all inside corners, outside corners, 3-way corners, and ends.
- .6 Expansion and Control Joints: Solidly embed tiles over installed edge strips with joint surface either flush with top of joint or 1 mm below top of tile.

3.6 GROUTING

- .1 Allow proper setting time prior to grouting.
- .2 Pre-seal tiles requiring protection from grout staining.
- .3 Apply cementitious grout into joints to ensure dense finish. Conform to manufacturer's recommendations and ANSI A108.10.
- .4 Force grout into joints to ensure dense finish.
- .5 Remove excess and polish with clean cloths.

3.7 FIELD QUALITY CONTROL

- .1 Inspect completed work and replace broken, cracked, or damaged tile.

3.8 TOLERANCES

- .1 Level tiles to conform to a 1 mm tolerance over a 3 mm joint.

3.9 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Apply floor sealer in accordance with manufacturer's instructions.

3.10 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect finished areas from traffic until setting materials have sufficiently cured.
- .3 Protect grouted areas from traffic for 24 hours after grouting.
- .4 Provide protective covering until Owner occupancy.
- .5 Protect wall tiles and bases from impact, vibration, heavy hammering on adjacent and opposite walls for at least 14 days after installation.

3.11 SCHEDULE

- .1 Tile Installed Over Masonry or Concrete Walls - Thin-Set Method: TTMAC Detail 303W.
- .2 Tile Installed On Cementitious Backer Units (CBU) - Thin-Set Method (Wet/Dry Areas and Exterior Use): TTMAC Detail 305W (A).
- .3 Tile Installed Hollow-Core Concrete Planks Over Mortar Bed With Cleavage Membrane: TTMAC Detail 309F.
- .4 Tile Bonded to Concrete Slab - Thin-Set Method (Interior/Exterior): TTMAC Detail 311F (A).
- .5 Tile Installed on Interior/Exterior Stairs (Steel Pan): TTMAC Detail 318S (A).

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Suspended metal grid ceiling system.
 - .2 Acoustic lay-in tiles.
- 1.2 RELATED SECTIONS
 - .1 Section 09 21 16 - Gypsum Board Assemblies: gypsum board ceilings.
- 1.3 REFERENCES
 - .1 ASTM C635/C635M-07: Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - .2 ASTM C636/C636M-08: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .3 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .4 ASTM E1264-08: Standard Classification for Acoustical Ceiling Products.
 - .5 Ceiling & Interior Systems Construction Association (CISCA): Ceiling Systems Handbook.
 - .6 Underwriters Laboratories of Canada: List of Equipment and Materials.
- 1.4 SUSTAINABLE DESIGN REQUIREMENTS
 - .1 Target Recycled Content for Acoustical Lay-in Tile: minimum 5 percent post-consumer and 40 percent post-industrial.
 - .2 Target Recycled Content for Suspended Tile Ceiling Grid: minimum 15 percent post-consumer and 50 percent post-industrial.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: one for each type of acoustic lay-in tile specified, 140 x 290 mm size, indicating texture, pattern, colour and edge detail.
- 1.6 QUALITY ASSURANCE
 - .1 Installers: company specializing in installing or applying the work of this Section with a minimum of three years documented experience.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver Products undamaged original containers.
 - .3 Store Products in warm, dry area.
- 1.8 EXTRA MATERIALS
 - .1 Supply extra materials as specified in Section 01 78 00.

- .2 Extra Materials: minimum two full bundles for each lay-in tile ceiling Product, colour and pattern; clearly marked to identify:
 - .1 Manufacturer's name,
 - .2 Product's name,
 - .3 Product colour and pattern.
- .3 Store bundles in original undamaged packages, in a warm, dry area.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of metal suspension systems who have Product considered acceptable for use:
 - .1 Armstrong World Industries.
 - .2 Bailey Metal Products Limited.
 - .3 CGC Inc.
 - .4 Chicago Metallic Corporation.
- .2 Manufacturers of acoustic lay-in tile who have Product considered acceptable for use:
 - .1 Armstrong World Industries.
 - .2 CertainTeed.
 - .3 CGC Inc.
- .3 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Ceiling Grid System, Type CGS-1: to ASTM C635/C635M, commercial quality, cold rolled steel, heavy duty, non-fire rated, main tees and cross tees with exposed 24 mm T-shape, 38 mm high flange; die cut and interlocking components; shop finished; eg. Prelude by Armstrong World Industries.
- .2 Fire-Rated Ceiling Grid System, Type CGS-2: to ASTM C635/C635M, commercial quality, cold rolled steel, heavy duty, fire rated, ULC labeled, main tees and cross tees with exposed 24 mm T-shape, 38 mm high flange; die cut and interlocking components; shop finished; eg. Prelude XL Fire Guard by Armstrong World Industries.
- .3 Standard Accessories: galvanized steel; stabilizer bars, clips, splices, edge mouldings, and hold down clips required for suspended grid system.
- .4 Capz Accessories: galvanized steel; stabilizer bars, clips, splices, edge mouldings, and hold down clips required for Optima Capz grid system.
- .5 Support Channels and Hangers: galvanized steel, to rigidly secure ceiling system with maximum deflection of 1/360.
- .6 Acoustic Ceiling Tile (ACT-1): wet-formed mineral fiber non-sagging lay-in tile, to ASTM E1264, Type III, Form 2, Pattern C E; as follows:
 - .1 Size: 610 x 1 220 mm size.
 - .2 Thickness: 15 mm.
 - .3 Pattern: medium texture, non-directional fissured.
 - .4 Edge: square edge.
 - .5 Finish: factory applied vinyl latex coated surface, White colour.
 - .6 Fire Resistance: fire resistive for use in UL rated assemblies.
 - .7 Weight: 4.882 kg/m²;
 - .8 Noise Reduction Coefficient: 0.55.
 - .9 Light Reflectance: 0.84.
 - .10 Manufacturer and Product Name: eg. Fine Fissured 1830 by Armstrong World Industries.

- .7 Acoustic Ceiling Tile (ACT-2): wet-formed mineral fiber non-sagging lay-in tile, to ASTM E1264, Type III, Form 2, Pattern C E; as follows:
 - .1 Size: 610 x 1 220 mm size.
 - .2 Thickness: 15 mm.
 - .3 Pattern: medium texture, non-directional fissured.
 - .4 Edge: square edge.
 - .5 Finish: factory applied vinyl latex coated surface, Tech Black colour.
 - .6 Fire Resistance: fire resistive for use in UL rated assemblies.
 - .7 Weight: 4.882 kg/m²;
 - .8 Noise Reduction Coefficient: 0.55.
 - .9 Light Reflectance: 0.84.
 - .10 Manufacturer and Product Name: eg. Fine Fissured 1830 by Armstrong World Industries.
 - .8 Acoustic Ceiling Tile (ACT-3): wet-formed mineral fiber lay-in tile, to ASTM E1264, Type IV, Form 2, Pattern G H; as follows:
 - .1 Size: 610 x 1,220 mm size.
 - .2 Thickness: 19 mm Field Unit, 15 mm Border Unit.
 - .3 Pattern: omnidirectional fissured.
 - .4 Edge: square edge.
 - .5 Finish: soil-resistant polyester film, White with Gray Spatter colour.
 - .6 Fire resistance: Class A.
 - .7 Noise Reduction Coefficient: 0.55 for Field Unit, 0.00 for Border Unit.
 - .8 Light Reflectance: 0.79.
 - .9 Manufacturer and Product Name: Armstrong Clean Room Mylar, 1716 Field Unit and 1721 Border Unit.
 - .9 Acoustic Ceiling Tile (ACT-4): fiberglass non-sagging lay-in tile, to ASTM E1264, Type XII, Form 2, Pattern E; as follows:
 - .1 Size: 610 x 1,220 mm size.
 - .2 Thickness: 25 mm.
 - .3 Pattern: fine monolithic texture.
 - .4 Edge: reverse tegular edge for use with Optima Capz system.
 - .5 Finish: factory applied acrylic latex coated surface, White colour.
 - .6 Fire Resistance: Class A.
 - .7 Noise Reduction Coefficient: 0.95.
 - .8 Light Reflectance: 0.90.
 - .9 Manufacturer and Product Name: eg. Optima Open Plan 3252 by Armstrong World Industries.
 - .10 Eggcrate Panel: 13 mm thick, acrylic, White colour.
- 2.3 SHOP FINISHING
- .1 Galvanizing: hot dipped method, minimum Z275 coating.
 - .2 Suspension Grid: baked enamel, colours as follows:
 - .1 Grid for Use With ACT-1: White colour.
 - .2 Grid for Use With ACT-2: Tech Black colour.
 - .3 Grid for Use With ACT-3: White colour.
 - .4 Grid For Use With ACT-4: White colour.
- 3 Execution
- 3.1 EXAMINATION
- .1 Refer to Section 01 71 00.
 - .2 Verify layout of hangers will not interfere with other work.

- .3 Verify ducts, pipes, fittings and other penetrations have been properly installed.

3.2 SUSPENSION SYSTEM INSTALLATION

- .1 Install suspension grid system to ASTM C636/C636M, CISCA installation standards and manufacturer's written instructions.
- .2 Hang system directly from structural elements, independent of walls, columns, metal deck, ducts, pipe fittings and conduit.
- .3 Space hangers at maximum 1,220 mm OC along supporting grillage, and not more than 150 mm OC from ends. Do not place hangers in front of access panels.
- .4 Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers to span the extra distance.
- .5 Install additional hangers and reinforcing to accommodate loads being carried.
- .6 Provide suspension hanger at each corner of suspended fixtures, and at maximum 610 mm OC around perimeter of fixture.
- .7 Locate system on room axis leaving equal border units according to reflected ceiling plan.
- .8 Install main tees suspended at maximum 1,220 mm OC and maximum 600 mm from wall.
- .9 Install cross tees perpendicular to main tees, and interlock with main tees.
- .10 Frame around fixtures and openings.
- .11 Install edge moulding at intersection of ceiling and vertical surfaces.
- .12 Form expansion joints as detailed. Form to accommodate plus or minus 25 mm movement. Maintain visual closure.

3.3 LAY-IN TILE INSTALLATION

- .1 Fit acoustic units in place, free from damaged edges.
- .2 Neatly cut tiles to accommodate necessary penetrations.
- .3 Lay directional patterned units one way with pattern parallel to longest room axis.
- .4 Fit border neatly against abutting surfaces.
- .5 Install hold-down clips to retain panels tight to grid system within 6.0 metres of an exterior door.

3.4 SITE TOLERANCES

- .1 Variation from Flat and Level Surface: 3 mm in 3.0 metres.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Resilient tile flooring.
 - .2 Resilient sheet flooring.
 - .3 Resilient base, trim and accessories.
- 1.2 RELATED SECTIONS
 - .1 Section 03 35 00 - Concrete Finishing: preparation of floor slab.
 - .2 Section 07 92 00 - Joint Sealants.
 - .3 Section 09 30 00 - Tiling.
 - .4 Section 09 65 66 - Resilient Athletic Flooring.
- 1.3 REFERENCES
 - .1 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .3 ASTM F1066-04: Standard Specification for Vinyl Composition Floor Tile.
 - .4 ASTM F1303-04: Standard Specification for Sheet Vinyl Floor Covering with Backing.
 - .5 ASTM F1861-02: Standard Specification for Resilient Wall Base.
- 1.4 SUSTAINABLE DESIGN REQUIREMENTS
 - .1 Use low-emitting adhesives conforming to CARB requirements.
- 1.5 SUBMITTALS
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples:
 - .1 Flooring: duplicate 300 x 300 mm size samples, illustrating colour and pattern selection for each flooring material specified.
 - .2 Base: duplicate 100 mm long samples, illustrating colour selection.
- 1.6 CLOSEOUT SUBMITTALS
 - .1 Submit maintenance data as specified in Section 01 78 00.
 - .2 Maintenance Data: duplicate copies of manufacturers' printed maintenance and cleaning instructions.
- 1.7 MOCK-UP
 - .1 Construct a jobsite mock-up as specified in Section 01 40 00.

- .2 Mock-Up: illustrating typical floor sheet and tile applications for each floor type and colour.
 - .1 Locate mock-ups in areas designated by Consultant.
 - .2 Incorporate borders or accent tiles as designated by Consultant.
 - .3 Incorporate transitions to adjacent materials. Include proposed transition strips and base materials.
 - .4 Accepted mock-ups will remain as part of the completed Work. Protect from damage or disfigurement until Substantial Performance of the Work.
- 1.8 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver and store Products undamaged in original wrapping or cartons.
 - .3 Store Products for a minimum of three days prior to installation in warm dry room with tiles stacked not over four cartons high.
- 1.9 PROJECT CONDITIONS
 - .1 Maintain ambient air temperature of 20 degrees Celsius three days prior to, during, and 48 hours after installation of flooring materials.
 - .2 Do not lay flooring in conditions of high humidity or where exposed to cold drafts. In hot weather, protect from direct sunlight. Provide adequate ventilation.
- 1.10 EXTRA MATERIALS
 - .1 Supply extra materials as specified in Section 01 78 00.
 - .2 Extra Materials: 6 m² or 3 percent, whichever is the greater, of each resilient flooring Product, colour and pattern; clearly marked to identify:
 - .1 Manufacturer's name,
 - .2 Product's name,
 - .3 Product colour and pattern.
 - .3 Package tile products neatly in original containers, to prevent damage.
 - .4 Supply sheet products in full width rolls. Store in upright position, with roll wrapped in a protective cover to prevent damage.
- 2 Products
 - 2.1 MANUFACTURERS
 - .1 Manufacturers of vinyl composition tile who have Product considered acceptable for use:
 - .1 Amtico.
 - .2 Armstrong World Industries.
 - .3 Flextile Ltd.
 - .2 Manufacturers of non-slip safety flooring having Product considered acceptable for use:
 - .1 Altro.
 - .3 Manufacturers of resilient base, trim and accessories who have Product considered acceptable for use:
 - .1 Amtico.
 - .2 Armstrong World Industries.
 - .3 Finercraft.
 - .4 Johnsonite.
 - .5 Roppe Corporation.
 - .4 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Vinyl Composition Tile (VCT): 305 x 305 mm size, 3.2 mm thick reinforced resilient vinyl, to ASTM F1066, Composition 1, Class 2; eg. Standard Excelon - Imperial Texture by Armstrong World Industries; colours as selected by Consultant up to a maximum of 10 different colours.
- .2 Non-slip Safety Floor (NSF): to ASTM F1303, Type II, Grade 1, Class A; 2.0 mm thick, 2.0 metre wide rolls; containing aluminum oxide, silicon carbide and quartz particles; eg. Walkway 20 by Altro; multiple colours as selected by Consultant.
- .3 Resilient Base (RB): thermoset vulcanized rubber, to ASTM F1861, Type TS, Style B - Cove; 100 mm high; 3 mm thick; c/w pre-moulded end stops and external corners; multiple colours as selected by Consultant.
- .4 Rubber Combination Stair Tread and Riser (RST-1): thermoset vulcanized rubber, one-piece stair tread and riser, speckled finish, round raised disc texture (RTR); eg. VIRTRSPS by Johnsonite with 50 mm contrasting rubber insert; colour as selected by Consultant.
- .5 Rubber Stair Tread (RST-2): thermoset vulcanized rubber, speckled finish, round raised disc texture (RTR); eg. VIRTRSPS by Johnsonite with 50 mm contrasting rubber insert; colour as selected by Consultant.
- .6 Rubber Stair Riser (RSR): thermoset vulcanized rubber, speckled finish, colour as selected by Consultant.
- .7 Transition Strips: thermoset vulcanized rubber, smooth, purpose made to accommodate wheeled traffic and prevent tripping; tapered designs to suit nature of transition; colour as selected by Consultant.

2.3 ACCESSORIES

- .1 Seam Welding Rods for Non-slip Safety Flooring: 4 mm OD vinyl, colour matched to slip-resistant resilient sheet flooring; Weldrod by Altro.
- .2 Subfloor Filler: white premix latex; as recommended by flooring manufacturer to be compatible with materials of this Section.
- .3 Cove Filler Strip: 25 x 25 mm size, 13 mm radius, extruded fire rated vinyl; eg. Johnsonite CFS-00-M.
- .4 Base Caps for Flash Coved Sheet Flooring: purpose made stainless steel profiles, to ASTM A167, Type 304, No. 4 - Brushed finish.
- .5 Joint Sealer: mildew-resistant joint sealer, as specified in Section 07 92 00.
- .6 Primers: waterproof; as recommended by flooring manufacturer.
- .7 Adhesive for Vinyl Composition Tile: water-based / latex resin adhesive, Clear colour; eg. Armstrong S-515 Clear Thin Spread Floor Tile Adhesive.
- .8 Adhesive for Non-slip Safety Flooring: two-part resin-based polyurethane adhesive; eg. Altrofix 300 by Altro.
- .9 Adhesive for Resilient Base: contact adhesive, water-based formulation; eg. Johnsonite 945.
- .10 Adhesive for Rubber Stair Treads and Risers: two-part urethane adhesive, eg. Johnsonite 975.
- .11 Sealers and Wax: as recommended by flooring manufacturer.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify surfaces are dry, true, even and smooth, and free of paint, grease and oil.
- .3 Verify surfaces designated to receive resilient base are even, smooth, free of gaps, holes and depressions.
- .4 Verify concrete floors are cured a minimum of 28 days, and that the slab surface has a neutral alkalinity and has carbonized.
- .5 Conduct calcium chloride tests on concrete slabs to ASTM F1869. Do not proceed with flooring installation until tests indicate the following conditions:
 - .1 Floors Designated to Receive Vinyl Composition Tile: maximum 11 kg per 100 sm for a 24 hour period.
 - .2 Floors Designated to Receive Seamless Safety Flooring: maximum 1.4 kg per 100 sm for a 24 hour period.
 - .3 Floors Designated to Receive Seamless Flexible Flooring: maximum 6.7 kg per 100 sm for a 24 hour period.

3.2 PREPARATION

- .1 Clean concrete substrate to remove deleterious matter which would impair adhesion of resilient flooring or sub-floor filler.
- .2 Prepare substrate to a smooth and flat surface, as follows:
 - .1 Remove sub-floor ridges and bumps by grinding or other means.
 - .2 Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
 - .3 Apply, trowel and float filler to leave smooth, flat, hard surface.
 - .4 Prohibit traffic until filler is cured.
 - .5 Vacuum clean substrate.
- .3 Prime substrate as and when recommended to ensure proper adhesion of finished flooring.

3.3 INSTALLATION - GENERAL

- .1 Install flooring materials to requirements of manufacturer's instructions.
- .2 Spread only enough adhesive to permit installation of materials before initial set.
- .3 Set flooring in place, press with heavy roller to attain full adhesion.
- .4 Lay flooring continuously from wall to wall in each area, including all areas beneath casework.
- .5 Terminate flooring at centre line of door openings where adjacent floor finish is dissimilar.
- .6 Scribe flooring to walls, columns, floor outlets, and other appurtenances to produce tight joints.

3.4 INSTALLATION - TILE FLOORING

- .1 Lay tiles with joints and seams parallel to building lines, unless indicated otherwise on Drawings.
- .2 Provide perimeter tile of similar size within any given area.

3.5 INSTALLATION - SHEET FLOORING

- .1 Lay sheet flooring with joints and seams parallel to building lines to produce minimum number of seams.

- .2 Provide minimum one-third full roll width.
- .3 Double cut sheet and continuously seal. Heat weld seams with seam welding rods.
- .4 Flash cove sheet flooring over cove filler strip, and extend 100 mm up wall surface. Cap flash coved base with stainless steel trim.

3.6 INSTALLATION - RESILIENT BASE

- .1 Install base on solid backing. Bond tight to wall and floor surfaces.
- .2 Mitre internal corners. Use only pre-moulded units at exposed ends and external corners.
- .3 Scribe and fit to door frames and other interruptions.

3.7 STAIR COVERING INSTALLATION

- .1 Install rubber combination stair treads and risers one piece for full height of riser, and full width and depth of tread.
- .2 Install rubber stair tread one piece for full width of landing and top of stair edge.
- .3 Install rubber stair riser one piece for full width of bottom riser.

3.8 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Clean, seal, and wax floor and base surfaces to requirements of manufacturer's instructions.

3.9 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect the finished floor with suitable and durable material or by keeping traffic off the floor until the building or room is ready for occupancy.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Athletic flooring, composite vinyl sheet.
- 1.2 RELATED SECTIONS
 - .1 Section 03 35 00 - Concrete Finishing.
 - .2 Section 09 65 00 - Resilient Flooring.
- 1.3 REFERENCES
 - .1 ASTM D2240-05: Standard Test Method for Rubber Property-Durometer Hardness.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: indicate game lines layout, and locations and sizes of special graphics, floor inserts, and equipment anchors. Note colours and thicknesses of games lines and graphic inserts.
- 1.5 CLOSEOUT SUBMITTALS
 - .1 Submit maintenance data as specified in Section 01 78 00.
 - .2 Maintenance Data: duplicate copies of manufacturer's printed maintenance and cleaning instructions.
- 1.6 QUALITY ASSURANCE
 - .1 Applicator: a firm experienced in the work of this Section, approved by the flooring manufacturer, and having a minimum of 2 years documented experience, indicating successful completion of not less than five similar installations.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver and store Products undamaged in original wrapping or cartons, with manufacturer's labels and seals intact.
 - .3 Store Products in up-right position, for a minimum of three days prior to installation in a warm dry room.
- 1.8 PROJECT CONDITIONS
 - .1 Maintain ambient air temperature between 18 degrees C and 30 degrees C.
 - .2 Do not apply flooring over concrete having a moisture content greater than 0.003 psf when tested to RMA method.
 - .3 Do not lay flooring in conditions of high humidity or where exposed to cold drafts. In hot weather, protect from direct sunlight. Provide adequate ventilation.
- 1.9 WARRANTY
 - .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
 - .2 System Warranty: for a period of 2 years, covering against punctures, tears, delamination, and excessive wear.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of resilient athletic flooring having Product considered acceptable for use:
 - .1 Gerflor.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 SYSTEM DESCRIPTION

- .1 Resilient Athletic Floor System: comprised of a vinyl foam backing, reinforced fiberglass mesh and a PVC wear layer; c/w game lines and graphics.

2.3 PERFORMANCE REQUIREMENTS

- .1 Resilient Athletic Flooring (RAF-1) shall meet the following criteria:
 - .1 Abrasion Resistance Taber (ASTM C501): ≤ 0.2 g.
 - .2 Impact Resistance (prEN 1517): ≥ 8 Nm.
 - .3 Dynamic Load Limit (prEN 1569): 1500 N.
 - .4 Shock Absorption (ASTM F355): 900.
 - .5 Coefficient of Friction (prEN German): 0.45.
 - .6 Light Reflectance (ISO 2813): ≤ 30 percent.
 - .7 Ball Rebound (prEN 12235): ≥ 90 percent.

2.4 MATERIALS

- .1 Resilient Athletic Flooring (RAF-1): 7.0 mm thick, homogenous 2.1 mm thick wear-layer combined with a closed-cell foam cushioned backing, reinforced with a fibreglass mesh interlayer; integral fungistatic and bacteriostatic treatment; treated with factory-applied photoreticulated, UV cured polyurethane, anti-dirt treatment; Maple colour and pattern; Taraflex Sport M Plus by Gerflor.
- .2 Levelling Compound: approved by manufacturer to correct minor subfloor deviations.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify that the concrete slab is adequately vapour sealed.
- .3 Verify that adequate perimeter drainage is provided.
- .4 Verify that the subfloor is properly cured, clean and dry.
- .5 Verify that no curing compounds or sealers have been applied to the concrete.
- .6 Verify that variations in concrete slab do not exceed plus or minus 3 mm in a 3 metre radius.

3.2 PREPARATION

- .1 Fill cracks, grooves, voids and /or construction joints with approved levelling compound.
- .2 Remove high spots on floor slab by grinding method.
- .3 Clean concrete sub-floors to remove deleterious matter which would impair adhesion of flooring.
- .4 Broom clean substrate.

3.3 INSTALLATION

- .1 Install flooring strictly in accordance with manufacturer's instructions.
- .2 Terminate flooring at centerline of openings where adjacent floor finish or colour is dissimilar.
- .3 Securely bond resilient sheet underlay to substrate. Cut neatly around any fixed objects.
- .4 Heat weld joints.
- .5 Lay out game lines and special graphics in accordance with accepted Shop Drawings.

3.4 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Restrict access to the area of the flooring installation for a minimum of 72 hours after completion.
- .3 Protect finished floor from damage until Owner occupancy. Make Good damage.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Patching of existing terrazzo floors and base.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-In-Place Concrete.
 - .2 Section 07 92 00 - Joint Sealants.
- 1.3 REFERENCES
 - .1 CAN/CSA-A3001-03: Cementitious Materials for Use in Concrete.
 - .2 ASTM A185/A185M-07: Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .3 Terrazzo Tile & Marble Association of Canada (TTMAC): 09 66 00 Terrazzo Specification Guide - 2007.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate divider strip and control and expansion joint layout, details of adjacent components and special details.
 - .3 Product Data: information pertaining to divider strips, control joint strips, expansion joints, etc.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Selection Samples: duplicate 300 x 300 mm size samples, illustrating colour, chip size and variation, mortar colour, and ground top surface of divider strip.
- 1.6 MAINTENANCE DATA
 - .1 Submit cleaning and maintenance data as specified in Section 01 78 00.
 - .2 Closeout Submittals: duplicate copies of the latest edition of the TTMAC Maintenance Guide.
- 1.7 QUALITY ASSURANCE
 - .1 Installer: Company specializing in full bed terrazzo applications with five years documented experience, and a member in good standing of the Terrazzo Tile and Marble Association of Canada (TTMAC).
- 1.8 ENVIRONMENTAL REQUIREMENTS
 - .1 Do not install wet mixed terrazzo when temperature is below 10 degrees Celsius or above 32 degrees Celsius.
- 1.9 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver, store and handle Products in a manner to avoid damage.
 - .3 Store Products in a clean, dry, heated location.
 - .4 Condition Products to ambient temperatures for a minimum of 24 hours prior to installation.

2 Products

2.1 MATERIALS

- .1 Portland Cement: to CAN/CSA-A3001, Type GU; white colour for topping mix, grey colour for underbed, modified to obtain a higher compressive strength of 19.3 MPa, obtained from single source.
- .2 Colour Pigments For Topping: Non-fading mineral type, to match existing.
- .3 Sand: Sharp, coarse, clean, screened, free of deleterious material.
- .4 Water: Potable.
- .5 Surface Aggregate: Crushed marble, granite, or quartz, to match existing terrazzo.

2.2 ACCESSORIES

- .1 Welded Steel Wire Fabric: to ASTM A185/A185M, flat sheets; 51 x 51 mm mesh size, 1.5 mm thick galvanized wire.
- .2 Control Joint Strips, Divider Strips, Base Caps and Separator Strips: to match existing.
- .3 Foam Filler: Closed cell urethane foam, capable of compression to 50 percent of its thickness with full recovery.
- .4 Slip Sheet: 0.15 mm thick polyethylene sheet.
- .5 Tape: Cloth type for wood subfloor joints.
- .6 Subfloor Filler: Latex type.

2.3 MIXES

- .1 Underbed: One part Portland cement to 4-1/2 parts sand by volume. Add water to produce low slump mix.
- .2 Floor and Base: matrix and aggregate mix to match existing.

3 Execution

3.1 PREPARATION

- .1 Remove loose and unsound materials and clean thoroughly.
- .2 Apply appropriate bonding agent to substrate.

3.2 INSTALLATION

- .1 Install divider and control joint strips, straight and level in locations indicated.
- .2 Place terrazzo topping mix over prepared substrate to thickness required to match existing. Conform to appropriate TTMAC Detail.
- .3 Allow terrazzo to cure.
- .4 After curing, grind patches using 80 grit or finer stones until area has similar finish to surrounding floor surface.
- .5 Allow area to dry, then apply appropriate sealer to terrazzo surface.

3.3 CLEANING

- .1 Refer to Section 01 74 00.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Carpet tile.
- 1.2 RELATED SECTIONS
 - .1 Section 09 65 00 - Resilient Flooring: resilient base.
- 1.3 REFERENCES
 - .1 CGSB 4-GP-129: Carpets, Commercial.
 - .2 CAN/CGSB-71.20-M88: Adhesive, Contact, Brushable.
 - .3 CAN/CGSB-71.28-M88: Adhesive, for Direct Glue-Down Carpet Installation.
 - .4 CRI 104-2002: Standard for Installation Specification of Commercial Carpet.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: indicate seaming plan, method of joining seams, and direction of carpet tile.
 - .3 Submit Product data as specified in Section 01 33 00.
 - .4 Product Data: manufacturers' data sheets on specified Products, describing physical and performance characteristics; sizes, patterns, colours available, and method of installation.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: two complete sets, 150 x 150 mm in size; illustrating colour and pattern for each carpet specified.
- 1.6 CLOSEOUT SUBMITTALS
 - .1 Submit maintenance data as specified in Section 01 78 00.
 - .2 Maintenance Data: duplicate copies of manufacturers' printed maintenance and cleaning instructions.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Deliver Products in original mill wrappings, with each roll having its register number properly marked on each bale.
 - .3 Protect Products from damage, dirt, stains and moisture.
- 1.8 PROJECT CONDITIONS
 - .1 Environmental Requirements: maintain temperature of 21 degrees Celsius for 48 hours before, during and after installation. Sub-floor temperature shall be maintained at a minimum temperature of 10 degrees Celsius.
- 1.9 WARRANTY
 - .1 Submit system and manufacturer's product extended warranties in accordance with the General Conditions of the Contract.

- .2 System Warranty: a 2 year extended warranty including coverage against loose fitting, breaking or unraveling of seams or breaking away from sub-base, and failure of materials or workmanship which proves detrimental to the appearance or performance of the carpeting.
- 1.10 EXTRA MATERIALS
- .1 Supply extra materials as specified in Section 01 78 00.
 - .2 Extra Materials: minimum 4 percent for each carpet tile Product, colour and pattern; clearly marked to identify:
 - .1 Manufacturer's name,
 - .2 Product's name,
 - .3 Product colour and pattern.
- 2 Products
- 2.1 MANUFACTURERS
- .1 Manufacturers of carpet tile having Product considered acceptable for use:
 - .1 InterfaceFLOR.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 MATERIALS
- .1 Carpet Tile: 500 x 500 mm size, 3 mm thick, tufted textured loop construction; 100 percent solution dyed nylon; non-directional pattern; Urban Grid by InterfaceFLOR; colour as selected by Consultant.
 - .2 Sub-Floor Filler: white premix latex type.
 - .3 Edge Strips: resilient type, as specified in Section 09 65 00.
 - .4 Carpet Adhesive: to CAN/CGSB-71.28-M, low-VOC, waterproof type, as recommended by carpet manufacturer.
 - .5 Seam Adhesive: latex seam sealer or thermoplastic adhesive.
- 3 Execution
- 3.1 EXAMINATION
- .1 Refer to Section 01 71 00.
 - .2 Verify concrete floors exhibit negative alkalinity, carbonization, or dusting.
 - .3 Conduct calcium chloride tests on concrete slabs to ASTM F1869. Do not proceed with flooring installation until tests indicate maximum 2.4 kg per 100 sm for a 24 hour period.
 - .1 Submit reports to manufacturer for their review and acceptance prior to commencement of flooring installation.
- 3.2 PREPARATION
- .1 Remove subfloor ridges and bumps.
 - .2 Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

3.3 INSTALLATION

- .1 Install carpet tile to CRI 104 for Direct Glue-Down Installation Method.
- .2 Verify carpet tile pattern match to ensure minimal variation between dye lots.
- .3 Maintain joints and seams parallel to building lines to produce symmetrical tile patterns.
- .4 Provide perimeter tile of similar size within any given area.
- .5 Lay carpet tile continuously from wall to wall in each area, including areas beneath casework.
- .6 Cut and fit carpet tiles around interruptions.
- .7 Fit carpet tiles tight to intersection with vertical surfaces without gaps.

3.4 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Remove dirt, carpet scraps, and threads from carpet surface.
- .3 Clean carpet with a beater-type vacuum cleaner.
- .4 Remove soiled spots or adhesive from carpet with a proper spot remover.
- .5 Remove loose pieces of face yarn with sharp scissors.

3.5 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect completed installation with protective covering until Owner occupancy.

END OF SECTION

- 1 General
 - 1.1 SECTION INCLUDES
 - .1 Batt and blanket insulation, acoustic type.
 - 1.2 RELATED SECTIONS
 - .1 Section 09 21 16 - Gypsum Board Assemblies.
 - 1.3 REFERENCES
 - .1 CAN/ULC-S702-09: Standard for Mineral Fibre Thermal Insulation for Buildings.
 - .2 ULC-S702.2-03: Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines.
 - 1.4 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Store Products away from construction activity and sources of ignition.
 - .3 Protect Products from damage during handling, installation and at point of installation.
- 2 Products
 - 2.1 MANUFACTURERS
 - .1 Manufacturers of acoustic insulation having Product considered acceptable for use:
 - .1 Fibrex Insulations Inc.
 - .2 Roxul Inc.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
 - 2.2 MATERIALS
 - .1 Acoustical Insulation, Type INS-5: mineral fibre acoustical batts, to CAN/ULC-S702, Type 1; non-rigid, friction fit type, manufactured from rock or slag, and acceptable for use in fire rated partitions:
 - .1 Noise Reduction Coefficient: 1.10 at 100 mm thickness, to ASTM C423.
 - .2 Facing: Unfaced.
 - .3 Density: minimum 40 kg/m³.
 - .4 Combustibility: Noncombustible to CAN/ULC-S114.
 - .5 Surface Burning Characteristics: to CAN/ULC-S102, maximum flame spread of 0, smoke developed of 0.
 - .6 Smoulder Resistance: 0.09 percent when tested to CAN/ULC-S129.
 - .7 Aged Thermal Resistance: RSI 0.76 per 25 mm of thickness.
 - .8 Thickness: as indicated on Drawings.
 - .9 Manufacturer and Product Name: eg. Roxul AFB by Roxul Inc.
 - 2.3 ACCESSORIES
 - .1 Mechanical Fasteners: stainless steel screw type fastener, c/w moulded plastic disc washer, minimum 75 mm diameter.
 - .2 Adhesive: mastic type, synthetic rubber base, fungi resistant, gun or trowel application, application temperature 12 degrees C to 50 degrees C.

3 Execution

3.1 INSTALLATION

- .1 Install acoustic insulation to ULC-S702.2, without gaps and voids.
- .2 Do not crush or tightly compress acoustic insulation when using mechanical fasteners.
- .3 Fit acoustic insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.

3.2 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect insulation edges at the end of each Working Day.
- .3 Protect insulation in areas where welding will be carried out.
- .4 Make Good acoustic insulation damaged by subsequent installations.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Fabric-covered acoustically insulated wall panels.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry: wall substrate.
 - .2 Section 09 21 16 - Gypsum Board Assemblies: wall substrate.
 - .3 Section 09 51 23 - Acoustical Tile Ceilings.
 - .4 Section 09 90 00 - Painting and Coating: site finishing.
- 1.3 REFERENCES
 - .1 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .2 ASTM E90-04: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .3 Ceilings & Interior Systems Construction Association (CISCA): Code of Practices.
 - .4 Underwriters Laboratories of Canada: List of Equipment and Materials.
- 1.4 SYSTEM DESCRIPTION
 - .1 Design acoustical wall panels to meet the following criteria:
 - .1 Noise Reduction Coefficient: 0.80 when tested to ASTM E90.
 - .2 Fire Rating: Class A when tested to ASTM E84.
 - .3 Flame Spread: maximum 25 when tested to ASTM E84.
 - .4 Smoke Developed: maximum 5 when tested to ASTM E84.
- 1.5 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: indicating panels sizes, mechanical attachment details and frequency of fasteners, and panel configuration. Field measure areas prior to determining panel layout on shop drawings.
 - .3 Product Data: Include published data and certification that acoustical panel material complies with design criteria.
- 1.6 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: duplicate 150 x 150 mm size samples, illustrating full range of exposed texture, and conditions of panel edges and ends.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Store Products stacked on a raised platform clear of the ground, and adequately protected from weather using waterproof coverings.
 - .3 Protect edges and surfaces from marring, soil and damage.

- .4 Cover bottom of stacks with a moisture-proof membrane, allowing for adequate air circulation to prevent condensation.
 - .5 Protect Products from water damage.
- 1.8 PROJECT CONDITIONS
- .1 Do not install Product until building is enclosed and HVAC system is operational.
 - .2 Locate Products in the area of the Work at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.
 - .3 Maintain the following environmental conditions for 24 hours before, during and after installation:
 - .1 Relative Humidity: maximum 80 percent.
 - .2 Ambient Air Temperature: between 15 degrees C and 30 degrees C.
- 2 Products
- 2.1 MANUFACTURERS
- .1 Manufacturers of acoustic wall panels having Product considered acceptable for use:
 - .1 Wenger Corporation.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 MATERIALS
- .1 Acoustical Wall Panel (AWP-1): fabric-covered; eg. Type I Convex Wall Diffuser Panels by Wenger Corporation.
 - .2 Mechanical Fastener System: 40 x 60 mm size, impale clip; minimum 13 mm long teeth, 1.2 mm thick sheet metal construction.
 - .3 Adhesive: single component polyurethane.
 - .4 Screws: self-drilling, self-tapping type, sufficient length to penetrate impaling clip and minimum 13 mm into substrate.
- 2.3 FABRICATION
- .1 Fabricate panels in strict accordance with approved shop drawings. Field cutting will not be allowed.
 - .2 Fully bond fabric cover to panel surfaces with fire-resistant adhesive. Wrap fabric around edges and return to back of panel.
- 3 Execution
- 3.1 EXAMINATION
- .1 Refer to Section 01 71 00.
 - .2 Inspect surfaces scheduled to receive acoustical panels for unevenness, irregularities and dampness that would affect quality and execution of work.
- 3.2 INSTALLATION
- .1 Install acoustical panels in accordance with CISCA Code of Practices and manufacturer's instructions.

- .2 Mounting Style: concealed, impale clip method.
- .3 Space fasteners at 610 mm OC maximum, both directions. Provide additional fasteners as required by project conditions.
- .4 Glue and screw impale clips to wall substrate.
- .5 Apply adhesive to toothed face of impale clip prior to application of panel.
- .6 Do not field cut panels.

3.3 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Clean exposed surfaces of acoustical panel, trim, mouldings and suspension members in accordance with manufacturer's printed instructions.
- .3 Remove and replace damaged Product.

3.4 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect installed Products and assemblies from damage resulting from subsequent construction activity.
- .3 Protect installation from inclement weather, excessive temperature and humidity conditions and dust.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Cementitious wood fibre wall panels and ceiling baffles.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry: wall substrate.
 - .2 Section 06 10 00 - Rough Carpentry: furring strips.
 - .3 Section 09 51 23 - Acoustical Tile Ceilings.
 - .4 Section 09 81 00 - Acoustic Insulation.
 - .5 Section 09 84 13 - Fixed Sound-Absorptive Panels.
 - .6 Section 09 90 00 - Painting and Coating.
- 1.3 REFERENCES
 - .1 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .2 ASTM E90-04: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .3 Ceilings & Interior Systems Construction Association (CISCA): Code of Practices.
 - .4 Underwriters Laboratories of Canada: List of Equipment and Materials.
- 1.4 SUBMITTALS
 - .1 Submit Product data as specified in Section 01 33 00.
 - .2 Product Data: Include published data and certification that acoustical wall treatment material complies with design criteria.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: duplicate 150 x 150 mm size samples, illustrating full range of exposed texture, and conditions of panel edges and ends.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01 60 00.
 - .2 Ensure Products delivered to the Place of the Work have a maximum moisture content of 12 percent.
 - .3 Store Products on a raised platform clear of the ground, and adequately protected from weather using waterproof coverings.
 - .4 Protect edges and surfaces from marring, soil and damage.
 - .5 Cover bottom of stacks with a moisture-proof membrane, allowing for adequate air circulation to prevent condensation.
 - .6 Protect Products from water damage.

1.7 PROJECT CONDITIONS

- .1 Do not install Product until building is enclosed and HVAC system is operational.
- .2 Locate Products in the area of the Work at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.
- .3 Maintain the following environmental conditions for 24 hours before, during and after installation:
 - .1 Relative Humidity: between 65 and 75 percent.
 - .2 Ambient Air Temperature: between 13 degrees C and 21 degrees C.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of cementitious acoustical panels having Product considered acceptable for use:
 - .1 Martin Acoustical Products.
 - .2 Tectum Inc.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 DESIGN REQUIREMENTS

- .1 Design acoustical wall panels to meet the following criteria:
 - .1 Noise Reduction Coefficient: 1.0 when tested to ASTM E90.
 - .2 Flame Spread: maximum 5 when tested to ASTM E84.
 - .3 Smoke Developed: maximum 5 when tested to ASTM E84.

2.3 MATERIALS

- .1 Acoustical Wall Panels (AWP-2): 50 mm thick panels composed of aspen wood fibre and magnesium oxysulfate hydraulic cement treated with an organic binder; 1,213 mm wide, 2,440 mm long; tongue and groove edges with square ends.
- .2 Acoustical Ceiling Baffles: 50 mm thick panels composed of aspen wood fibre and magnesium oxysulfate hydraulic cement treated with an organic binder; 610 mm wide, 1,220 mm long; square edges and ends.
- .3 Moulding: purpose made plastic mouldings to profiles recommended by panel manufacturer for proposed installation.
- .4 Furring Strips: non-structural light framing, as specified in Section 06 10 00.
- .5 Insulation: 62 mm thick sound attenuating mineral fibre, Type INS-5 as specified in Section 09 81 00.
- .6 Screws: self-drilling, self-tapping type, sufficient length to penetrate panel and minimum 13 mm into substrate; colour to match panel finish; as recommended by manufacturer.
- .7 Touch-up Paint: Natural.

2.4 SHOP FINISHES

- .1 Cementitious Panels: Natural off-white finish, average light reflection 0.60.

- 3 Execution
- 3.1 EXAMINATION
 - .1 Refer to Section 01 71 00.
 - .2 Inspect surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities and dampness that would affect quality and installation.
- 3.2 INSTALLATION
 - .1 Install acoustical wall panels and ceiling baffles in accordance with CISCA Code of Practices and manufacturer's instructions.
 - .2 Wall Panel Mounting Style: in accordance with Tectum Type C-40 method.
 - .3 Hanging Baffle Mounting Style: as indicated on Drawings.
 - .4 Install 38 mm thick furring strips, secured horizontally to substrate at maximum 610 mm OC.
 - .5 Install sound attenuating insulation between furring strips, securely adhered to substrate.
 - .6 Ensure screw heads are flush with panel surface.
 - .7 Cover field cut edges with wood trim or mouldings.
- 3.3 CLEANING
 - .1 Refer to Section 01 74 00.
 - .2 Clean exposed surfaces of acoustical panel, trim, mouldings and suspension members in accordance with manufacturer's printed instructions.
 - .3 Touch-up minor damage to finishes.
 - .4 Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- 3.4 PROTECTION
 - .1 Refer to Section 01 76 00.
 - .2 Protect completed installation from damage resulting from subsequent construction activity.
 - .3 Protect installation from inclement weather, excessive temperature and humidity conditions and dust.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Painting and finishing.

1.2 PRODUCTS FURNISHED OR INSTALLED UNDER OTHER SECTIONS

- .1 Carefully examine the scope of the Work as indicated on the Drawings, and include all finishing, whether specifically mentioned or not, except as specifically excluded below:
- .1 Section 05 12 00 - Structural Steel Framing: shop priming.
 - .2 Section 05 21 00 - Steel Joist Framing: shop priming.
 - .3 Section 05 30 00 - Metal Decking: shop priming.
 - .4 Section 05 50 00 - Metal Fabrications: shop priming.
 - .5 Section 05 51 00 - Metal Stairs: shop priming.
 - .6 Section 06 40 00 - Architectural Woodwork: melamine and laminate finishes on shop-fabricated casework.
 - .7 Section 07 62 13 - Sheet Metal for Built-Up Roofing: shop finishing of metal flashing.
 - .8 Section 07 62 16 - Sheet Metal Flashing and Trim: shop finishing of metal flashing.
 - .9 Section 08 11 13 - Hollow Metal Frames: galvanized coating.
 - .10 Section 08 13 13 - Hollow Metal Doors: galvanized coating.
 - .11 Section 08 14 00 - Wood Doors: laminate faces.
 - .12 Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: shop finishing of aluminum doors and frames.
 - .13 Section 08 44 13 - Glazed Aluminum Curtain Wall: shop finishing curtain wall frames.
 - .14 Section 08 51 13 - Aluminum Windows: shop finishing aluminum window frames.
 - .15 Section 09 51 23 - Acoustical Tile Ceilings: shop finishing of lay-in tiles and metal suspension systems.
 - .16 Section 10 14 00 - Signage: shop finishing of signage elements.
 - .17 Section 10 21 13.13 - Metal Toilet Compartments: shop finishing of metal toilet compartment components.
 - .18 Section 10 51 13 - Metal Lockers: shop finishing of metal lockers.
 - .19 Plated and polished surfaces are prefinished under the appropriate Section.

1.3 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 04 22 00 - Concrete Unit Masonry.
- .3 Section 05 12 00 - Structural Steel Framing.
- .4 Section 05 21 00 - Steel Joist Framing.
- .5 Section 05 30 00 - Metal Decking.
- .6 Section 05 50 00 - Metal Fabrications.
- .7 Section 05 51 00 - Metal Stairs
- .8 Section 06 10 00 - Rough Carpentry.
- .9 Section 06 20 00 - Finish Carpentry.
- .10 Section 06 40 00 - Architectural Woodwork.
- .11 Section 08 11 13 - Hollow Metal Frames.
- .12 Section 08 13 13 - Hollow Metal Doors.
- .13 Section 08 14 00 - Wood Doors.

- .14 Section 08 31 00 - Access Doors and Panels.
- .15 Section 09 21 16 - Gypsum Board Assemblies.
- .16 Section 09 84 13.13 - Fixed Sound-Absorptive Cementitious Panels.

1.4 REFERENCES

- .1 CAN/CGSB-85.100-93: Painting.
- .2 Underwriters Laboratories of Canada: List of Equipment and Materials.
- .3 Ontario Painting Contractors' Association (OPCA): Architectural Painting Specification Manual.

1.5 SYSTEM DESCRIPTION

- .1 Gloss Range: paint and varnish textures are specified by their Gloss type, which is defined by the dried film Sheen Factor. Refer to OPCA Architectural Painting Specification Manual - "Glossary of Terms" to determine Sheen Factors for the various Gloss types.
- .2 Colours:
 - .1 As selected by Consultant.
 - .2 There may be a maximum of 5 exterior colours and 20 interior colours required.
 - .3 There may be more than 2 colours used in each room or space.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

- .1 Use ECOLOGO paints and coatings with volatile organic compound (VOC) contents less than 150 g/L for non-flat sheen coatings and 50 g/L for flat sheen coatings.

1.7 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Selection Samples: a full range of colour selector samples for each type of paint or stain required.
- .3 Verification Samples: If requested by Consultant, prepare sample panels, 1 000 x 1 000 mm minimum size. Apply finish material to the actual surface or acceptable alternate if required to be portable.

1.8 QUALIFICATIONS

- .1 Manufacturer: use only paint manufacturers and products listed in the OPCA Architectural Painting Specification Manual - Paint Product Recommendation section.
- .2 Applicators: company specializing in the work of this Section, and with a minimum of ten years documented experience.
- .3 Independent Inspection Agency: painting and decorating inspector acceptable to Owner and the Ontario Painting Contractors' Association.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 60 00.
- .2 Deliver Products in original containers with unbroken seals and labeled to indicate the name of the manufacturer, brand, colour and quality of the contents.
- .3 Store thinners, loose soaked rags and similar combustible materials in closed containers. Remove from site or store in an assigned area.
- .4 Provide adequate safe-guards against spontaneous combustion of finishing materials.

- .5 Arrange for a properly enclosed and heated space, satisfactory to Consultant, to be used as a paint shop. Store paint materials in a minimum temperature of 10 degrees Celsius.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Conform to OPCA Architectural Painting Specification Manual.

1.11 WARRANTY

- .1 Submit a 30 month OPCA warranty or a 30 month 100 percent maintenance bond in accordance with the General Conditions of the Contract.
- .2 Warranty: Ontario Painting Contractors Association standard Certificate of Guarantee, warranting that the work of this Section meets the standards and requirements incorporated in the OPCA Painting Specification Manual.

1.12 EXTRA MATERIALS

- .1 Supply extra materials as specified in Section 01 78 00.
- .2 Extra Materials: minimum of 4 litres of each Product, colour and sheen used. Supply extra materials in unopened, new containers, clearly labelled as to manufacturer, product, colour and sheen.

2 Products

2.1 MANUFACTURERS

- .1 Where OPCA code numbers are not referenced, use Products from one of the following manufacturers:
 - .1 Benjamin Moore & Co. Ltd..
 - .2 ICI (Glidden) Paints.
 - .3 The Sherwin-Williams Company.
 - .4 SICO Coatings.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Paints: highest grade, first line quality, ready mixed except field catalyzed coatings; good flow and brushing properties; capable of drying or curing free of streaks or sags.
- .2 Paint Accessory Materials: linseed oil, shellac, turpentine, and other materials, of commercial quality.

2.3 MIXING

- .1 Pigments shall be fully ground and shall maintain a soft paste consistency in the vehicle during storage, that can and will be dispersed readily and uniformly by paddle to a complete homogeneous mixture.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Do not proceed with finishing until surface is acceptable.
- .3 Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the recommended maximum.

3.2 PREPARATION

- .1 Prepare surfaces to receive finishes in accordance with OPCA Painting Specification Manual.
- .2 Mask out surrounding surfaces not designated to receive paint to protect from overspray and overbrushing.
- .3 Remove mildew, efflorescence and all foreign material from surfaces by appropriate methods.
- .4 Correct minor defects and deficiencies in surfaces which affect the work of this Section.

3.3 APPLICATION

- .1 Apply Products to OPCA Architectural Painting Specification Manual for the paint systems listed, Premium grade unless otherwise specified.
- .2 Refer to CAN/CGSB-85.100.
- .3 Do not use compressed air or aerosol methods of application without the prior written approval of the Consultant.
- .4 Spread finishes evenly and flow on smoothly without runs or sags.
- .5 Apply Products under adequate illumination.
- .6 Sand lightly between coats to achieve required finish.
- .7 Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- .8 Vary tint of successive coats to assist with inspection.
- .9 Backprime interior wood work with enamel primer sealer paint.
- .10 Backprime exterior wood work with exterior primer paint.
- .11 Finish wood door stiles, head rails and bottom rails prior to final door installation.

3.4 MECHANICAL AND ELECTRICAL EQUIPMENT

- .1 Refer to facility services Sections for mechanical and electrical schedules of painting and finishing requirements, colour coding and identification banding of equipment, ducting, piping, and conduit.
- .2 Remove finished louvres, grilles, covers, and access panels on mechanical and electrical components from location and paint separately. Finish paint primed equipment to colour as selected by Consultant.
- .3 Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, to match adjacent work, except where items are prefinished.
- .4 Paint interior surfaces of air ducts, convection and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, convection and baseboard cabinets to match face panels.
- .5 Paint exposed conduit and electrical equipment occurring in finished areas. Colour and texture to match adjacent surfaces.
- .6 Paint both sides and edges of plywood backboards for electrical equipment before installing equipment.

- .7 Colour code equipment, piping, conduit, and exposed ductwork in accordance with colour schedule. Colour band and identify with flow arrows, names, and numbering.

3.5 FIELD QUALITY CONTROL

- .1 Arrange for the assignment of an inspector from an Independent Inspection Agency by the Ontario Painting Contractors Association prior to the commencement of work.
- .2 Pay for costs of inspection as set out by the Ontario Painting Contractors Association.

3.6 ADJUSTING

- .1 Make Good damaged surfaces.
- .2 The Work shall be in perfect condition, free of spattering, finger marks, rust, water marks, scratches and other blemishes.

3.7 CLEANING

- .1 Refer to Section 01 74 00.
- .2 As the Work proceeds, promptly remove spots, stains and other disfigurements. Leave the Work clean and free from dirt and debris.

3.8 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect completed applications from damage.
- .3 Make Good damage.

3.9 FINISH SCHEDULE

- .1 Uppercase titles and code numbers refer to the OPCA Architectural Painting Specification Manual, latest edition.
- .2 Other generic systems stipulate type of coating required, based upon the use of Products by Manufacturers listed in Article 2.1.
- .3 Exterior Painting and Finishing Schedule
 - .1 Ferrous Metal - Non-rated Coating
 - .1 Waterborne Finish; for exposed steel and iron, as follows:
 - .1 Waterborne Metal Primer - 1 coat.
 - .2 100% Acrylic Corrosion Resistant Gloss - 2 coats.
 - .2 Galvanized Metal
 - .1 EXT. 12-C, LATEX FINISH; Premium grade, High Gloss finish; steel lintels, post plates, doors, frames.
 - .3 Aluminum
 - .1 EXT. 13-A, ALKYD FINISH - EXPOSED; Premium grade, High Gloss finish; touch up of pre-finished surfaces.
 - .4 Interior Painting and Finishing Schedule
 - .1 Wood - Opaque Finish
 - .1 INT. 1-B, LATEX FINISH; Premium grade; Semi-Gloss finish, using low odour / VOC Product No. 133 for 2nd and 3rd coats; wood doors and trim scheduled for opaque finish.
 - .2 Wood - Transparent Finish
 - .1 INT. 1-D, SEMI-TRANSPARENT STAIN POLYURETHANE VARNISH (SINGLE COMPONENT) FINISH; Premium grade, Semi-Gloss finish; custom casework, etc.
 - .3 Wood - Fire Retardant Transparent Finish

- .1 INT. 1-K, FIRE RETARDANT CLEAR FINISH; Premium grade, Semi-Gloss finish; wood panelling and trim, etc.
- .4 Gypsum Board - Painted Finish
 - .1 INT. 4-B, LATEX FINISH; Premium grade; Semi-Gloss finish, using low odour / VOC Product No. 132 for 2nd and 3rd coats; 100 percent solvent free.; for gypsum board walls in Dry areas.
 - .2 INT. 4-B, LATEX FINISH; Premium grade; Satin/Eggshell finish, using low odour / VOC Product No. 132 for 2nd and 3rd coats; 100 percent solvent free; for gypsum board ceilings.
- .5 Gypsum Board - Glazed Finish
 - .1 INT. 4-D, EPOXY TILE-LIKE FINISH (SOLVENT BASE); Premium grade; Gloss finish; for gypsum board walls above tile surfaces in Wet areas.
- .6 Concrete Masonry Units - Dry Areas
 - .1 INT. 8-A, LATEX FINISH; Premium grade; Semi-Gloss finish, using low odour / VOC Product No. 132 for 2nd and 3rd coats; concrete block walls. Use minimum 2 coats of block filler, each tinted differently.
- .7 Concrete Masonry Units - Wet Areas
 - .1 INT. 8-D, TILE-LIKE EPOXY FINISH FOR WET SURFACES; Premium grade, Semi-Gloss finish.
- .8 Ferrous Metal - Non-Rated Coating
 - .1 INT. 12-A, ALKYD FINISH; Premium grade; Semi-Gloss finish; for structural steel not requiring an intumescent coating.
- .9 Ferrous Metal - Epoxy Coating
 - .1 INT. 12-G, WATER-BASED EPOXY FINISH; Premium grade; exposed balustrades and railings.
- .10 Galvanized Metal
 - .1 INT. 13-D, LATEX FINISH; Premium grade; using a vinyl wash primer and low odour / VOC Product No. 133 for 2nd and 3rd coats, Semi-Gloss finish; ducts, pipes, doors, frames.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Tackboards.
 - .2 Chalkboards.
 - .3 Markerboards.
 - .4 Display cases and bulletin directories.
- 1.2 RELATED SECTIONS
 - .1 Section 06 20 00 - Finish Carpentry: surrounding or abutting wood trim.
 - .2 Section 06 40 00 - Architectural Woodwork: casework and millwork.
- 1.3 REFERENCES
 - .1 Aluminum Association Designation System for Aluminum Finishes.
 - .2 AAMA 2603-02: Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - .3 ASTM A924/A924M-07: Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .4 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .5 Porcelain Enamel Institute: PEI S104.
 - .6 CAN/ULC-S102-03: Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .7 CAN/ULC-S706-02: Standard for Wood Fibre Thermal Insulation for Buildings.
- 1.4 SYSTEM DESCRIPTION
 - .1 Use only matching components from a single manufacturer's series.
- 1.5 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: illustrate materials, finishes, dimensions, locations, details of connections and fastening, elevations, sections, metal thicknesses, trim and hardware.
- 1.6 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Samples: a composite sample of a chalkboard, markerboard and tackboard; 1000 x 1000 mm in size; illustrating the quality of each material, trim pieces, and the method of joining adjacent panels.
- 1.7 CLOSE-OUT SUBMITTALS
 - .1 Submit operation and maintenance data as specified in Section 01 78 00.
 - .2 Affix removable maintenance instruction labels to markerboards.

1.8 WARRANTY

- .1 Submit an extended warranty in accordance with the General Conditions of the Contract.
- .2 Manufacturer's Extended Warranty: warrant markerboards for a period of 10 years against defects other than those due to normal usage and wear, including fading, crazing, chipping, peeling, and the surface becoming unsuitable for use.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of visual display boards having Product considered acceptable for use:
 - .1 Architectural School Products.
 - .2 Global School Products Inc.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MANUFACTURED UNITS

- .1 Tackboard: 13 mm thick; factory pre-laminated units, consisting of a 6 mm thick tackboard face mechanically laminated with waterproof adhesive to a 6 mm thick particleboard or hardboard backer; 1,210 x 2,420 mm size panels; shop finish rear faces of tackboard units being installed in horizontal sliding trim to a matte black finish; conform to authorities having jurisdiction:
 - .1 Tackboard Face - Classrooms: 6 mm thick natural cork.
 - .2 Tackboard Face - Staff Workrooms (workstations) and Corridor Display Cases: 6 mm thick Krommenie cork; colour as selected by Consultant.
- .2 Chalkboard: 13 mm thick; sandwich type construction consisting of face panel, core and balancing rear sheet; as follows:
 - .1 Chalkboard Face Panel: 0.76 mm thick electroplated steel; Vit-Rite porcelain enamel writing surface, washable surface; colour Black.
 - .2 Core: 11 mm impregnated sound absorbing fiberboard laminated under heat and pressure to face panel and back sheet.
 - .3 Back-up Balancing Sheet: 0.38 mm thick zinc coated stretcher levelled steel in one unjointed section.
- .3 Markerboard: 13 mm thick; sandwich type construction consisting of face panel, core and balancing rear sheet; as follows:
 - .1 Markerboard Face Panel: 0.76 mm thick electroplated steel; LCS porcelain enamel writing surface, washable surface; colour White.
 - .2 Core: 11 mm impregnated sound absorbing fiberboard laminated under heat and pressure to face panel and back sheet.
 - .3 Back-up Balancing Sheet: 0.38 mm thick zinc coated stretcher levelled steel in one unjointed section.
 - .4 Provide permanent music score lines to one markerboard in Music Room.
- .4 Fixed Trim: ASP Series 200 to match details and profiles shown on Drawings. Aluminum to be 6063-T5 alloy with 0.051 mm thick clear anodized satin finish, free from extruding draw marks and surface scratches; components as follows:
 - .1 Perimeter Trim: extruded aluminum trim for tackboards and vertical jambs of markerboards; eg. ASP No. 205.
 - .2 Divider Bar: extruded aluminum trim for adjacent panels of elevations greater than 2,440 mm; eg. ASP No. 207.
 - .3 Map Rail: extruded aluminum trim complete with integral tan cork cork insert, end stops and two combination roller map hooks for every 1.83 linear metres of map rail; eg. ASP No. 206.

- .4 Marker Tray: extruded aluminum triangular box section for markerboard elevations only complete with contour fitting end castings; 102 mm projection from finished wall; eg. ASP No. 212.
- .5 Marker Tray Over Millwork: extruded aluminum trim section for elevations mounted directly on or above millwork; 70 mm projection from finished wall; eg. ASP No. 264.
- .5 Trophy and Display Case: surface mounted lockable design; sliding tempered glass front panels and fixed tempered glass top and ends; complete with 3 adjustable shelves and fluorescent lighting; satin anodized aluminum trim; size as indicated on Drawings.
- .6 Hinged Door Bulletin Directory: continuously-hinged door bulletin directory, lockable type, door comprised of clear tempered glass set in satin anodized aluminum trim; natural cork tackboard surface; surface mounted design; sizes as indicated on Drawings.

2.3 SHOP FINISHES

- .1 Porcelain Enamel Panels: to PEI Institute PEI S104, gloss factor of 6-8 measured by 45 degree glossometer; colours as noted.
- .2 Aluminum:
 - .1 Markerboard Trim: clear etched and anodized 0.051 mm satin finish free from extruding draw marks and surface scratches; to Aluminum Association AA-A41.
 - .2 Chalkboard Trim: Painted to AAMA 2603, one-coat of thermosetting fluoropolymer coating, minimum 0.02 mm thick; eg. PPG Duracron, Black colour.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify millwork units designated to incorporate visual display surfaces are installed.

3.2 INSTALLATION

- .1 Install components to ensure a rigid, straight, square, plumb installation with horizontal lines level.
- .2 Securely attach aluminum trims to ensure fastenings are concealed.
- .3 Adhere tackboards to wall surface with an approved adhesive in egg-size blobs at approximately 200 mm OC. Press tackboards firmly into adhesive, ensuring proper adhesion.
- .4 Join chalkboards and markerboards together using 25 mm wide steel spline and extruded polyvinyl slotted inserts to ensure a flush butt joint with a hairline appearance.
- .5 Properly chalk in chalkboards and clean after installation.
- .6 Leave visual display boards in a state suitable for immediate use by Owner.

3.3 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Clean down, remove dirt and leave Products in a first class condition.

END OF SECTION

- 1 General
 - 1.1 SECTION INCLUDES
 - .1 Interior signage.
 - .2 Banners and banner hardware.
 - 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry.
 - .2 Section 05 50 00 - Metal Fabrications.
 - .3 Section 08 13 13 - Hollow Metal Doors.
 - .4 Section 08 14 00 - Wood Doors.
 - .5 Section 09 21 16 - Gypsum Board Assemblies.
 - 1.3 REGULATORY REQUIREMENTS
 - .1 Stairwell Door Signage: conform to local code requirements for exiting.
 - 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate sizes, thicknesses, style, methods of attachment, and special details.
 - 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Verification Samples: one full size sample of each sign type, illustrating size, thickness, method of attachment, font style and size, and finishes.
 - 1.6 CLOSEOUT SUBMITTALS
 - .1 Submit installation and maintenance data for signage as specified in Section 01 78 00.
- 2 Products
 - 2.1 MANUFACTURED ITEMS
 - .1 Text Door Plates: surface engraved type; 2 mm thick dual-layered acrylic with 30 degree bevelled edges; as follows:
 - .1 Length: as required to fit text, minimum 300 mm;
 - .2 Height: 57.2 mm high;
 - .3 Text: 25 mm high Helvetica upper and lower case letters;
 - .4 Fastening: pre-drilled 5 mm OD holes to accommodate countersunk fasteners, centered along left and right edges;
 - .5 Colours: as selected by Consultant from manufacturer's complete colour selection;
 - .6 Text: as determined by Owner.
 - .7 Product Name: eg. Gravoply by A-K & Lippert Plastics.
 - .2 Pictogram Door Plates: 3 mm thick plexiglass, square edged, hot stamped or silk screened image on rear face, 150 mm high; pre-drilled 5 mm OD holes to accommodate countersunk fasteners, centered along left and right edges; eg. A-K & Lippert Plastics Pictograms, as follows:
 - .1 Male with Barrier Free: 200 mm wide, white symbols on blue background;

- .2 Female with Barrier Free: 200 mm wide, white symbols on blue background;
 - .3 Janitor: 150 mm wide, black symbol on white background;
 - .4 Stairwell: 150 mm wide, black symbol on white background.
- .3 Signs: 300 mm long, minimum 75 mm high, greater height as required to accommodate text and insert channels; double layered acrylic, as follows:
- .1 Back Layer: 3 mm thick clear acrylic with surface mounted Sparcal premium vinyl film background colour and 19 mm high lettering in white premium vinyl film.
 - .2 Front Layer: 3 mm thick non-glare acrylic with subsurface premium vinyl film strips designed to cover mounting pads and insert channels.
 - .3 Fastening Holes: pre-drilled 5 mm OD holes to accommodate countersunk fasteners, centered along left and right edges.
 - .4 Colours: as selected by Consultant.
- .4 Name Inserts: 0.5 mm thick clear plastic with White premium vinyl film lettering; text as provided by Consultant.
- .5 Fasteners: countersunk screw-type; suitable for materials. Do not use through-fastening types.
- .6 Banner Brackets: gravity cast AS 380 aluminum alloy; direct bolting type and tension-adjustable, powder coated to custom colour as selected by Consultant; eg. Titan Econo.
- .7 Fabric Banners: flame-retardant fabric, by D.Garden Collection, sizes and graphics as selected by Consultant and indicated on Drawings.

3 Execution

3.1 INSTALLATION

- .1 Install signage in accordance with manufacturer's installation guidelines.
- .2 Install signs straight, plumb, level and secured in a manner to prevent distortion or displacement.
- .3 Provide routing or mortising for items required to be mortised, rebated or otherwise housed within material.
- .4 Replace Products that are bent, scratched or damaged.
- .5 Properly tighten screws and fastenings and install to the full required complement.
- .6 Finished work shall be free of defects, warping, open seams, and rattles.
- .7 Exposed fasteners shall be neatly executed and shall match adjacent surfaces.
- .8 Do not fasten signage through sound-rated doors.
- .9 Provide banners and banner hardware as indicated on Drawings.

3.2 PROTECTION

- .1 Protect installed Products as specified in Section 01 76 00, until Owner occupancy.

END OF SECTION

- 1 General
 - 1.1 SECTION INCLUDES
 - .1 Traffic and emergency identification signage.
 - 1.2 REFERENCES
 - .1 ASTM A307-07b: Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .2 ASTM A1008/A1008M-07a: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - .3 ASTM B456-03: Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - 1.3 SYSTEM DESCRIPTION
 - .1 Traffic and Emergency Signage: sheet steel, conforming to local municipality standards; reflective baked enamel finish; sufficient quantity to conform to the requirements of the authorities having jurisdiction; as follows:
 - .1 Stop.
 - .2 Fire Access Route - No Parking.
 - .3 Barrier Free Parking.
 - .4 Staff Parking.
 - .5 Pedestrian Crossing.
 - 1.4 SUBMITTALS
 - .1 Submit shop drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate sizes, thicknesses, style, methods of attachment, and special details.
 - 1.5 CLOSEOUT SUBMITTALS
 - .1 Submit installation and maintenance data for traffic signage as specified in Section 01 78 00.
- 2 Products
 - 2.1 MATERIALS
 - .1 Sheet Steel: to ASTM A1008/A1008M, galvanized.
 - .2 Stakes: galvanized steel, U-shaped stakes c/w regularly spaced drilled holes for attachment of signage; suitable length to accommodate buried depth of not less than 1.0 metre and sign mounting height in accordance with the authority having jurisdiction.
 - .3 Bolts, Nuts and Washers: to ASTM A307.
 - .4 Adhesive: as recommended by sign manufacturer.
 - 2.2 SHOP FINISHES
 - .1 Chrome Nickel Plating: to ASTM B456, Type SC 2, Polished finish.
 - .2 Galvanizing: to CAN/CSA-G164-M, hot dipped method, 610 g/m² zinc coating.

- .3 Baked Enamel - Reflective Surfaces: Clean and degrease metal surface; apply one coat of zinc oxide primer sprayed and baked; two coats of semi-gloss reflective enamel sprayed and baked; symbols and colours as required by authorities having jurisdiction.
- .4 Powder Coating: electrostatic spray-applied polymer powder coating, minimum 0.05 mm dry film thickness; symbols and colours as required by authorities having jurisdiction.

3 Execution

3.1 INSTALLATION

- .1 Install traffic signage in accordance with the requirements of the local municipality.
- .2 Provide routing or mortising as required.
- .3 Bury support stakes minimum 1.0 metre below finished grade.
- .4 Replace Products that are bent, scratched or otherwise damaged.
- .5 Properly tighten screws and fastenings and install to the full required complement.

3.2 PROTECTION

- .1 Protect surfaces as specified in Section 01 76 00, until Owner occupancy.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Metal toilet compartments.
 - .2 Urinal and vestibule screens.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry.
 - .2 Section 06 20 00 - Finish Carpentry: safety release coat hooks.
 - .3 Section 10 28 13 - Toilet Accessories.
- 1.3 REFERENCES
 - .1 ANSI A208.1-2009: Particleboard.
 - .2 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .3 ASTM A653/A653M-09: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM B456-03: Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicating partition plan and elevation views, internal reinforcement, dimensions, details of wall and floor supports, and door swings.
 - .3 Product Data: manufacturer's standard data sheets illustrating panel construction, hardware, and accessories.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of metal toilet compartments having Product considered acceptable for use:
 - .1 Bradley Corporation.
 - .2 Global Steel Products Corporation.
 - .3 Hadrian Manufacturing Inc.
 - .4 General Storage Systems.
 - .5 ASI Watrous Inc.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 MATERIALS
 - .1 Steel Sheet: to ASTM A653/A653M, galvannealed coating.
 - .2 Stainless Steel Sheet: to ASTM A167, Type 304.
 - .3 Chromed Steel Sheet: to ASTM B456.
 - .4 Particleboard: to ANSI A208.1, Grade M-3.

- .5 Attachments, Screws, and Bolts: Stainless steel; tamper proof type; heavy duty extruded aluminum brackets.

2.3 COMPONENTS

- .1 Doors - Regular Stalls: 25 mm thick, 610 mm wide, 1,473 mm high; comprised of 0.76 mm thick steel sheet faces, with honeycomb core and internal reinforcement; swinging in.
- .2 Doors - Barrier Free Stalls: 25 mm thick, 810 mm wide, 1,473 mm high; comprised of 0.76 mm thick steel sheet faces, with honeycomb core and internal reinforcement; swinging out.
- .3 Panels: 25 mm thick, 1,473 mm high, width to suit application; comprised of 0.76 mm thick steel sheet faces, with honeycomb core and internal reinforcement.
- .4 Pilasters: 32 mm thick, height and width to suit application; comprised of 0.9 mm thick steel sheet faces, with honeycomb core and internal reinforcement.
- .5 Head Rails: Hollow, 32 x 62 mm size aluminum tubing, with anti-grip strips and cast socket wall brackets.
- .6 Pilaster Shoes: 75 mm high, formed stainless steel.
- .7 Splash Plates: 760 mm wide, 1,066 mm high; 1.2 mm thick stainless steel sheet; rounded corners; for screw fastener application.
- .8 Hinges: Chrome plated non-ferrous cast pivot hinges, gravity type, adjustable for door close positioning; c/w nylon bearings.
- .9 Latch: Chrome plated non-ferrous slide bolt with combination door stop and keeper with rubber bumper.
- .10 Door Pull: Chrome plated cast zinc alloy handle; through-door fastening.
- .11 Brackets: heavy duty extruded aluminum alloy, brightened and polished.
- .12 Door Bumper: chrome plated non-ferrous casting with rubber shock absorbing bumper insert.

2.4 FABRICATION

- .1 Bond cores and reinforcements to sheet steel faces under pressure using waterproof adhesive.
- .2 Fabricate doors with a 100 x 1,450 mm solid particle board reinforcement down the full length on the hinge side, and a 75 x 860 mm solid piece of structural honeycomb next to particle board.
- .3 Provide a 152 x 152 mm solid piece of particle board reinforcement in doors located where the latch is to be positioned.
- .4 Fill doors, dividing panels and pilasters with honeycomb core.
- .5 Miter and weld overlapping steel edges.
- .6 Provide headrail fitted snugly over top of each pilaster, and secured to pilasters and wall using recommended fittings.

2.5 SHOP FINISHING

- .1 Galvannealed Coating: streak-free matte grey appearance, to ASTM A653/A653M, ZF001 coating designation, no minimum coating.
- .2 Powder Coating: electrostatic spray-applied polymer powder coating, minimum 0.05 mm dry film thickness; multiple colours as selected by Consultant.
- .3 Stainless Steel: to ASTM A167, No. 4 - Brushed.
- .4 Chrome/Nickel Plating: to ASTM B456, Type SC 2; Polished finish.

3 Execution

3.1 INSTALLATION

- .1 Install partitions secure, plumb, and level in accordance with manufacturer's instructions.
- .2 Attached panel brackets securely to walls using anchor devices.
- .3 Install splash panels on partitions adjacent to urinals. Fasten with stainless steel screws spaced 20 mm OC.
- .4 Anchor urinal screen panels to walls with two panel brackets and vertical upright consisting of pilaster rigidly anchored to floor and ceiling.
- .5 Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.
- .6 Equip each door with two hinges, one door bumper and one door latch.
- .7 Equip out-swinging doors with a door pull.

3.2 ADJUSTING

- .1 Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 5 mm.
- .2 Field touch-up of scratches and damaged enamel finish will not be permitted.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Acoustic operable partitions.
 - .2 Ceiling track, ceiling guards, retracting top and bottom seals, and operating hardware.
- 1.2 RELATED SECTIONS
 - .1 Section 05 12 00 - Structural Steel Framing: Overhead track structural support framing.
 - .2 Section 05 50 00 - Metal Fabrications: Overhead track attachment brackets.
 - .3 Section 06 10 00 - Rough Carpentry: Wood blocking and wood trim backing.
 - .4 Section 09 51 23 - Acoustical Tile Ceilings: Adjacent ceiling finish.
- 1.3 REFERENCES
 - .1 ASTM E84-09a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .2 ASTM E90-04: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, track switches, track loads, adjacent construction and finish trim, and stacking sizes.
 - .3 Product Data: Describe partition operation, hardware and accessories, electric operating components, track switching components, colours and finishes available.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Verification Samples: Two samples of surface finish, 300 x 300 mm size, illustrating quality, colour, texture, and weight.
- 1.6 REGULATORY REQUIREMENTS
 - .1 Conform to applicable codes for combustibility requirements for materials.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of operable partitions having Product considered acceptable for use:
 - .1 Hufcor.
 - .2 Moderco.
 - .3 Modernfold.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 PERFORMANCE REQUIREMENTS
 - .1 Sound Transmission Coefficient (STC): to ASTM E90, STC 52.

- .2 Surface Burning Characteristics of Vinyl Fabric: tested to ASTM E84; as follows:
 - .1 Flame spread: 25.
 - .2 Fuel Contributed: 35.
 - .3 Smoke Developed: 50.
- .3 Install partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.

2.3 MANUFACTURED UNITS

- .1 Operable Partition, Type OP-1: based on Modernfold Acousti-Seal 931; as follows:
 - .1 Operation: manual, side stacked, with expandable closure panel.
 - .2 Panel Configuration: minimum 75 mm thick, single panels, top supported, steel construction with steel facers welded to panel frame, automatic sound seals providing handless operation.
 - .3 Panel Width: maximum 1,220 mm.
 - .4 Panel Face - Inner Face: Acoustical wall carpet, heavy weight type, meeting Class A fire resistance rating; colour as selected by Consultant.
 - .5 Panel Face - Outer Face: Vinyl-coated fabric; heavy weight, mildew resistant; polyvinyl fluoride finish for washability and flame retardation, meeting Class A fire resistance rating; colour as selected by Consultant.
 - .6 Hinges: full-leaf butt hinges attached directly to panel frame and supported by anchor plates contained within panel frame.
 - .7 Track: 3 mm thick roll-formed steel; eg. Modernfold #17.
 - .8 Optional Accessories: as described below.
 - .9 Trolleys: 4 wheels, steel with self-lubricating bearings; two per panel.
- .2 Operable Partition, Type OP-2: based on Modernfold Acousti-Seal 932; as follows:
 - .1 Operation: manual, centre stacked, with expandable closure panel.
 - .2 Panel Configuration: minimum 75 mm thick, paired panels, top supported, steel construction with steel facers welded to panel frame, automatic sound seals providing handless operation.
 - .3 Panel Width: maximum 1,220 mm.
 - .4 Panel Face - Inner Face: Acoustical wall carpet, heavy weight type, meeting Class A fire resistance rating; colour as selected by Consultant.
 - .5 Panel Face - Outer Face: Vinyl-coated fabric; heavy weight, mildew resistant; polyvinyl fluoride finish for washability and flame retardation, meeting Class A fire resistance rating; colour as selected by Consultant.
 - .6 Hinges: full-leaf butt hinges attached directly to panel frame and supported by anchor plates contained within panel frame.
 - .7 Track: 3 mm thick roll-formed steel; eg. Modernfold #17.
 - .8 Optional Accessories: as described below.
 - .9 Trolleys: 4 wheels, steel with self-lubricating bearings; one per panel.

2.4 ACCESSORIES

- .1 Trim: White enamel ceiling closure.
- .2 Acoustic Seals: roll-formed steel astragals, with reversible tongue and groove joints with vinyl acoustical contacts and baked enamel finish; mechanically-retractable top and bottom seals with 6 mm vinyl strips; bottom seals capable of fixing panels in position without use of handles.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.

- .2 Confirm track supports are laterally braced and will permit track to be level within 6 mm of required position and parallel to the floor surface.
- .3 Confirm floor flatness of 3 mm per 3 metres, non-cumulative.
- .4 Verify that required utilities are available, in proper location, and ready for use.

3.2 INSTALLATION

- .1 Install partition in accordance with manufacturer's installation guidelines.
- .2 Fit and align partition assembly level and plumb.
- .3 Provide lateral restraint to secure partition panels to floor when in closed position. Partition can not move as a result of lateral impacts or applied forces.

3.3 ADJUSTING

- .1 Adjust partition assembly to provide smooth operation from stacked to drawn position.

3.4 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Clean finish surfaces and partition accessories.

3.5 DEMONSTRATION

- .1 Conduct training and demonstration as specified in Section 01 79 00.
- .2 Demonstration: demonstrate operation and maintenance procedures for operable partitions.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Architectural washroom accessories.
- 1.2 RELATED SECTIONS
 - .1 Section 04 22 00 - Concrete Unit Masonry: in wall framing for support of accessories.
 - .2 Section 06 10 00 - Rough Carpentry: in wall blocking for securement of accessories.
 - .3 Section 08 80 00 - Glazing: frameless mirrors.
 - .4 Section 10 14 00 - Signage: washroom door signs.
 - .5 Section 10 21 13.13 - Metal Toilet Compartments: toilet partitions.
- 1.3 REFERENCES
 - .1 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A269-07: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A1008/A1008M-07a: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - .4 ASTM B456-03: Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .5 ANSI / NEMA LD 3-2000: High Pressure Decorative Laminates.
 - .6 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
- 1.4 QUALITY ASSURANCE
 - .1 Provide materials from a single manufacturer's standard line of products.
- 1.5 SUBMITTALS
 - .1 Submit product data as specified in Section 01 33 00.
 - .2 Product Data: describing size, finish, details of function, and attachment methods.
- 1.6 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Selection Samples: duplicate 300 x 300 mm size, illustrating colour and finish.
- 1.7 CLOSE-OUT SUBMITTALS
 - .1 Submit operation and maintenance data as specified in Section 01 78 00.
- 1.8 KEYING
 - .1 Supply two keys for each accessory to Owner.
 - .2 Master key accessories.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of toilet accessories having Product considered acceptable for use:
 - .1 Frost.
 - .2 Bobrick.
 - .3 Watrous.
- .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 MATERIALS

- .1 Sheet Steel: to ASTM A1008/A1008M.
- .2 Stainless Steel Sheet: to ASTM A167, Type 304.
- .3 Stainless Steel Tubing: to ASTM A269, Type 304.
- .4 Adhesive: Two-component epoxy type, waterproof.
- .5 Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.
- .6 Expansion Shields: Fibre, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 COMPONENTS

- .1 Sanitary Napkin Disposal: surface mounted design, 203 mm wide, 337 mm high, 115 mm deep; complete with 0.76 mm thick welded stainless steel construction, with self-closing lid and pivoting bottom with friction catch, and permanent die embossed bilingual lettering; eg. Frost Model 622.
- .2 Sanitary Napkin/Tampon Dispenser: dual purpose dispenser, surface mounted design; 1.2 mm thick steel door; tamper-proof lock; 25 cent operation; eg. Frost Model 608-3.
- .3 Grab Bars (GB): 32 mm outside diameter; 1.2 mm thick stainless steel; peened non-slip finish; round or oval concealed flange attachments, as described below:
 - .1 Straight Profile: eg. Frost Model 1001-DP-24.
 - .2 L-Shaped Profile: eg. Frost Model 1003-DP-30x30.
- .4 Fixed Framed Mirror (MF): 610 x 915 mm size, one piece stainless steel frame with mitred corners and bright annealed finish; vandal-resistant three-way mounting; 4 mm thick mirrored glass with shock resistant primary back and fully galvanized back panel; eg. Frost Model 941-2436.
- .5 Tilting Framed Mirror (MFT): 610 x 915 mm size, one piece stainless steel frame with mitred corners and bright annealed finish; adjustable tilt mechanism; 4 mm thick mirrored glass with shock resistant primary back and fully galvanized back panel; eg. Frost Model 941-AT.
- .6 Janitorial Shelf (MRS): 0.9 mm thick stainless steel, 914 x 203 mm size, surface mounted; complete with 3 mop / broom holders, 2 pail hooks and an 8 mm OD chrome plated drying rod; eg. Frost 1115.
- .7 Stainless Steel Shelf (SSS): 460 mm long, 140 mm deep, 102 mm high; 0.76 mm thick stainless steel with rounded corners, surface mounted; eg. Frost 950-18.

2.4 FABRICATION

- .1 Weld and grind smooth, joints of fabricated components.
- .2 Use mechanical fasteners only where approved.

- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Do not apply manufacturer's or brand names on face of units.

2.5 FINISHES

- .1 Galvanizing: to CAN/CSA-G164-M, hot dipped method, 380 g/m² zinc coating.
- .2 Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- .3 Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- .4 Chrome/Nickel Plating: to ASTM B456, Type SC 2; Polished finish.
- .5 Stainless Steel: No. 4 - Brushed finish.

3 Execution

3.1 PREPARATION

- .1 Provide templates and rough-in measurements as required.

3.2 INSTALLATION

- .1 Install fixtures, accessories and items to requirements of manufacturers' instructions.
- .2 Install accessories rigidly in place as follows:
 - .1 Stud Walls: install steel back plate to stud prior to application of wall board. Provide plate with threaded studs or plugs.
 - .2 Hollow Masonry Units, Existing Plaster or Gypsum Board: use toggle bolts drilled into cell or wall cavity.
 - .3 Solid Masonry or Concrete: use bolt with lead expansion sleeve set into drilled hole.
 - .4 Grab Bars: use built-in anchors.
 - .5 Metal Toilet Compartments: use male / female through bolts.
 - .6 Use tamper-proof screws and bolts.
- .3 Set square items plumb.
- .4 Install mirrors on concealed wall hanger and secure in place with minimum 2 theft-proof locking screws.

3.3 PROTECTION

- .1 Refer to Section 01 76 00.
- .2 Protect stainless steel items with a removable surface protection film until Owner occupancy.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Metal lockers, prefinished.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-in-Place Concrete: concrete base.
 - .2 Section 04 22 00 - Concrete Unit Masonry: concrete masonry walls.
 - .3 Section 06 10 00 - Rough Carpentry: wood blocking.
- 1.3 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: clearly indicate quality of materials, layouts, anchorage details, and details for trim and end panels.
- 1.4 SAMPLES
 - .1 Submit samples as specified in Section 01 33 00.
 - .2 Selection Samples: colour selection chart for selection of colour by Consultant.
- 1.5 MOCKUPS
 - .1 Construct a jobsite mockup as specified in Section 01 40 00.
 - .2 Mockup: illustrate anchoring and finishing details, colours, base construction, sloping top and end panels.
 - .3 Accepted mockup may remain as part of the finished Work.
- 1.6 EXTRA MATERIALS
 - .1 Supply extra materials as specified in Section 01 78 00.
 - .2 Extra Materials: hooks, hinges, doors, bodies, base, and end panels, sufficient quantity to reconstruct 10 additional lockers, colour to match those installed; clearly marked to identify:
 - .1 Manufacturer's name,
 - .2 Product's name,
 - .3 Product colour.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of metal lockers having Product considered acceptable for use:
 - .1 ASI Storage Solutions Inc.
 - .2 Hadrian Manufacturing Inc.
 - .3 General Storage Systems (GSS).
 - .4 Buddsteel.
 - .5 Lincora Inc.
 - .6 Shanahan Manufacturing Ltd.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.

2.2 SYSTEM DESCRIPTION

- .1 Metal Locker (LOK-1): Single-tier design; 305 x 1,830 mm size, 380 mm deep; minimum 3 coat hooks with one top shelf, two hat shelves, one set mid-height and the other at a standard distance from locker top, and one reinforced bottom shelf; complete with sloping top, ventilated frame, non-ventilated doors; steel end panels, fillers, jamb trim, and metal base.

2.3 MATERIALS

- .1 Sheet Steel: cold-rolled steel, free from imperfections.

2.4 COMPONENTS

- .1 Frame: welded construction; 1.62 mm thick formed channel steel sections, c/w two rubber door grommets on lock side.
- .2 Door: welded construction; 1.62 mm thick outer panel and either a full door size 0.91 mm thick non-reinforced or 0.58 mm thick reinforced inner panel; rigid box construction.
- .3 Sides and Backs: 0.76 mm thick prefinished steel; stiffening ribs on sides and flanges on backs.
- .4 Tops, Bottoms and Shelves: 1.62 mm thick sheet steel, flanged, complete with channel formation at front.
- .5 Sloping Tops: 0.76 mm thick prefinished steel.
- .6 End Panels and Miscellaneous Trim: 1.62 mm thick prefinished steel; c/w any necessary clips or other attachment devices.
- .7 Latching: single point; padlock type flange; in recessed steel pocket.
- .8 Coat Hooks: galvanized steel coat hooks.
- .9 Hinges: 1.62 mm continuous hinges secured using theft-proof fasteners or welded in place.

2.5 FABRICATION

- .1 Verify site dimensions prior to fabrication.
- .2 Fabricate the work true to dimensions, square, plumb and level.
- .3 Accurately fit members with hairline joints. Secure intersecting members with appropriate fastenings.
- .4 Fabricate the finished work free from distortion and defects detrimental to appearances and performance.
- .5 Incorporate ventilation slots at top and bottom of doors or frames.
- .6 Close door on frame with closure strike the full height of door. Fit outer face of door flush with outside face of frame.
- .7 Provide two rubber door grommets on lock side of frame.
- .8 Form and factory punch bodies with necessary assembly holes.
- .9 Flange tops, bottoms and shelves on four sides with a channel formation at front of shelves.
- .10 Provide 3 coat hooks per compartment and a recessed, mechanically-fastened number plate on door, numbered as directed by Consultant.
- .11 Provide a hidden nylon friction door stop to ensure proper door closure and quiet operation.

2.6 SHOP FINISHING

- .1 Steel: baked enamel on steel coating or electrostatic spray-applied polymer powder coating having a minimum 0.05 mm dry film thickness; multiple colours as selected by Consultant.

3 Execution

3.1 INSTALLATION

- .1 Install Products true to dimensions.
- .2 Accurately secure joints, and intersecting members with concealed attachment system.
- .3 Install Products square and plumb, and forming a rigid structure.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Division 1 General Requirements of the Contract, are a part of this Section and shall apply here.
- .2 The General Contractor shall be responsible for all work contained in this section of the specification including the work provided by the:
 - Foodservice Division 11400;
 - Electrical Division 16000;
 - Mechanical Division 15000; and
 - Other trades subcontractors.

.3 ABBREVIATIONS

S.S.	-	Stainless Steel
C/W	-	Complete With
A.F.F.	-	Above Finished Floor
A	-	Amperes
V	-	Volts
CY	-	Cycle
P	-	Phase
Pl. lam.	-	Plastic Laminate
Kw	-	Kilowatt
kPa	-	Kilopascals
J.B.	-	Junction Box
L/S	-	Litres per Second
L.E.D	-	Light Emitting Diode
mm	-	Millimetres
C	-	Celsius
C.P.	-	Chrome Plated
I.P.S.	-	Inside Pipe Size
N.I.C.	-	Not in Contract (for Section 11400)
L.C.	-	Load Centre
CBP	-	Circuit Breaker Panel
KEC	-	Kitchen Equipment Contractor

1.2 RELATED WORK BY OTHER TRADES

1.2.1 WORK PROVIDED BY ELECTRICAL DIVISION 16

- .1 Supply, rough-in, installation and connection of all necessary electrical wiring in liquid tight flexible conduit (AC-90) required for the operation of, but not limited to the foodservice equipment, prefabricated insulated walk-in refrigerated and frozen room assemblies, mechanical refrigeration systems, and warewashing/waste management systems unless otherwise stated in Part 1.3 of this Section of the Specification.
- .2 Supply and installation of electrical wiring from the building source or distribution point of power, through disconnect switches or starters to the terminals, connection box, circuit breaker panel or plug receptacles located on the equipment. Equipment manufacturer's control panels and switches are not considered to be a disconnect switches unless specifically permitted by applicable codes.
- .3 Supply and installation of all required disconnect switches except for those required for evaporator coils inside walk-in refrigerated and frozen room assemblies.
- .4 Supply and installation of electrical wiring form power source to components of the fire control system as required.
- .5 Inter-wiring of the kitchen ventilation and fire suppression system components including but not necessarily limited to the following; exhaust ventilator(s) (hood), surface fire suppression detector(s) in each hood, fire suppression building alarm fire and trouble interlocks as required, exhaust fans, makeup air units, cooking equipment shut down devices, and interlocks to Building Management Controls.
- .6 Supply and installation of electrical wiring from power source through disconnect switches to each condensing unit, provided for walk-in refrigerators, freezers or other equipment as specified in Part 2 of this specification.
- .7 Supply and installation of electrical wiring from power to a junction box(es) on top of each prefabricated walk-in refrigerator and freezer for power supply to interior lights. Division 11400 to physically mount all interior lights and run electrical wiring within conduit from each interior light to a junction box located on top of the prefabricated walk-in refrigerated and frozen room assembly. Division 16000 to provide interconnection between junction boxes for interior lights and light switch(s).

- .8 Supply and installation of electrical wiring from power to a junction box(es) on top of each prefabricated walk-in refrigerator and freezer for power supply to interior light switches. Division 11400 to factory pre-wire light switches within pre-fabricated insulated wall panels and run wiring to a junction box located on top of the walk-in room assembly. Division 16000 to provide all wiring interconnections between junction boxes for light switches and junction boxes for interior lights.
- .9 Supply and installation of electrical wiring from power source to a junction box(es) on top of each prefabricated walk-in refrigerator and freezer for power supply to door heaters. Division 11400 to factory pre-wire door heaters within pre-fabricated insulated wall panels and run wiring to a junction box located on top of the walk-in room assembly.
- .10 Supply and installation of electrical wiring from power source to a junction box(es) on top of each prefabricated walk-in freezer for power supply to heater cables. Division 11400 to factory pre-wire an electrical receptacle located behind evaporator coil for heater cable within pre-fabricated insulated panels to a junction box on top of walk-in freezer room assembly.
- .11 Supply and installation of all electrical wiring from power source to a junction box(es) on top of prefabricated walk-in refrigerators and freezers for power supply to evaporator coils. Division 11400 to pre-wire all interconnections for thermostats, solenoid valves etc as required. Division 11400 to run electrical wiring from terminals on evaporator coils through disconnect switch to a junction box on top of walk-in refrigerators and freezers assemblies ready for final connection by Division 16000.
- .12 Supply and installation of electrical wiring form power source through disconnect switches to the exhaust and make-up air fans.
- .13 Inter-wiring of exhaust and make-up air fans, exhaust hood control panels, magnetic contactors and shunt trips etc. so as to shut down power to electric cooking equipment in the event of a fire condition in conjunction with the fire suppression system.
- .14 Inter-wiring of the fire suppression system to the maintenance annunciator panel or building security system as required including building fire and trouble annunciation.
- .15 Supply and installation of a wall switch for the exhaust ventilator(s) (hood) lights and the supply and installation of inter-wiring between the wall switch and junction boxes on each hood section.
- .16 Supply and installation of electrical wiring from power source through disconnect switches to the exhaust ventilator (hood) control panel.

- .17 Supply and installation of any electrical control wiring required except for mechanical refrigeration system.
- .18 Supply, rough-in and installation of all electrical wiring for "Owners Supplied", or "NIC" designated equipment, as well as the final hook-up or connections.
- .19 Supply, rough-in and capping off of electrical wiring required for any equipment designated as "Future".
- .20 Supply and installation of all electrical receptacles located in floors, ceilings or walls.

1.2.2 WORK PROVIDED BY MECHANICAL PLUMBING - DIVISION 15

- .1 Supply, installation, rough-in, and connection of all domestic hot and cold water, drains, vents, gas supply lines as per code from building supply to the point of connection required for the complete operation of, but not limited to, the foodservice equipment, mechanical refrigeration systems, the pre-fabricated, insulated walk-in refrigerated and frozen room assemblies and the warewashing/waste management systems.
- .2 Supply and installation of domestic hot and cold water lines complete with shut off valves, back flow preventers, line strainers, shock absorbers, pressure, temperature and pressure gauges and control valves or devices (unless otherwise stated and/or supplied with the equipment of this section).
- .3 Supply and installation of drain lines complete with traps, vent piping and clean outs.
- .4 Supply and installation of drain lines, traps, vent piping, clean outs and grease traps, drains for floor pans, connected drains for equipment, floor drains with funnels for open drains on equipment and floor drains with funnels etc.
- .5 Supply and installation of all indirect drain lines including, but not limited to those required for foodservice equipment and warewashing and waste management systems and any other open or indirect type connections from custom fabricated stainless steel equipment to a hub, funnel or combination drain at a rate of not less than 25mm in 610mm.
- .6 Extend all open or connected drains on foodservice equipment, exhaust ventilators and warewashing/waste management systems to above funnel floor drains using chrome plated piping.
- .7 Supply and installation of all floor drains for general drainage purpose, maintenance and cleaning, throughout the facilities.
- .8 Supply and installation of all hand sinks, slop sinks, janitorial sinks, drinking fountains, grease traps and general sanitizing stations.

- .9 Supply and installation of gas lines with manifolds to each piece of gas fired foodservice equipment complete with shut off valves. Installation of mechanical gas valve(s) as specified under the Foodservice Section of Division 11400, in conjunction with the fire suppression system. Install pressure regulating valves as specified under the Foodservice section of Division 11400.
- .10 Supply and inter-connection of water lines between hose reel control panels and hose reels.
- .11 Connection of all equipment designated as "Owner Supplied".
- .12 Roughing-in and capping off of mechanical services required for any equipment designated as "Future".
- .13 Use chrome plated piping wherever exposed.

1.2.3 WORK PROVIDED BY THE MECHANICAL HVAC - DIVISION 15 FOR KITCHEN EXHAUST SYSTEMS

- .1 Supply, installation and connection of all exhaust ductwork from, but not limited to foodservice equipment, exhaust ventilator(s) (hoods) or dishwashing per the current edition of the NFPA-96 as recognized by building codes, and per the requirements of the Ontario Gas Utilization Code.
- .2 Supply and installation of all exhaust fan motor starters and overloads for exhaust ventilator(s) (hoods) with the 120V magnetic coils interlocked to the water wash control panel(s).
- .3 Supply and installation of all exhaust s.s. duct work leading to exhaust ventilator(s) (hoods) take-off collars and connect to collars. Use watertight duct work and weld all joints as per NFPA Code - 96.
- .4 Supply and installation of make-up air system including fan, s.s. duct work and distribution grills.
- .5 Connection of all duct work to equipment designated as "Owner Supplied".
- .6 Roughing-in and capping off of any exhaust duct work required for equipment designated as "Future"

1.2.4 WORK PROVIDED BY OTHER TRADES

- .1 Construction of all walls, partitions or ceilings, openings therein and finishes thereon.
- .2 Supply and installation of floors, floor leveling materials and floor finishes throughout the foodservice areas as well as those required for, but not limited to, prefabricated insulated walk-in type refrigerated and frozen room assemblies.
- .3 Provision of all floor depressions required for foodservice equipment, prefabricated walk in-type refrigerated or frozen room assemblies, floor pans, trench drains etc. as required or indicated on drawings.
- .4 Provision of concrete bases or pads with vibration isolation for condensing units.
- .5 Provision of all building floor leveling, grouting, finishing, cutting and patching required to accommodate installation of prefabricated insulated walk-in refrigerated and frozen room assemblies.
- .6 Provision of all building floor slab depressions, slab insulation and flexcell expansion joints(s) for prefabricated, insulated walk-in refrigerated or frozen room assemblies where specified.
- .7 Supply and installation of extruded styrofoam - Foamular 1000 or equal insulation in floor depressions or under concrete slab for prefabricated, insulated walk-in type refrigerated and frozen room assemblies as indicated on drawings.
- .8 Supply and installation of in-fill concrete topping inside prefabricated, insulated walk-in refrigerated and frozen room assemblies which have depressed prefabricated insulated floor panels or extruded styrofoam so as to make floor level with outside floors (allowing for floor finish thickness).
- .9 Supply and installation of all floor tile or other specified flooring finishes inside prefabricated, insulated walk in type refrigerated and frozen room assemblies including coving up inside and outside of prefab walls.
- .10 Provision of all core hole drilling through building structural slab, walls or roof to accommodate refrigeration lines, electrical conduit, plumbing lines, gas lines and exhaust/make-up air ducting etc.
- .11 Supply and installation of grout under and around floor sump pans and depressions.

- .12 Supply and setting of sleeves in floors, walls and ceiling (as well as any related core drilling) for electrical, mechanical refrigeration, plumbing and gas lines etc.
- .13 Provision and installation of sand for leveling insulated floor panels or extruded styrofoam for prefabricated insulated walk-in refrigerated and frozen room assemblies.
- .14 Supply and installation of structural supports or sleepers for roof top condensing units, exhaust and make-up air units etc as specified.

1.3 WORK INCLUDED BY FOODSERVICE DIVISION 11400 SUB-CONTRACTORS

1.3.1 GENERAL

- .1 The work listed here applies to the following foodservice sub sections:
 - Foodservice Equipment
 - Prefabricated Insulated Walk-In Type Refrigerated and Frozen Room Assemblies
 - Mechanical Refrigeration Systems
 - Warewashing systems
- .2 The work listed here includes, but is not limited to, the provision of all equipment indicated on the drawings and listed in the specifications together with labour, material, tools, plant, delivery, uncrating, setting-in-place of equipment, erecting of prefabricated insulated walk-in type refrigerated and frozen room assemblies, leveling, final assembly of equipment items shipped knocked down or in sections and cleaning herein ready for final connection of services by mechanical and electrical trades.
- .3 Coordination with the construction schedule of the delivery and set-into-place of all large foodservice equipment that may not fit through normal building doorways such as but not limited to mechanical refrigeration system components, dishwashing components or exhaust ventilators. Ensure that there is sufficient access into the building for the delivery of such equipment.

1.3.2 ELECTRICAL

- .1 All work shall comply with the standards for material and workmanship specified under Division 16.
- .2 Supply and installation of low water cut-off devices for any equipment in which immersion type electric heating elements are utilized.
- .3 Supply and installation of all motors integral with equipment complete with starters and internal thermal overload protection.
- .4 Supply and installation of all internal wiring on custom fabricated items in a concealed and well supported manner and terminated inside circuit breaker panels or junction boxes ready for final connection by the electrical trades. All equipment shall be inspected by the local hydro authority and carry CSA and ULC approval.
- .5 Supply and installation of all necessary junction boxes and circuit breaker panels (electrical load centres) required to terminate internal wiring within custom fabricated equipment and exhaust ventilator(s) (hoods) etc.
- .6 Tag each multiple electrical wire or cable used in any custom fabricated piece of equipment to indicate the item serviced. When circuit breaker panels are used, identify each circuit.
- .7 Supply and installation of waterproof wiring, outlets, panels and controls in all wet areas.
- .8 Supply and installation of cords and plugs on equipment as required and match the plug with the respective receptacle.
- .9 Supply and installation of watertight electrical outlets on all custom fabricated equipment. Mount electrical plug receptacles with stainless steel cover plates and casings. Furnish and install waterproof wiring
- .10 Supply and installation of switches for all lights in custom fabricated items.
- .11 Supply and installation of all internal wiring in a concealed and well supported manner required for the pre-fabricated insulated walk in type refrigerated and frozen room assemblies including the wiring for light switches, digital thermostats and high/low temperature alarm systems etc.
- .12 Supply and installation of electrical wiring from evaporator coil fan motors, electric defrost, lights and condensate drain line heaters to junction boxes located on top of each prefabricated, insulated walk-in type refrigerated and frozen room assembly. Factory pre-wire all interconnections for light switches, door heaters and automatic alarms inside foamed-in urethane panels and terminate on top of prefabricated structures in junction boxes.

- .13 Supply and installation of all electrical control wiring required for the mechanical refrigeration systems including but not limited to inter-connections from remote condensing units and evaporator coils.

1.3.3 MECHANICAL

- .1 All work shall comply with the standards for material and workmanship specified under Division 15000.
- .2 Provision and installation of all faucets complete with aerators and replaceable seats, ready for connection by appropriate contractor.
- .3 Supply and installation of chrome plated overflow assemblies, drain fittings and traps with tailpieces for all sink type assemblies.
- .4 Supply and installation of chrome plated blow down piping from items with relief or safety valves, extend piping to nearest hub or floor drain approximately 4" (100mm) above drain.
- .5 Supply of any pressure regulating valves on domestic hot and cold water and gas lines for equipment supplied herein.
- .6 Conceal and support of all piping and accessories within custom fabricated equipment.
- .7 Interconnection of drains and water lines between common multiple pieces of equipment. i.e. exhaust ventilator(s) (hoods), dishwashers etc.
- .8 Supply and installation of hard drawn copper condensate drain lines from each evaporator coil inside prefabricated, insulated walk-in refrigerated and frozen room assemblies complete with traps to building funnel floor drains. Wrap freezer evaporator coil drain lines with drain line heaters from coil to exterior of walk-in freezer. Evaporator fan coil condensate drain lines to be pitched down from drip pan connection to funnel floor drain at a rate of not less than 25mm in 610mm.
- .9 Supply gas pressure regulating valves for gas fired equipment for installation by Division 15000.

1.3.4 PREFABRICATED, INSULATED WALK IN TYPE REFRIGERATED AND FROZEN ROOM ASSEMBLIES

- .1 Supply, installation and erection of all prefabricated, insulated panels for walk-in type refrigerated and frozen room assemblies including ceiling and evaporator coil suspensions.
- .2 Supply, installation and erection of all prefabricated insulated panels required to insulate building structural columns that occur within walk-in type refrigerated and frozen room assemblies.

- .3 Supply and set into place of all over head horizontal structural supports and hanging rods required for suspension of ceiling panels for prefabricated walk in type refrigerated and frozen room assemblies and evaporator coils.
- .4 Supply and installation of internal and external bumpers as specified for all pre-fabricated, insulated walk-in type refrigerated or frozen room assemblies.
- .5 Supply and installation of all door assemblies specified as part of the walk in structures.
- .6 Supply and mount interior low temperature fluorescent lights with quick start ballasts within prefabricated walk-in refrigerator and frozen room assemblies. Division 11400 to physically mount all interior lights and run electrical wiring within conduit from each interior light to a junction box(es) located on top of the prefabricated walk-in refrigerated and frozen room assembly. Division 11400 to supply and install junction box(es), ready for final connection by Division 1600.
- .7 Supply and installation of interior light switches within pre-fabricated insulated walk-in refrigerated and frozen room assemblies. Division 11400 to factory pre-wire light switches within pre-fabricated insulated wall panels and run wiring to a junction box located on top of the walk-in room assembly.
- .8 Supply and installation of door heaters. Division 11400 to factory pre-wire door heaters within pre-fabricated insulated wall panels and run wiring to a junction box located on top of the walk-in room assembly.
- .9 Provision of all holes required in pre-fabricated insulated wall and ceiling panels by Electrical Division 16000 and Mechanical Division. Seal all penetrations with an approved permagum sealant.
- .10 Supply and installation of 2.8mm thick stainless steel corner guards at all interior and exterior outside corners and insulated panels around building structural columns. Corner guards are to be "L" - Shape 150 x 150 mm x 1830 mm high mounted 50 mm above the top of the finished floor cove.
- .11 Supply and installation of s.s. door sill cover plates.
- .12 Supply and installation of 1220mm high s.s. tread plates on both interior and exterior of sliding doors and hinged doors.
- .13 Supply and installation of viewing windows (heated for freezers) on hinged doors.

1.3.5 MECHANICAL REFRIGERATION SYSTEMS

- .1 Supply and installation of all mechanical refrigeration systems including but not limited to evaporator coils, condensing units and all refrigerant supply and suction lines etc as specified.
- .2 Supply and installation of all insulated liquid refrigerant supply and suction return lines required to interconnect mechanical refrigeration system components including piping runs to the evaporator coils within each prefabricated, insulated walk-in type refrigerated or frozen room assembly and any other device or equipment items required to form a complete operating mechanical refrigeration system.
- .3 Supply and installation evaporator coil fan motors, time clocks, room thermostats, solenoid valves and defrost heaters ready for final electrical connection by Division 16000.
- .4 Supply and installation of all control wiring for evaporator coil fan motors, room thermostats, alarms and sensors to junction boxes located on the top of each prefabricated, insulated walk-in type refrigerated or frozen room assembly. Run electrical control wires in conduit above the ceilings of the prefabricated structures and enter inside exactly where required. Factory pre-wire all interconnections for room thermostats, alarms and sensors inside foamed-in urethane panels and terminate on top of prefabricated structures in junction boxes.
- .5 Supply, installation and inter-connection of all control wiring between various components of the mechanical refrigeration system.

1.3.6 EXHAUST VENTILATOR(S) (HOODS) AND FIRE SUPPRESSION SYSTEMS

- .1 Supply, and set-into-place and/or suspension of all the specified exhaust ventilator(s) (hoods).
- .2 Supply and set into place of all hanging rods required for the suspension of exhaust ventilator(s) or (hoods).
- .3 Supply, and set-into-place exhaust ventilator(s) control panels complete with control relays as required for interlock to the building central alarm panel.
- .4 Supply, and set-into-place fire suppression electrical control panel(s).

- .5 Supply and installation of fire suppression systems complete with piping, bottles, detection devices as specified, release mechanisms and all other necessary accessories and components to form a complete operational and approved system.
- .6 Supply and installation of remote fire pull stations for the exhaust ventilator/fire suppression system.
- .7 The supply and installation of remote fire suppression system shall be in accordance with all requirements and regulations of Underwriters' Laboratories of Canada, "N.F.P.A. Code 96", Ontario Building Code and other local municipal authority having jurisdiction.
- .8 Supply of emergency gas valve(s) for installation by the mechanical contractor into the gas supply line.
- .9 Supply and set-into-place all control panels for exhaust ventilator(s) (hoods) complete with magnetic relay for remote building central alarm control panel.

1.3.7 MISCELLANEOUS

- .1 Supply and installation of all hardware and standard accessories normally part of the equipment whether shown and/or specified or not; ie locks, catches, handles, hinges, etc.
- .2 Provision of rubber button feet or pads under any piece of equipment that will rest on a counter.
- .3 Provision of plastic laminated, painted or other applied finishes as specified or shown. Colour shall be so designated by the Architect/Consultant and/or Owner.
- .4 Caulking and sealing of equipment to walls, curbs, bases, adjacent units and between any dissimilar materials. Use an approved silicone sealer for gaps under 8mm and stainless steel trim strips and sealer for wider gaps. Prepare area being siliconed prior to silicone application.
- .5 Securing of all permanent equipment to floor or base. Use stainless steel shims for leveling.
- .6 Supply and installation of all stainless steel strips and filler pieces necessary to properly finish any individual or combined set of pieces of equipment as part of the contract.
- .7 Protection, identification and recessing of all controls, pilot lights, switches and valves on any item of equipment.

- .8 Provision of all necessary access panels within each piece of equipment to allow for proper maintenance and service. Allow access when two (2) or more units are adjacent to each other.
- .9 Supply of all standard equipment accessories normally furnished with all items specified whether indicated or not.
- .10 Provision of all inserts, bolts, anchors, sleeves, ferrules, sleepers and other assorted hardware as may be necessary for the proper anchorage, fixing or attachment of equipment to the building.
- .11 Supply and installation of all mechanical refrigeration equipment and systems specified as integral with food equipment, complete with sufficient ventilation louvers for proper air circulation in and around the condensing units.
- .12 Provision of all required accessories for mechanical refrigeration systems in order to form a complete operating system. Mount condensing units on all welded and painted angle iron structure complete with vibration type insulator pads or 150mm high concrete pads with vibration isolators as specified.
- .13 Verification of the dimensions and services of all pieces of equipment that may be supplied by the Owner but are to become a part of a unit specified under this work in order to ensure a proper fit and co-ordination of installation.

1.4 QUALITY ASSURANCE

- .1 The work of this section shall be executed by one of the invited food service equipment dealers:
- .2 Each Foodservice Sub-contractor shall have capable plant, engineering, supervisory personnel and a minimum of five (5) years of experience in Canadian foodservice equipment supply and installation. Each Foodservice Sub-contractor will provide, three (3), references at the time of submission to substantiate recent work of similar type, size and quality to that specified herein.
- .3 If the Foodservice Sub-contractor performing the work included in this specification is an equipment dealer only, the firm shall at the time of tendering, provide in writing the name, address and qualifications of the fabricator proposed for the manufacturing and installation of custom stainless steel equipment.
- .4 If the sub-contractor proposing to supply and install the prefabricated insulated walk-in panels also proposes to supply the mechanical refrigeration systems, the firm shall at the time of tendering provide in writing the name, address and qualifications of the company proposed to supply and install the mechanical refrigeration systems.
- .5 No company will be considered for the supply and installation of the mechanical refrigeration systems without having an authorized service agency in Vancouver, Canada. At the time of tendering, the name of the authorized service agent for each and every component of the mechanical refrigeration system must be identified as well as the terms and conditions of the warranty.
- .6 Before submitting tenders, it is the responsibility of the bidder to carefully examine the drawings, specifications and the site to become aware of all existing conditions and limitations and to ensure that all of the work called for will be included in the tender submission.
- .7 All equipment and components supplied from manufacturers shall be the latest model or issue and shall be new and unused in every respect.

1.6 TENDER FORMAT

- .1 Comply with Division 1, General Requirements and all documents referred to therein.
- .2 All bidders will include in their tender a cash allowance of one thousand five hundred dollars (\$1,500.00) for the supply and installation of miscellaneous stainless steel trim, flashing and/or minor extra work as directed by this consultant. Should **approved** extra work and materials exceed this amount, this amount shall be deducted from the total of all extra work and materials.
- .3 Conform to the tender form provided at the end of this specification.
- .4 Submit an itemized price breakdown of the cost for each piece of equipment specified, including labour and materials. Separately indicate the Provincial Sales Taxes if applicable and a separate cost for transportation, delivery, un-crating and setting into place.
- .5 Prices tendered shall be for the manufacturer as specified in the first instance for each piece of equipment listed in the item specification section and shall form a base stipulated price bid.
- .6 Prices tendered for the other acceptable manufactures as indicated in the item specification shall be included on a separate form and shown as either an addition to, or deletion from, the base stipulated price bid.
- .7 List the item number, name and quantity of each item together with the manufactures name and model number.
- .8 Failure to provide the itemized list of equipment with identification of the manufacturer, model number and individual price forming the base stipulated price bid will **automatically** disqualify the tender submission.
- .9 The Owner reserves the right to open the tenders received in private.
- .10 The Owner also reserves the right not to disclose the results of the tenders.
- .11 By submitting a tender, the bidder acknowledges that the results of the bids are not accessible under any freedom of information legislation either nationally or provincially enacted.

1.7 ALTERNATIVES AND SUBSTITUTIONS

- .1 Refer to Division 1 - General Requirements.
- .2 The specifications, drawings and mechanical and electrical services etc. have been prepared on the basis of the brand names and models identified in the first instance for each individual piece of equipment as listed in the item specification. The tender must include a base stipulated price bid for the foodservice equipment as specified in the first instance for each individual piece of equipment. Tenders which include any other brand or model other than what was specified in the first instance for any individual piece of equipment in the base stipulated price bid, will be **automatically** rejected.
- .3 Should the bidder elect to use one of the acceptable alternative manufactures listed in the item specification, he/she may do so by submitting an alternative price for this item together with the chosen manufacturer and model number etc. Acceptable alternative manufacturers proposed for any equipment item must be listed on a separate page for “Acceptable Alternative Manufactures” located at the end of the tender form. Acceptable alternatives proposed, must indicate the addition to, or deletion from, the cost of the base stipulated price bid. The alternative price must also show and include the cost of all changes or modifications in the building necessary to accommodate the installation of the alternative item.
- .4 Alternatives proposed other than those listed in the specification as being acceptable alternative manufacturers may be submitted for review and consideration by the Owner and/or Consultant. These must be submitted in advance of the tender close and must be pre-approved in writing by the Owner and/or Consultant in order to be considered.
- .5 If an alternative other than those listed in the specification as being acceptable alternative manufacturers is proposed, the item must be submitted on a separate page included at the end of the tender form for “Other Pre-Approved Acceptable Manufactures” together with the chosen manufacturer and model number etc. Other pre-approved acceptable alternatives must indicate the addition to, or deletion from, the cost of the base stipulated price bid.
- .6 Alternatives proposed other than acceptable alternative manufacturers, must meet the physical and technical requirements of the specified item, be of a known and recognized manufacturer and satisfy the performance criteria and design intent originally determined by the Consultant in conjunction with the Owner.
- .7 Any alternative that is judged not to meet the above requirements, criteria or intent for whatever reasons shall be rejected and the model and manufacturer originally specified shall be supplied and installed at no additional cost to the Contract.

- .8 The proposed alternative and costs will be evaluated against the requirements set for the original specified manufacturer or model and a final decision made prior to the signing of a contract.
- .9 If any alternative is accepted, it is the responsibility of the respective Foodservice Equipment Sub-contractor to coordinate and bear all costs for mechanical, electrical, structural, architectural and any other adjustments necessary as a result of the substitution.
- .10 The Foodservice Equipment Sub-contractor awarded the work under Section 11400, shall also pay the costs of all professional fees and disbursements required to make necessary adjustments to the plans, specifications, mechanical and electrical requirement schedules or other information as a result of the substitution and for any coordination that must be done by the other project Consultants to accommodate any alternatives that are accepted.

1.8 REJECTION OF TENDERS

- .1 Refer to Division 1 General Requirements.

1.9 ADDENDA

- .1 Refer to Division 1 General Requirements.

1.10 CERTIFICATES OF APPROVAL

- .1 Conform to all laws, bylaws, rules, regulations and requirements of all authorities having jurisdiction.
- .2 All electrical equipment must conform to the Canadian Hydro Electrical Code, the Electrical Inspection Department Bulletins, the Ontario Hydro Electric Safety Code and the Canadian Standards Association. All equipment must have a C.S.A. approval label. Equipment that is not C.S.A. approved will be rejected, removed from the site and substituted for at no additional cost to the Contract.
- .3 Gas equipment shall conform to the Canadian Gas Association, the Gas Utilization Code of the Department of Energy and Resources Management, Ontario and Canadian Standard Association.
- .4 Any plumbing or drainage systems shall conform to the Plumbing Code and Ontario Water Resources Act except as modified by regulations and bylaws of authorities having jurisdiction.
- .5 Each piece of equipment shall be accompanied by a label or certificate of approval.
- .6 All mechanical refrigeration system shall be supplied with safety relief valves, shut-off valves for each piece of equipment and all other items as required by local regulations.

- .7 All welded pressure vessels shall be constructed to ASME Code. The vessels shall bear the stamp and certificates framed under glass and hung adjacent to the vessel.
- .8 Equipment design and fabrication must conform with the National Sanitation Foundation and Provincial as well as Local Municipal Health Department Regulations.

1.11 PERMITS

- .1 The Foodservice Equipment Sub-contractor shall be responsible to obtain and pay for all relevant permits or special inspections. No extra allowances will be considered for costs incurred.

1.12 SHOP DRAWINGS AND MECHANICAL AND ELECTRICAL REQUIREMENTS

- .1 Provide shop drawings, product data and samples as requested by this Section, in accordance with Section 01300.
- .2 All fabricated items and assemblies of equipment shall be completely illustrated by shop drawings with detailed descriptions, clearly indicated methods of construction, gauges, assembly, fastenings and services, etc.
- .3 Drawings prepared by the Consultant depict equipment design intent only. It is the responsibility of the foodservice equipment sub-contractor to prepare shop drawings in conjunction with the Consultants' drawings, specifications, mechanical and electrical data, details and other information. The Foodservice Equipment Sub-contractor shall be responsible to coordinate all shop drawings with Architectural and Engineering plans, as built site conditions and the work of all relevant Sections.
- .4 Identify and explain any variation in the shop drawings which do not adhere to the original specifications or details. Advise the Consultant in writing of any conditions that would limit or adversely affect the design intent.
- .5 Ensure that all component parts and assemblies of each piece of equipment will support the loads anticipated without detriment to function, safety or appearance.
- .6 Prepare shop drawings on the same size sheet as plans and elevations, in a scale of not less than 1:50 metric for plans and 1:25 for details and sections so as to clearly illustrate the construction and arrangement of equipment.

- .7 Prepare fully dimensioned "roughing-in" and final connection point drawings for mechanical and electrical services. Separate mechanical and electrical, or combined drawings, may be submitted. In either case, drawings must be a minimum of 1:50. Include walk-in and fire suppression schematics and any pertinent installation diagrams including dimensioned "sleeving" drawing.
- .8 "Rough-in" and "final connection point drawings" must include a list of symbols for each type of connection and must show the location of connections on equipment as well as the location of the rough-in point for all mechanical and electrical services. Both connections to the equipment and the rough-in point must be dimensioned so as to show the relative distances from grid lines or architectural wall reference points as well as the height above the finished floor.
- .9 Verify the energy requirements for any piece of equipment that is being supplied by the Owner. Incorporate this information into the shop drawings, "rough-in" and connection point drawings.
- .10 Depression drawings including low walls, cutouts and openings must be fully dimensioned and drawn at 1:50 scale.
- .11 Submit equipment data sheets and shop drawings in the following order:
 1. Catalogue cuts and illustrations.
 2. Plan lay out drawing with mechanical and electrical "roughing-ins" and "connection points"
 3. "Sleeving" drawing
 4. Depressions
 5. Custom fabricated items
- .11 Review of shop drawings is general and applies to design only, it is not intended to serve as a final check and shall not relieve the Foodservice Equipment Sub-contractor of the responsibility for errors in dimensions, quantity, material or interfacing as required to complete the intent of the design.
- .12 All shop drawing submissions shall be checked and signed by a senior member of the firm qualified to evaluate the function and construction necessary.
- .13 The Consultant reserves the rights to reject any submissions that do not comply with the standards noted herein.
- .14 After the drawings have been reviewed, provide the number of sets required by the Consultant for distribution. Do not proceed with the fabrication until the drawings have been reviewed by the Consultant.
- .15 The Foodservice Equipment Sub-contractor shall be responsible to keep one (1) copy of the reviewed shop drawings on the project job site in good order available to all consultants approved

- .16 Examine the drawings and specification of all Sections for any information that may affect this work and co-ordinate the architectural and service requirements with other appropriate contractors.
- .17 Submit one (1) reproducible copy and seven (7) print copies of each shop drawing submitted.
- .18 All shop drawings must be prepared using AutoCAD. Hand drawn shop drawings will be automatically rejected without review and returned to the Foodservice Equipment Sub-contractor.
- .19 The Consultant will only perform one (1) subsequent review of re-submitted shop drawings that have been rejected. If shop drawings are rejected in whole a second time, the Consultant will proceed to prepare the shop drawing and the costs including fees and disbursements will be deducted from the Foodservice Equipment Sub-Consultant contract amount.
- .20 “Rough-in” and connection point drawings will not be reviewed unless the catalogue cuts and illustrations are submitted first.

1.13 CATALOGUE CUTS AND ILLUSTRATIONS

- .1 All manufactured items being purchased by the Foodservice Sub-contractor must be illustrated by catalogue cuts and data sheets.
- .2 Submit sets of illustration/cuts bound in booklet form for review. Sheets are to be in numerical order, properly labeled with the name of the project and accompanied by a lead sheet with an itemized list of contents. The lead sheet must include the project name, the name of the General Contractor (if applicable), the name of the Foodservice Equipment Sub-contractor, the item number, the manufacturers name and model number, all options and accessories included as well as mechanical and electrical service requirements.
- .3 Ensure that the equipment suits the space allocations and the intent of the design.
- .4 After the illustrations have been reviewed, provide the required number of sets for distribution.

1.14 AS-BUILT DRAWINGS

- .1. Provide As-Built drawings as requested by this Section, in accordance with Section 01780.

.2. In addition to preparing shop drawings illustrating custom fabricated equipment or assemblies, the Foodservice Equipment Sub-contractor shall be responsible to prepare a set of final plan layouts of the foodservice equipment included at Georgetown District High School. These final plan layouts are to include:

- 1:50 final plan drawings of Georgetown District High School on AutoCad version 2000 or later; and
- Depression drawings.

1.15 MAINTENANCE MANUALS

.1. Provide maintenance manuals as requested by this Section, in accordance with Division 1 General Requirements.

.2. Maintenance manuals are to include the following:

- Emergency contact names;
- Finalized itemized list of food equipment by component and functional area indicating item number, quantity, manufacturer, model number, etc. for all new and relocated existing equipment;
- Detailed schedule of the mechanical, electrical and structural requirements for new and re-used existing equipment with connection size information; and
- One (1) copy of all shop drawings.

PART 2 - PRODUCTS

2. PRODUCTS

2.1 GENERAL

- .1 All equipment supplied under this contract shall be made of the best grade materials and with first class workmanship and shall be in strict accord with the Drawings and Specifications.
- .2 The specifications attached hereto shall be considered the minimum acceptable standard and all equipment supplied shall be within the intent of approved shop drawing and specification.
- .3 Unless otherwise specified in the Itemized List of Equipment, fabricated equipment referred to as "stainless steel" shall incorporate the materials listed in 2.2 wherever necessary.
- .4 Trademarks and labels, including applied trademarks and labels are not acceptable in the finished work, except those required for operating instructions.

2.2 MATERIALS

- .1 Materials for fixed surfaces shall be impervious to moisture, corrosion resistant, smooth and able to withstand regular cleaning and sanitizing.
- .2 Stainless steel, denoted by the abbreviation "s.s." in this specification shall be ASTM-A167-81A, (18-8 Analysis) type 304 cold rolled and annealed, No. 4 finish one side, 180 grit finish free of buckles, pits, warps and imperfections. Ensure that direction of grain matches throughout units.
- .3 Stainless steel tubing shall be 304, seamless and welded, No. 4 finish, 38mm sq. for all legs and bracing.
- .4 Nuts, bolts, screws, washers and other fastenings shall be type 304 stainless steel.
- .5 Galvanized steel sheet, generally referred to as Satincoat; zinc coated, 380 gms/sq. m. Where such material is used as an exposed surface, it shall be finished with one (1) coat of primer and two (2) coats of air dry enamel, silver gray unless otherwise specified.
- .6 Structural steel shall be new material, conforming to recognized standards, grade 300W, cleaned and primed.
- .7 Gauges of material refer to U.S. Standard Gauges.

- .8 Plywood to be Douglas Fir, minimum 5 ply construction conforming to CSA 0121, good two (2) sides, waterproof where required.
- .9 Particle board to be CAN 3 0188.1 MÄ78 with smooth dense surfaces.
- .10 Laminated plastic sheet and decorative materials used to clad surfaces of wood or metal shall be Arborite, Formica or Nevamar, 1.0mm thick or such other materials as may be specified or indicated on the Drawings. Where plywood or wood particle board panels are being clad, apply laminate manufacturer's backing sheet wherever necessary to obtain a balanced construction and prevent warpage. All panels shall be 19mm thick before plastic laminate is applied. Finish all exposed edges.
- .11 Sound deadening, 3mm thick rigid waterproof insulation, Component Hardware M75-1366 applied under working surfaces.
- .12 Gauges are as follows:
 - 1.0 mm - 20 ga.
 - 1.2 mm - 18 ga.
 - 1.6 mm - 16 ga.
 - 2.0 mm - 14 ga.
 - 3.0 mm - 12 ga.

2.3 ELECTRICAL COMPONENTS

- .1 Electrical parts supplied under this Section shall be compatible with materials specified for use on this project. Refer to Division 16. Receptacles shall have stainless steel cover plates and screws. Cords and caps shall be approved type, matching the receptacles for which they are intended, whether or not such receptacles are supplied by the Foodservice or Refrigeration Sub-contractor.
- .2 Make receptacles, junction boxes and breaker panels easily accessible without dismantling equipment.
- .3 Terminate wiring within equipment at load centre or junction boxes with wires identified by Item No. and load.
- .4 Properly rate and ground all receptacles.
- .5 Equip 3-phase motors with magnetic starters with thermal overload protection on each of the three phases.
- .6 Equip single-phase motors of fractional horsepower rating and those ranging up to and including .746 Kw with overload protection. Motors rated over .746 Kw must have magnetic starter with overload protection.
- .7 Control circuits to be 120 V maximum.

- .8 Provide all lighting fixtures for designated equipment with colour corrected lamps and controls or switches wired to an easily accessible common junction box for power connection.
- .9 Fit all portable and mobile electrical equipment with cord and plug suited for the electrical characteristics and outlets specified for the equipment. Include grounding conductor in the cord.

2.4 PLUMBING COMPONENTS

- .1 Plumbing components supplied under this section shall be compatible with materials specified for use on this project. Refer to Division 15.
- .2 All control valves and faucets, pipe fittings, waste and tail pieces etc., must be brass chrome plated, bright finish, new, best quality and comply with applicable codes.
- .3 Valve handles must be of non-conductive materials.
- .4 Faucets, Fisher or T&S Brass equivalent, Inlet Size 12mm IPS.
 - Deck Mount, inlet Centres 102mm, spout 152mm
 - Deck Mount, inlet centres 102mm, spout 152mm.
 - Deck Mount, inlet centres 203mm, or gooseneck
 - Deck Mount, inlet centres 203mm, spout 203mm, 279mm, or gooseneck.
 - Splash Mount, inlet centres 203mm, spout 203mm or 279mm.
 - Splash Mount, inlet centres 203 mm, spout 203mm or 279mm.
 - Provide wrist action handle on all faucets unless specified otherwise.
- .5 Pre-Rinse units, Pot Sink, 19mm IPS Encore Model KN53-5026-12, complete with K50Y-500 swivel arm support, K55-7012 add-on faucet and all attachments including wall brackets for splash mount units.

- .6 Wastes, 38mm or 51mm IPS.
- Centre type, with removable basket strainers and tailpiece, Specialty Hardware model P1.
 - Rotary type stainless steel, Specialty Hardware DSS8000 with strainer.
 - Corner type, with stainless steel overflow, removable strainer and tailpiece.

2.5 MISCELLANEOUS

- .1 Casters to be Darnell, Colson, Kilian or Jarvis black neoprene non-marking rubber tired, 60 shore hardness, doughnut shaped, ball bearing, equipped with brakes as noted, sized to suit specific usage, zinc finished. Plate type shall be securely bolted to frame. Shank casters shall be threaded type c/w bushing. Bushing shall be welded and upright. Bolts, nuts and lock washers shall be stainless steel All casters supplied shall be made by the same manufacturer. Casters shall be supplied on each unit to suit its particular application so that it runs freely and handles easily, minimum of 4" diameter and 200 lbs. capacity per caster.
- .2 Bumpers shall be Colson #6915 for wrap around type set into stainless steel channel and #6927 for corner type c/w a 1.6mm s.s. exterior casing. Secure bumpers on equipment at identical height and seal any exposed gap.
- .3 All sealants shall be one-part silicone type, tackfree in less than one hour with complete cure achieved to 6mm depth in less than 24 hours. Sealant must not significantly alter its properties when set.
- .4 Sealant to remain flexible and resistant to damage from all normal environments of a commercial kitchen. It must not support the growth of bacteria, mould or fungi or discolor.
- .5 Sealant to be clear or as required to suit colour of surrounding materials.

2.6 HARDWARE

- .1 Handles that are an integral part of doors shall be Component Hardware Model P44-1010 full grip stainless steel pulls.
- .2 Handles that are an integral part of drawers shall be Component Hardware Model P44-1010 full grip stainless steel pulls.
- .3 Catches shall be Component Hardware Model M32-2401, concealed magnetic catch with a 30 lb. pull.

- .4 Door track hardware shall be Component Hardware Model B57-0144.
- .5 Door guides shall be Component Hardware Model B62-1093 or equal.
- .6 Door stops shall be Component Hardware Model B60-1086 or equal.
- .7 Front door bypassing door locks shall be Component Hardware Model B58-5513 for non-heated cabinets and B58-5511 for heated cabinets.
- .8 Back door bypassing door locks shall be Component Hardware Model B58-5523 for non-heated cabinets and B58-5521 for heated cabinets.
- .9 Swing door hinge for refrigerator doors shall be Component Hardware Model R42-2840.
- .10 Refrigerator door hardware: Self closing, heavy duty stainless steel offset pivot hinges with magnetic gaskets and 430 stainless steel door frame and tamper proof cylinder locks and two (2) keys per lock.
- .11 Stainless steel drawer slides: Component Hardware Model S52 series for standard and refrigerated units.
- .12 Drawer locks: Component Hardware Model P30 series, stainless steel face (drawers shall not be keyed alike). Supply two (2) keys per lock and hand over to the Owner or Consultant.
- .13 Provide locks on all doors and drawers. Key each section of the foodservices areas with a different series of locks, two (2) keys per lock.
- .14 Casters shall be cadmium plated, steel disc cushion non-marking rubber tired wheels with adjustable cup and cone ball bearings. Caster swivel with two rows of ball bearings running in hardened raceways. Capacity per caster, minimum 100 kg. All stem casters with expanding type fittings of size to suit tube. Plate casters mounted with stainless steel bolts and lock washers for easy replacement. All casters on mobile equipment lubricated for efficient use in varied temperatures of kitchen, walk-in refrigerators and freezers. Casters on mobile equipment equipped with cart-washable casters with grease nipples to assure adequate watertight lubrication.
- .15 Pilaster strips, stainless steel 20mm wide with 13mm adjustment.
- .16 Clips for shelves shall be die formed stainless steel.

2.7 WELDING

- .1 All welding shall conform to the requirements of CSA specifications and be performed by fabricators who are approved by the Canadian Welding Bureau and CSA specifications. Exposed welds shall be filed or ground smooth and flush and polished to match surfaces. All exposed welds shall be continuous.
- .2 Electric seamless welding shall utilize low carbon filler rod, coated with non-carbonaceous flux, with sufficient chromium and nickel so that the deposited metal and the original metal have the same composition.
- .3 Welds shall be free from pits, cracks, discolouration and other imperfections.
- .4 Welded joints shall be butt fitted, properly jigged, continuous, ground smooth and polished for both exposed conditions as well as unexposed welds on underside of equipment.
- .5 Where soldering is desirable, it shall be made with tin-lead solder. In no case shall soldering be relied upon for the stability of the seam or joint. Soldering shall serve only as a filler to prevent leakage and shall not be considered as a replacement for welding or brazing.
- .6 Butt joints made by spot welding or riveting straps under seams and filling with solder, puddle welds and exposed screws are not acceptable.

2.8 FABRICATION

- .1 Before fabrication commences, check all dimensions and conditions at the building site, including means of access into and through the building to the area where equipment is to be set in place, for all conditions affecting the delivery and installation of the equipment.
- .2 Fix and assemble work in the shop wherever possible. Execute the work in accordance with details and shop drawings which have been reviewed and accepted by the Consultant. Where complete or final shop fabrication is not possible, make a trial assembly in the shop prior to delivery.
- .3 Workmanship shall be of the best grade modern shop and field practice for the manufacturers who specialize in this work.
- .4 Fabricate and erect work square, plumb, straight and accurately fitted. Provide adequate reinforcing and anchorage in all places.
- .5 Insulate where necessary to prevent electrolysis.
- .6 All drillings to be reamed and exposed edges left clean and smooth.

- .7 All straight lengths shall be one piece throughout, with all seams, including field joints, continuously welded. Radiused corners must be welded and polished to match original finish.
- .8 Conceal joints and connections wherever possible. Intermediate joints between supports are not acceptable.
- .9 Machine dressed work and finished work shall be free from drag, feathers or roughness of any kind. Remove machine marks by sanding
- .10 Pop rivets shall not be used unless clearly noted on shop drawings, and then only if such drawings have been reviewed and accepted by the Consultant.
- .11 The methods of construction, reinforcement and anchorage, as well as details of finish, fitting and jointing, and other data indicated on shop drawings shall be accurately followed. No deviations from shop drawings which have been reviewed and accepted will be permitted during the construction of equipment or installation.
- .12 The gauge of metal and methods of construction shall in all cases be adequate for the various conditions to be met, with the requirements of the design details and Specifications considered as minimum. Finished equipment shall be rigid when assembled and installed.
- .13 All fastenings and fittings shall be stainless steel, type 302 or 304 unless otherwise specified. All bolts and screws shall have truss heads or flat heads which are properly countersunk, at exterior and interior surfaces which are normally visible. Concealed fastenings shall be used throughout, unless otherwise approved by the Consultant.
- .14 Sheet material for counter tops, tables, shelves and similar forms shall be straight lengths, in one continuous sheet if not over 3 metres long.
- .15 Make provisions in the equipment for proper installation of services and connections. Cut and patch only when necessary. The completed installation shall be properly finished without rough edges or exposed openings.
- .16 Allow for expansion and contraction of materials.
- .17 Obtain samples and confirm sizes of trays, racks, pans and china to determine the exact requirements for openings in equipment.

2.9 CONSTRUCTION

2.9.1 WORKTABLES & COUNTERS

- .1 2.0mm stainless steel continuous sheets all welded.
- .2 Reinforcing shall be a minimum 3.0mm Satin Coat subtop arranged so that forms are concealed from normal view. Secure reinforcing to tops with stud welding and appropriate silicone.
- .3 Table or counters up to 1800mm in length shall have a minimum of 4 legs.
- .4 Tables with sinks shall have a marine edge unless otherwise specified.
- .5 Worktable and counters with sink, work tops to slope towards sinks at a slope of 20mm per metre. For dish tables 8mm per metre toward dishwashing machine. Front edge level over full length.
- .6 Edges shall be as shown and specified in the standard detail 401.
- .7 Kickplates, where specified, shall be of 1.6mm stainless steel and secured to equipment, easily removable.

2.9.2 TOPS

- .1 Stainless steel tops as specified under "Worktables and Counters".

2.9.3 BACKSPLASH

- .1 2.0mm stainless steel fully welded. See Standard Detail 401.
- .2 Integral section of table or counter top turned up on a 19mm radius to the height specified, then boxed or splayed. Refer to Standard Detail 401.
- .3 Enclose, fill and weld all exposed ends and back. Exposed backs at upturns and splashbacks shall be faced with 1.2mm stainless steel back panel to bottom of splashback. Such panels shall be removable as required for access to mechanical and electrical parts. Seal backs to wall with clear silicone.

2.9.4 LEGS AND BRACING

- .1 1.6mm stainless steel wall, 41mm O.D. tubular.
- .2 Provide framework for table tops to maintain a height of 900mm above finished floor.
- .3 Leg spacing maximum 1600mm apart, 760mm front to back.

- .4 Bullet feet, Component Hardware Model A10-0851. When table has service connections, dowel and secure to floor using Component Hardware Model A10-0854. Secure to one set of feet only when bridging a structural expansion joint.
- .5 Braces shall be continuously welded to legs, polished with minimum reduction in volume.
- .6 Cross brace legs in pairs and longitudinal brace at front, centre or back to suit requirements. All set at 250mm above floor.
- .7 Legs shall be continuously welded to s.s. saddles of inverted U shape 100mm wide x 20mm deep x 2.75mm. Flanges angled back or rounded at each end.

2.9.5 OVER-CUPBOARDS

- .1 1.2mm stainless steel all welded
- .2 Top sloped at 30 deg., end gables boxed and bottom shelf fixed.
- .3 Intermediate and adjustable shelves as specified under "Shelving".
- .4 Doors as specified under "Doors" section.
- .5 Secure units to wall with stainless steel fastenings.

2.9.6 SHELVING

- .1 1.6mm stainless steel all welded construction.
- .2 Boxed edges on all four (4) sides. Notch corners to fit contour of legs as required for work tables.
- .3 Shelves with sides or backs shall be turned up 50mm and set to backs or folded if away from walls.
- .4 Shelves shall be easily removable and in sections capable of being pulled out through a single door opening.
- .5 Overshelves to be boxed with backs set to walls and secured with stainless steel tubular brackets.
- .6 Wire shelves to be 5mm O.D. on 25mm centres, set in a 10mm O.D. perimeter frame either stainless steel or heavy duty chrome plated finish as specified.
- .7 Provide a removable bottom shelf in any counter or table set on an enclosed base with mechanical and electrical services.

- .8 Removable bottom shelf in counters or tables with sink for access to clean-out valve on trap.

2.9.7 ANGLE SLIDES

- .1 1.6mm stainless steel construction
- .2 Slides shall be of 50mm x 50mm section, length to suit. Leading corners rounded, fully welded to supports on vertical edge (for fabrication) or secured by no less than four (4) s.s. screws (for millwork)
- .3 Round exposed corners and provide back stops. Mount units in keyhole slots to ease cleaning and removal.
- .4 Back stops to be provided to limit travel.
- .5 Verify tray, pan or basket size to ensure accurate fit.

2.9.8 DRAWERS

- .1 Front shall be double pan construction with insulation equal to cabinet body. Where drawer fronts are shown to have a plastic laminate finish, the double pan construction shall be reversed so that the plastic laminate is contained by the outer edges of the back pan.
- .2 Frames shall be 1.6mm. stainless steel channel, welded to drawer front.
- .3 Pulls shall be formed of stainless steel and welded onto the top edge of drawers; profile shape and size as indicated on the Drawings. Where such formed pulls are not indicated, recessed pulls shall be used, Component Hardware P63-1012 or approved equal.
- .4 Slides for refrigerated cabinets shall be Component Hardware S52 series; for other drawers Component Hardware S26 series as specified under "Hardware".
- .5 All slides to be installed so that drawers are self closing.
- .6 Housing of 1.0mm stainless steel fully enclosed for drawers under worktables and open cabinets.
- .7 Drawers shall accommodate one plastic pan Component Hardware S80 series or one stainless steel pan Component Hardware S81 series for 510 x 510 x 125mm insert.
- .8 Provide rubber buttons at end of frames to cushion drawer.
- .9 Locks as specified under "Hardware".

2.9.9 SINK BOWL

- .1 All of 2.0mm stainless steel integrally welded into table or counter top.
- .2 Interior corners radiused 19mm both vertically and horizontally, all welded and polished. Slope bottom to drain fitting.
- .3 Undercoat with sound deadening compound when sinks are not exposed.
- .4 Multiple sinks to have 18 ga. stainless steel apron to conceal gap between bowls.
- .5 Faucets and drains as specified under "Hardware".

2.9.10 HINGED & SLIDING DOOR

- .1 Front and back of 1.6mm stainless steel.
- .2 All welded, double pan type 19mm thick sound deadened with fibreglass insulation board.
- .3 Hinges for cabinet doors shall be concealed, continuous stainless steel piano type secured to body with stainless steel screws.
- .4 Sliding doors shall be top hung with a stainless steel track mounted above to allow self closing. Provide nylon rollers with ball bearing centre except for heated cabinets where stainless steel rollers shall be used. Doors must be removable without tools.
- .5 Provide rubber buttons to cushion doors.

2.9.11 UNHEATED CABINETS

- .1 Stainless steel tops and backsplash. Top edges boxed, backs up and splayed unless otherwise noted.
- .2 1.2 mm stainless steel body.
- .3 Door to be hinged or sliding as required.
- .4 Stainless steel pilasters for adjustable shelves c/w clips.
- .5 1.6 mm stainless steel fixed bottom shelf and removable intermediate shelf.
- .6 Legs as specified under "Legs and Bracing"

2.10 PREFABRICATED, INSULATED WALK-IN TYPE REFRIGERATED & FROZEN ROOM ASSEMBLIES

2.10.1 MATERIALS

- .1 Stainless steel sheet metal (min. 24 ga): to CSA G1110.6 1968 type 304 with No. 4 finish.
- .2 Galvanized steel sheet metal: commercial grade to ASTM A526-M81 with galvanized zinc coating to ASTM A525-M80, designation Z275.
- .3 Mild steel: cold rolled sheet to SAE 1010 to 1020 suitably prepared for the specified finish.
- .4 Aluminum sheet metal: utility sheet with "stucco" pattern finish unless otherwise indicated.
- .5 Sealant: silicone sealing compound, eg. Dow Corning Silastic 732 RTV silicone adhesive/sealant.
- .6 Asphaltic paint: to CGSB 1-GP-108c, type 1.
- .7 Insulation shall be foamed-in-place polyurethane injected into the panels to form a rigid wall without the use of wood or metal structural members. Insulation shall have a "K" thermal conductivity factor of not more than 0.86 watts per square metre per degree Kelvin for a temperature difference of 38°C (100°F) and shall be rated as self extinguishing, fire retardant type. Overall wall thickness shall be a minimum of 76mm (3"), having a density of 40 kg per cubic metre.
- .8 Factory fabricate the exterior and interior walls, ceilings and floor panels using steel pressure dies and maintain uniformity.

2.10.2 CONSTRUCTION

- .1 All pre-fabricated insulated wall and ceiling panels shall bear a stamp indicating ULC approval.
- .2 Panel sections shall consist of exterior and interior metal pans with die formed flanged edges. Section edges shall have a matching tongue and groove profile to ensure self-alignment and to provide a continuous foam-to-foam airtight contact, when panels are locked into place. Flexible vinyl gaskets may be used in addition to the continuous foam-to-foam airtight contact.
- .3 Silicone between all panel joints to provide a clean finished appearance and to form air-tight vapour-proof joints. No wood framing to be used in wall or ceiling panels.

- .4 Panel sections shall be of modular design, assembled with eccentric locking devices, or approved equal, actuated from the interior of any of the rooms and enabling sections to be erected within 38mm of any building room, column and ceiling.
- .5 Steel for all panels to be painted shall be Satincoat or approved alternative, 0.595mm thick minimum. Paint shall be baked white enamel in two coats. All exterior panels not exposed to normal view to be 0.792mm core galvanized steel.
- .6 Door panels shall be insulated and finished as per exterior and interior panels with a minimum 865 x 1980mm clear door opening. Ensure that doors will close and seal opening.
- .7 Infitting flush hinged type doors (swing as indicated in item description) to fit door openings, insulated and finished same as panels, complete with 1015 high x 1.6mm thick stainless steel kick plates on both exterior and interior, as well as soft thermoplastic gaskets with magnetic steel core at top and both sides and adjustable rubber wiper gasket at bottom. Gaskets to be oil, fat, water and ultra violet resistant and to be replaceable.
- .8 Door hinges shall be self-closing type, with stainless steel pin and nylon cam-type bearing, of satin finished aluminum.
- .9 Latches to match hinges, for opening door by breaking force of trigger-action door closer and magnetic gasket. Latch to be capable of being locked with padlock and to have safety release handle. Adjustable sliding gasket on the bottom of each door. The magnetic force of the gasket must be sufficient to keep the door closed and airtight.
- .10 Foot treadles to match hinges and latches, for opening door without use of hands.
- .11 One trigger-action positive door closer, located on exterior, to assist in positive closing of door.
- .12 Anti-condensation heater cables shall be supplied and installed on all walk-in doors at gasket contact area, in snap-on channel, providing sufficient heat to prevent condensation and frost formation. Heaters across sill shall be protected with removable 1.60 stainless steel cover plates or angles. Heaters shall be inter-wired at factory, terminating in a junction box located on top of prefabricated insulated refrigerated and frozen room assemblies, ready for connection by electrical trades.
- .13 Provide appropriate number of fluorescent fixtures to ensure a 70 foot/candle (light intensity) at working level.

- .14 Where 4' long double tube fluorescent lights are specified for walk-in type refrigerated and frozen room assemblies provide CBM AW248 CWHO vapor proof type fixtures with electronic rapid start low temperature ballasts (-29 C) and standard 120 Volt switches. Double tube 4' long fluorescent fixtures to operate on 120/60/1. Terminate wiring for lights in junction boxes located on top of the prefabricated insulated refrigerated and frozen walk - in type room assemblies, ready for final connection by electrical trades. Use three way switches if more than one door is specified.
- .15 Each door panel section shall have on the latch side, approximately 1676mm above the finished floor, an operating toggle switch and pilot light, inter-wired within the panel to an interior fluorescent vapour proof light fixture complete with light tubes and suspended from ceiling panels.
- .16 Wiring shall terminate in a junction box on top of the prefabricated walk-in room, ready for connection by electrical trades. Use three-way switches if more than one (1) door is specified.
- .17 Provide L.E.D. readout thermometers to provide temperature readings from -40 C to +15 C and mount on latch side of door panel approximately 1525mm from floor. Cover sensing bulb with protective metal cover, same finish as walk-in.
- .18 Two-way pressure relief port shall be installed in freezer door panel and refrigerator door panels in rooms operating at +2 C or less. Anti-sweat heater cables in frame of port to prevent intake and exhaust ports from freezing. Vent port to be pre-wired within panel.
- .19 Where walk-in rooms are floor less, wall panels are to be fastened to screeds in lieu of floors; 76mm high screeds are to be of similar construction material and insulation to wall and ceiling panels. Screeds are to be installed plumb and level and secured to finished building floor.
- .20 Supply and installation of an alarm system for each prefabricated walk-in refrigerated and frozen storage room. Supply and install inter-wiring from alarm system to junction box installed on top of each room. Alarm system shall be equipped with one contact for auxiliary remote alarm.

Equip with temperature sensor, mounted inside prefabricated rooms and connect to the alarm system control box. Immerse capillary tube sensor in glycol bath.

Run all wiring between the alarm system and junction box on top of prefabricated room through conduit and down inside of prefabricated wall panels to alarm system. Exposed wire is not acceptable and will be rejected.

- .26 Removable closure panels shall be installed from lower edge of erected ceiling panels to finished building ceiling and cover strips or angles to extend from building floor to ceiling closure panels between exposed ends of walk-in boxes and building wall. Closure panels, cover strips or angles to match finish of exposed exterior wall panels. Provide removable ventilation panels in front of each condensing unit.
- .27 Supply and installation of bumpers on all exposed exterior walls as specified. Tops and vertical ends, where bumper makes contact with wall panels, are to be sealed.
- .28 Supply and installation of 2.8mm stainless steel corner guards 150mm x 150mm x 1830mm H on all exposed exterior and interior corners.
- .29 Openings through walls or ceilings for electrical, plumbing or refrigeration lines must be sleeved, fit with grommets and sealed with an approved sealant.
- .30 Prefabricated walk-in refrigerated and frozen storage rooms covered under this section of the specification shall be fabricated to comply with Canadian Standards Association. The CSA label shall be affixed to the interior door jamb.

2.11 MECHANICAL REFRIGERATION SYSTEMS

- .1 Supply and installation of all mechanical refrigeration equipment and controls for refrigerators and freezers to form a complete and functional system consisting of but not limited to:
 - semi-hermetic condensing unit, as specified
 - evaporator/cooling coil c/w electric defrost heaters in all freezer evaporator coils
 - room thermostat
 - thermostatic expansion valve(s)
 - liquid line sight glass
 - dehydrator filter/drier
 - solenoid valve
 - thermostat
 - dual pressure control
 - time clock (for defrost cycle in refrigerators and freezers), time activated and temperature terminated
 - evaporator coil drain line heaters
 - contactor (where applicable)
 - fused disconnect switch on evaporator coils (where applicable)
 - service valves
- .2 The contractor shall supply all products, materials and labour necessary to provide a complete operating mechanical refrigeration system capable of meeting the cooling demands of, but not limited to, all refrigerated and frozen storage rooms.

- .3 Each individual mechanical refrigeration system shall be sized by the Foodservice Equipment Sub-contractor to suit the internal space, ambient temperatures and humidity levels of surrounding areas, product type and load, heat infiltration and temperature of incoming product in order to maintain the specified holding temperatures. The Equipment Supplier (Refrigeration Sub-contractor) must verify all of this information with the Owner and/or the Consultant during the bidding period. Equipment sizes specified are to be used as a guideline only. Should an adjustment in the size of any refrigeration equipment be required, advise the Consultant during the bidding period so that an addendum may be issued.
- .4 Design compressor and coil capacity on a 16 to 18 hour day compressor operation in 32.8 C ambient temperature maximum.
- .5 Design refrigeration equipment for use with Freon R134A or R404 for refrigerators and freezers (high, medium, and low temperature applications). Refrigeration equipment for use with Freon R22 will not be accepted.
- .6 All condensing units 3/4 H.P. or greater if specified shall be Semi-Hermetic complete with motor, condenser, receiver, compressor, suction and discharge valves, oil separator, high/low pressure controls and all other necessary components mounted in a flexible manner on a common base with all service valves and controls readily accessible and easily serviceable.
- .7 Evaporator (coil) to be forced convection unit cooler type, made to be suspended from ceiling panels. Forced air discharge to be parallel to ceiling. Air circulation motor, multi-fin with tube type coil and grill to be assembled within protective housing. Expansion valve, with strainer, heat exchanger inlet and outlet service valve connections also to be contained within housing.

Construct evaporator entirely of non-corrosive materials. Air circulation motors to be life-time sealed and entire unit-cooler assembly readily accessible for cleaning.
- .8 Evaporator (coil) shall be equipped with mounting brackets, stainless steel drip pan, drain connection and required controls for a safe and satisfactory operation.
- .9 Mechanical refrigeration systems used for freezer applications shall have an automatic electric system for defrosting including heaters and time control. Defrost to be time initiated and temperature terminated with built in fail safe control and fan delay switch.
- .10 Thermostatic type expansion valves, all metal, moisture proof with gas charged bulb clamped to suction end of evaporator (coil). Freezers with 10 P.S.I. expansion valves.

- .11 Equip each prefabricated walk-in refrigerated or frozen storage room and refrigerated preparation/assembly rooms with a room thermostat to control solenoid valve. Mount solenoid valves on liquid lines, close to the cooling unit to control flow of refrigerant.
- .12 Remote condensing units shall be mounted on 38 x 38mm (1 1/2" x 1 1/2") angle iron racks, welded, primed and painted with black enamel or on concrete pads as specified.
- .13 Provide 19mm (3/4") plywood panel G.I.S. for mounting of components. Paint and mount panel on wall behind rack.
- .14 Mount components for each system, as specified herein, on the plywood panel in a neat and orderly arrangement. Identify the system being serviced with a permanent stenciled label as well as a second permanent label identifying the name and address of the service agency responsible for servicing and warranty work. Show dates of installation and end of warranty period.
- .15 Compressors
 - under 1/2 hp - 120/1/60 service
 - 1/2 hp to 3/4 hp - 208/1/60 service
 - 1 hp - 208/3/60 service
 - 2 hp and over - 600/3/60 service
- .17 Provide a contactor for each three (3) phase motor and an ON/OFF switch, rated for the hp served, for each single (1) phase motor.
- .18 Install a PVC sleeve in the walk-in refrigerator wall where any pipe passes through. The sleeve shall be larger than the penetrating pipe to allow for a "permagum" packing and vapour seal.
- .19 All refrigeration piping shall be type "L" copper tubing hard drawn with "silfos" brazed joints, verified free of leaks. Completely dehydrate piping before charging with refrigerant.
- .20 Joints at equipment on lines 16mm O.D. and smaller shall be made with flareless compression fittings, Swagelock or Imperial "Hy-Seal". Joints on lines larger than 16mm O.D. shall be wrought copper solder joint fitting, with adaptor fittings where screwed connections are necessary.
- .21 Installation of piping shall conform to applicable requirements of ANSI code for Pressure Piping, Section on "Refrigeration Piping" and CSA Standard for "Mechanical Refrigeration Code". Refrigerant piping to obtain a pressure drop of less than 23 kPa per 50 metres in suction lines and 47 Kpa per 50 metres in liquid lines. To increase the velocity and assure proper oil return, install smaller diameter vertical risers on suction lines.

- .22 All new refrigerant piping is to be pressure tested with dry nitrogen and properly evacuated before recharging with refrigerant.
- .23 All refrigerant piping shall be properly identified as to service and direction of flow.
- .24 Valves shall be packless type designed and selected for R134A or R404 refrigerant. R22 refrigerant will not be accepted.
- .25 Insulate suction lines with 16mm thick Armaflex, 19mm thick on freezer system; or approved equivalent fire retardant pipe covering, installed in strict accordance with the manufacturer's recommendations. Tape liquid and suction lines together.
- .26 Testing and evacuation procedure shall conform to ANSI B31.5 and test pressure shall be in accordance with CSA Code.
- .27 Evacuation shall be accomplished by the use of a vacuum pump to ensure removal of all moisture and non-condensable gases.
- .28 Provide all refrigerant required for charging and placing the system in proper operation. Charging shall be done through a new filter dryer and completed by a licensed refrigeration contractor holding a valid ODP.

2.12 EXHAUST VENTILATORS AND HOODS

- .1 The canopy inner liner shall be 18gauge stainless steel, type 304 with #4 finish. The canopy shall have an integral exhaust duct collar. All seams of the inner liner shall have grease tight joints. Each canopy shall have a filter housing of the same material as the canopy liner. The filter housing shall be equipped with a concealed drip tray the full length of the canopy and with a grease cup for easy removal and daily cleaning.
- .2 The outer shell shall be 18 gauge stainless steel, type 304 with #4 finish. Canopy ends shall be double side wall construction (no single wall hoods permitted). All exterior joints shall be continuously welded liquid tight, ground smooth, and polished to a #4 finish. Tack welded and cap seamed joints are not permitted. The canopy shall have an integral supply collar with an 18 gauge steel fire damper with a U.L.C. listed Re-Fuse permanent and resettable fusible link.
- .3 The exhaust air flow will be based on the convective heat generated by the appliances underneath each canopy. Submittal shall include convective heat calculations base on the input power of the appliance served.

- .4 The minimum grease extraction efficiency is 93% on particles with a diameter of 5 microns and 98% on particles with a diameter of 15 microns or larger, as tested by an independent testing laboratory. The pressure loss over the extractor shall not exceed 0.50" of water at flow rates approved by U.L.C. for heavy load cooking. Sound levels shall not exceed an NC rating of 55. Baffle or slot type extractors shall not be used.
- .5 Air shall be introduced through a special discharge panel and shall not exceed 15% of the calculated exhaust air flow. The discharge velocity will be a minimum of 1500 FPM. Slot type discharge shall not be used. Suction only (exhaust only) systems not meeting the face velocity of this at design exhaust volumes shall not be approved. This air increases the capture efficiency of smoke and contaminated air at both the face and sides of the hood by increasing the face velocity of the hood.
- .6 The air flows through the grease extractors and the supplemental air chamber are to be determined through the integral testing and balancing ports mounted in the hood. The airflows are to be determined by the pressure vs. Airflow curves supplied by the Halton Company.
- .7 The hood shall include an approved automatic fire control system. Submit manufactures data and shop drawings to the consultant for approval. Any system used shall comply with and be approved by all applicable codes.
- .8 The hood and all components shall meet the approval and bear the label of the National Sanitation Foundation. All electrical components and other equipment shall comply with applicable local codes. The installation shall be in accordance with the manufacturer's recommendations and conform to NFPA-96 guidelines and all applicable local codes. The size shall be as indicated on drawings and/or equipment schedule.
- .9 All hood wiring, exhaust and supply fan control shall be by the General Contractor. Hood controls shall be pre-wired and assembled ready for connection to hood and fire extinguishing system by the General Contractor.
- .10 The General Contractor shall provide 24 hour uninterrupted power source and inter wiring between hoods, control panels, fans and fire suppression system.
- .11 Provide the specified number of fluorescent fixtures with lamps and approved by all applicable codes. The lights are to be wired to junction box by the General Contractor. The General Contractor shall supply and install all required hood light switches.
- .12 Hood manufacturer to provide 18 Ga. S/S duct collar running from the top of the hood and terminated 76 mm (3") above the hood body. All duct connections shall be fully welded to the hood by the General Contractor.
- .13 The exhaust fan will be supplied by the General Contractor and will be backward inclined, non overloading centrifugal type, U.L. 762 for grease removal. The fan will be in compliance with the hood manufacturer's

requirements and specifications requiring hood duct collar and duct work static pressure levels and minimum duct air velocities. The wheel shall be backward inclined, statically and dynamically balanced. Fan shall include a grease drain. Motor and drives shall be isolated from the exhaust air stream. Fan shall bear AMCA certified ratings for air and sound.

2.12.1 CONDENSATE HOODS

- .1 Fabricate hoods of 1.25 mm stainless steel type 304, No. 4 finish with joints and seams fully welded and liquid tight.
- .2 Provide removable s.s. condensate baffles.
- .3 Duct collars shall be 1.6 mm stainless steel all welded c/w 25 mm flanged perimeter connection.
- .4 Provide 13mm s.s. condensate drain coupling and condensate trough.
- .5 Stainless steel removable enclosure panels shall be provided from top of condensate hoods to underside of finished ceilings.
- .6 Support and hang condensate hoods by means of mild steel threaded rod, secured to structural ceiling member. Utilize turn-buckles to ensure a plumb and level installation, ready for duct connection.

2.13 FIRE SUPPRESSION SYSTEM

- .1 Pre-piped in the exhaust hood manufacturer's plant, allowing concealment of most of the piping. Nozzles and exposed piping are sleeved in stainless steel or chrome plated. Piping between the hoods and fire suppression cylinder is the responsibility of the kitchen equipment contractor. Mount the wet chemical cylinder and control head within the enclosure. Allow for concealment of all piping and conduit
- .2 Manual pull stations to be located near the exit to kitchen per local code requirements.
- .3 Engineering and installation requirements per the ULC, UL, NFPA codes, and all local codes. The systems shall be sized and designed per the appliance layout drawings and specification. The systems shall protect the appliances, hood duct collars, hood plenums and other items as required by codes.
- .4 General Contractor to install mechanical gas valve supplied by the kitchen equipment contractor.

- .5 General Contractor to interlock the wet chemical control head to the building fire alarm systems, interlock shunt trip to the wet chemical control head and supply and install shunt trips for each appliance line-up to shut off electrical cooking equipment in the event of a fire.
- .6 The fire suppression system shall be a Pyrochem, Ansul, or Range Guard liquid agent type operated with a fixed nozzle distribution network.
- .7 Discharge nozzles shall be tested and listed with the restaurant systems for the equipment specific applications and discharge nozzles shall be bras or chrome plated and stamped with a part number and flow rating. All nozzles shall be equipped with grease cups and soft pliable silicone.
- .8 The suppression system release mechanism shall be the spring loaded mechanical type capable of providing the expellent gas to the agent tanks and the mechanism shall have a visual indicator of the cocked for fired condition without having to open enclosure. The detection system shall be selected and installed in accordance with the operating temperatures in the ventilation system. The detection system shall contain fusible links, complete with brackets and linkage assemblies, connecting conduit and die cast pulleys with cables.
- .9 The systems shall be interlocked to a ULC listed electric snap action switch supplied and installed by the General Contractor to sound alarm when systems is activated.

2.14 ITEMIZED EQUIPMENT SPECIFICATIONS

- .1 The following numbers correspond to those on the Foodservice Equipment Drawings.
- .2 Where a manufacturer's name and model number is indicated, the item shall be supplied with all standard components, features and materials whether specifically identified or not, and shall be considered inherent in this specification.
- .3 Items identified as custom fabricated shall be constructed of stainless steel unless otherwise specified. Refer to detail drawings at the end of this section for general fabrication methods for all items.
- .4 Verify mechanical and electrical services on existing equipment to be reused. Include in bid all modifications or adjustments to this equipment which are necessary to meet the mechanical and electrical services as shown on plans and specifications.
- .5 Mechanical and electrical characteristics of existing equipment indicated in the schedules are from manufacturers published literature sheets. These are to be considered nominal, or a guide only. Actual mechanical and electrical characteristics of existing equipment must be confirmed by the Foodservice Equipment Sub-contractor.
- .6 Relocate all existing equipment to be reused.
- .7 Visit the existing site to fully examine the scope of work related to the modification and/or refurbishing of existing equipment to be reused.
- .8 Approved alternative manufactures must supply a product that is equal in performance to the specified item.

.9 Itemized Specification – Georgetown Distric High School, MAIN
KITCHEN

ITEM NO. 1.001: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2260NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.002: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.003: DUNNAGE RACKS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.004: CART, UTILITY

Quantity: One (1) – by K.E.C.
Manufacturer: METRO or equivalent by RUBBERMAID
Model: MW106

Components:

- Manufacturer's standard components.

ITEM NO. 1.005: UTILITY TRUCK – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.006: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2260NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.007: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.008: DUNNAGE RACKS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.009: SPARE NUMBER

ITEM NO. 1.010: WALK-IN REFRIGERATOR

Quantity: One (1) – by K.E.C.
Nominal Size: 2,620mm wide x 2,950mm long x 2,438mm high
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Operating Temperature: +3 °C
Estimated Capacity: 2,200 kg
Product Type: Refrigerated raw foods

Components:

- 76mm thick prefabricated ULC listed insulated wall and ceiling panels.
- White baked enamel on all exposed interior and exterior surfaces.
- Galvanized steel on all unexposed surfaces.
- Wall panels fastened to floor screeds as per Section A-A & B-B on Drawing No. FS-200.
- One (1) left hand hinged door 914mm wide x 2135mm high complete with heated viewing window and 1220mm high stainless steel treadplate on both sides of door.
- Stainless steel sill plate below door.
- Heat tracing on three (3) sides of door.
- Locking hardware with safety release on door.
- One (1) 1220mm long fluorescent light fixtures with low temperature quick start ballast and low voltage on/off switch as per Details 321 and 322 on Drawing No. FS-500.
- 25mm x 200mm polyethylene bumpers on all walls as per Detail 302 on Drawing No. FS-500.
- Full length vertical trim, finish to match walk-in where walk-in banks to building wall.
- Removable enclosure panels, finish to match walk-in, from top of walk-in to underside of ceiling as required as per Detail 308 on Drawing No. FS-500.

Work By General Contractor:

- Continuous finished floor extended inside walk-in room.
- In-slab insulation complete with expansion joints and concrete topping as per section AA & BB on Drawing No. FS-200.

ITEM NO. 1.011: EVAPORATOR COIL

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by KYSOR WARREN
Model: KLP-209MA
Evaporator coil should be sized and balanced to match the compressors and should be capable of maintaining the specified temperature.

Components:

- Manufacturer's standard components.
- 120/60/1.
- External junction box.
- Air defrost timer.
- Complete with vapour proof disconnect switch and wiring to a junction box on top of room as per Detail 326 on Drawing FS-500.
- Complete with copper drain line and insulation as per Detail 329 on Drawing FS-400.

ITEM NO. 1.012: TEMPERATURE ALARM

Quantity: One (1) – by K.E.C.
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Model: Electronic temperature monitor and alarm.

Components:

- Manufacturer's standard components.
- Flush mounted in prefabricated panel.
- All electrical wiring runs in conduits.
- Working temperature range from -50°C to +50°C with a precision of $\pm 0.5^\circ\text{C}$.
- A rechargeable back-up battery Nickel-Hydride type.
- Three (3) hours lasting battery in a case of power failure.
- Hi-Lo temperature adjustable set points.
- Alarm sets points are lockable for unauthorized users.
- K.E.C. to run wiring from temperature alarm to a junction box located on top of room as per Detail 323 on Drawing FS-500.

ITEM NO. 1.013: CONDENSER REMOTE, AIR COOLED

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by KYSOR WARREN
Model: KESA010M6

Components:

- Manufacturer's standard components.
- 208-230/60/3.
- Factory pre-assembled compact suction cooled semi-hermetic compressor (no oil pump), heated and insulated receiver, sight glass, replaceable filter drier, replaceable suction line filter, suction accumulator and non-fused disconnect switch.
- Remotely installed air cooled units located on roof within 100ft as shown on Drawing No.FS-101. Provide weatherproof housing.
- Control wiring to evaporator coils, solenoids, time clock etc. as required by kitchen equipment contractor, refer to Detail 326.
- Mounted on support structure supplied and installed by General Contractor.
- Refrigeration piping secured to pre-cast concrete pavers. Concrete paver, roof cap sheets, pitch pocket and insulation by Roofing Sub-contractor/General Contractor.

ITEM NO. 1.014: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2260NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.015: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.016: DUNNAGE RACKS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.017: SPARE NUMBER

ITEM NO. 1.018: SPARE NUMBER

ITEM NO. 1.019: SPARE NUMBER

ITEM NO. 1.020: WALK-IN FREEZER

Quantity: One (1) – by K.E.C.
Nominal Size: 2,620mm wide x 2,950mm long x 2,438mm high
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Operating Temperature: - 21 °C
Estimated Capacity: 2,200 kg
Product Type: Frozen raw foods

Components:

- 76mm thick prefabricated ULC listed insulated wall and ceiling panels.
- White baked enamel on all exposed interior and exterior surfaces.
- Galvanized steel on all unexposed surfaces.
- Wall panels fastened to floor screeds as per Section A-A & B-B on Drawing No. FS-200.
- One (1) left hand hinged door 914mm wide x 2135mm high complete with heated viewing window and 1220mm high stainless steel treadplate on both sides of door.
- Stainless steel sill plate below door.
- Heat tracing on four (4) sides of door.
- Locking hardware with safety release on door.
- One (1) 1220mm long fluorescent light fixtures with low temperature quick start ballast and low voltage on/off switch as per Details 321 and 322 on Drawing No. FS-400.
- One (1) receptacle for drain line heater as per Detail 328 on Drawing No. FS-500.
- 25mm x 200mm polyethylene bumpers on all walls as per Detail 302 on Drawing No. FS-500.
- Full length vertical trim, finish to match walk-in where walk-in banks to building wall.
- Removable enclosure panels, finish to match walk-in, from top of walk-in to underside of ceiling as required as per Detail 308 on Drawing No. FS-500.

Work By General Contractor:

- Continuous finished floor extended inside walk-in room.
- In-slab insulation complete with expansion joints and concrete topping as per section AA & BB on Drawing No. FS-200.

ITEM NO. 1.021: EVAPORATOR COIL

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by NORBEC
Model: KLP-207LE

Evaporator coil should be sized and balanced to match the compressors and should be capable of maintaining the specified temperature.

Components:

- Manufacturer's standard components.
- KEC to remove existing evaporator coils and refrigeration system and replace with new system.
- 230/60/1.
- External junction box.
- Electric defrost timer.
- Complete with vapour proof disconnect switch and wiring to a junction box on top of room as per Detail 327 on Drawing No. FS-500.
- Complete with copper drain line, heat trace and insulation as per Detail 328 on Drawing FS-500.

ITEM NO. 1.022: TEMPERATURE ALARM

Quantity: One (1) – by K.E.C.
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Model: Electronic temperature monitor and alarm.

Components:

- Manufacturer's standard components.
- Flush mounted in prefabricated panel.
- All electrical wiring runs in conduits.
- Working temperature range from -50°C to +50°C with a precision of $\pm 0.5^\circ\text{C}$.
- A rechargeable back-up battery Nickel-Hydride type.
- Three (3) hours lasting battery in a case of power failure.
- Hi-Lo temperature adjustable set points.
- Alarm sets points are lockable for unauthorized users.
- K.E.C. to run wiring from temperature alarm to a junction box located on top of room as per Detail 323 on Drawing FS-500.

ITEM NO. 1.023: CONDENSER REMOTE, AIR COOLED

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by NORBEC
Model: KESA020L6

Components:

- Manufacturer's standard components.
- KEC to remove existing condensing unit and refrigeration system and replace with new system.
- 208-230/60/3.
- Factory pre-assembled compact suction cooled semi-hermetic compressor (no oil pump), heated and insulated receiver, sight glass, replaceable filter drier, replaceable suction line filter, suction accumulator and non-fused disconnect switch.
- Remotely installed air cooled units located on roof within 100ft as shown on Drawing No.FS-101. Provide weatherproof housing.
- Control wiring to evaporator coils, solenoids, time clock etc. as required by kitchen equipment contractor, refer to Detail 326.
- Mounted on support structure supplied and installed by General Contractor.
- Refrigeration piping secured to pre-cast concrete pavers. Concrete paver, roof cap sheets, pitch pocket and insulation by Roofing Sub-contractor/General Contractor.

ITEM NO. 1.024: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2260NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.025: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.026: DUNNAGE RACKS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.027: SPARE NUMBER

ITEM NO. 1.028: SPARE NUMBER

ITEM NO. 1.029: SPARE NUMBER

ITEM NO. 1.030: WALK-IN REFRIGERATOR

Quantity: One (1) – by K.E.C.
Nominal Size: 2,620mm wide x 2,700mm long x 2,438mm high
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Operating Temperature: +3 °C
Estimated Capacity: 2,200 kg
Product Type: Refrigerated raw foods

Components:

- 76mm thick prefabricated ULC listed insulated wall and ceiling panels.
- White baked enamel on all exposed interior and exterior surfaces.
- Galvanized steel on all unexposed surfaces.
- Wall panels fastened to floor screeds as per Section A-A & B-B on Drawing No. FS-200.
- One (1) left hand hinged door 914mm wide x 2135mm high complete with heated viewing window and 1220mm high stainless steel treadplate on both sides of door.
- Stainless steel sill plate below door.
- Heat tracing on three (3) sides of door.
- Locking hardware with safety release on door.
- One (1) 1220mm long fluorescent light fixtures with low temperature quick start ballast and low voltage on/off switch as per Details 321 and 322 on Drawing No. FS-500.
- 25mm x 200mm polyethylene bumpers on all walls as per Detail 302 on Drawing No. FS-500.
- Full length vertical trim, finish to match walk-in where walk-in banks to building wall.
- Removable enclosure panels, finish to match walk-in, from top of walk-in to underside of ceiling as required as per Detail 308 on Drawing No. FS-500.

Work By General Contractor:

- Continuous finished floor extended inside walk-in room.
- In-slab insulation complete with expansion joints and concrete topping as per section AA & BB on Drawing No. FS-200.

ITEM NO. 1.031: EVAPORATOR COIL

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by KYSOR WARREN
Model: KLP-209MA
Evaporator coil should be sized and balanced to match the compressors and should be capable of maintaining the specified temperature.

Components:

- Manufacturer's standard components.
- 120/60/1.
- External junction box.
- Air defrost timer.
- Complete with vapour proof disconnect switch and wiring to a junction box on top of room as per Detail 326 on Drawing FS-500.
- Complete with copper drain line and insulation as per Detail 329 on Drawing FS-400.

ITEM NO. 1.032: TEMPERATURE ALARM

Quantity: One (1) – by K.E.C.
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Model: Electronic temperature monitor and alarm.

Components:

- Manufacturer's standard components.
- Flush mounted in prefabricated panel.
- All electrical wiring runs in conduits.
- Working temperature range from -50°C to +50°C with a precision of $\pm 0.5^\circ\text{C}$.
- A rechargeable back-up battery Nickel-Hydride type.
- Three (3) hours lasting battery in a case of power failure.
- Hi-Lo temperature adjustable set points.
- Alarm sets points are lockable for unauthorized users.
- K.E.C. to run wiring from temperature alarm to a junction box located on top of room as per Detail 323 on Drawing FS-500.

ITEM NO. 1.033: CONDENSER REMOTE, AIR COOLED

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by KYSOR WARREN
Model: KESA010M6

Components:

- Manufacturer's standard components.
- 208-230/60/3.
- Factory pre-assembled compact suction cooled semi-hermetic compressor (no oil pump), heated and insulated receiver, sight glass, replaceable filter drier, replaceable suction line filter, suction accumulator and non-fused disconnect switch.
- Remotely installed air cooled units located on roof within 100ft as shown on Drawing No.FS-101. Provide weatherproof housing.
- Control wiring to evaporator coils, solenoids, time clock etc. as required by kitchen equipment contractor, refer to Detail 326.
- Mounted on support structure supplied and installed by General Contractor.
- Refrigeration piping secured to pre-cast concrete pavers. Concrete paver, roof cap sheets, pitch pocket and insulation by Roofing Sub-contractor/General Contractor.

ITEM NO. 1.034: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.035: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.036: DUNNAGE RACKS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.037: SPARE NUMBER

ITEM NO. 1.038: SPARE NUMBER

ITEM NO. 1.039: SPARE NUMBER

ITEM NO. 1.040: WALK-IN FREEZER

Quantity: One (1) – by K.E.C.
Nominal Size: 2,620mm wide x 2,700mm long x 2,438mm high
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Operating Temperature: - 21 °C
Estimated Capacity: 2,200 kg
Product Type: Frozen raw foods

Components:

- 76mm thick prefabricated ULC listed insulated wall and ceiling panels.
- White baked enamel on all exposed interior and exterior surfaces.
- Galvanized steel on all unexposed surfaces.
- Wall panels fastened to floor screeds as per Section A-A & B-B on Drawing No. FS-200.
- One (1) left hand hinged door 914mm wide x 2135mm high complete with heated viewing window and 1220mm high stainless steel treadplate on both sides of door.
- Stainless steel sill plate below door.
- Heat tracing on four (4) sides of door.
- Locking hardware with safety release on door.
- One (1) 1220mm long fluorescent light fixtures with low temperature quick start ballast and low voltage on/off switch as per Details 321 and 322 on Drawing No. FS-400.
- One (1) receptacle for drain line heater as per Detail 328 on Drawing No. FS-500.
- 25mm x 200mm polyethylene bumpers on all walls as per Detail 302 on Drawing No. FS-500.
- Full length vertical trim, finish to match walk-in where walk-in banks to building wall.
- Removable enclosure panels, finish to match walk-in, from top of walk-in to underside of ceiling as required as per Detail 308 on Drawing No. FS-500.

Work By General Contractor:

- Continuous finished floor extended inside walk-in room.
- In-slab insulation complete with expansion joints and concrete topping as per section AA & BB on Drawing No. FS-200.

ITEM NO. 1.041: EVAPORATOR COIL

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by NORBEC
Model: KLP-207LE

Evaporator coil should be sized and balanced to match the compressors and should be capable of maintaining the specified temperature.

Components:

- Manufacturer's standard components.
- KEC to remove existing evaporator coils and refrigeration system and replace with new system.
- 230/60/1.
- External junction box.
- Electric defrost timer.
- Complete with vapour proof disconnect switch and wiring to a junction box on top of room as per Detail 327 on Drawing No. FS-500.
- Complete with copper drain line, heat trace and insulation as per Detail 328 on Drawing FS-500.

ITEM NO. 1.042: TEMPERATURE ALARM

Quantity: One (1) – by K.E.C.
Manufacturer: CURTIS or equivalent by KYSOR WARREN
Model: Electronic temperature monitor and alarm.

Components:

- Manufacturer's standard components.
- Flush mounted in prefabricated panel.
- All electrical wiring runs in conduits.
- Working temperature range from -50°C to +50°C with a precision of $\pm 0.5^\circ\text{C}$.
- A rechargeable back-up battery Nickel-Hydride type.
- Three (3) hours lasting battery in a case of power failure.
- Hi-Lo temperature adjustable set points.
- Alarm sets points are lockable for unauthorized users.
- K.E.C. to run wiring from temperature alarm to a junction box located on top of room as per Detail 323 on Drawing FS-500.

ITEM NO. 1.043: CONDENSER REMOTE, AIR COOLED

Quantity: One (1) – by K.E.C.
Manufacturer: KEEPRITE or equivalent by NORBEC
Model: KESA020L6

Components:

- Manufacturer's standard components.
- KEC to remove existing condensing unit and refrigeration system and replace with new system.
- 208-230/60/3.
- Factory pre-assembled compact suction cooled semi-hermetic compressor (no oil pump), heated and insulated receiver, sight glass, replaceable filter drier, replaceable suction line filter, suction accumulator and non-fused disconnect switch.
- Remotely installed air cooled units located on roof within 100ft as shown on Drawing No.FS-101. Provide weatherproof housing.
- Control wiring to evaporator coils, solenoids, time clock etc. as required by kitchen equipment contractor, refer to Detail 326.
- Mounted on support structure supplied and installed by General Contractor.
- Refrigeration piping secured to pre-cast concrete pavers. Concrete paver, roof cap sheets, pitch pocket and insulation by Roofing Sub-contractor/General Contractor.

ITEM NO. 1.044: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2260NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.045: MOBILE SHELVING UNIT

Quantity: Two (2) – by K.E.C.
Manufacturer: METRO or equivalent by others
Model: Metro MaxQ

Components:

- Manufacturer's standard components.
- Four (4) 2248NK3 shelves.
- Four (4) 63UPK3 posts.
- Four (4) 5MPB all swivel casters.
- Metroseal 3 shelving with Microban coating.

ITEM NO. 1.046: DUNNAGE RACKS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.047: SPARE NUMBER

ITEM NO. 1.048: SPARE NUMBER

ITEM NO. 1.049: SPARE NUMBER

ITEM NO. 1.050: S.S. POT WASH TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,800mm long x 2,350mm long x 762mm wide x 914mmhigh
Type: Custom fabricated S.S. construction in accordance with the Specification for this section

Components:

- 14ga S.S. top with dished and rolled edges as per Detail 401.
- Edge on right side to suit dishwasher.
- Three (3) 610mm wide x 406mm deep sinks complete with one (1) splash mount mixer faucets, swing spouts and S.S. apron.
- One (1) deck mount pre-rinse faucet Encore model, complete with K50Y-500 swivel arm support, K55-7012 add-on faucet and all attachments including wall brackets.
- Full length 300mm high x 100mm wide integral splash at back.
- Full length 300mm high x 50mm wide integral splash at left and right side.
- Leg and brace sets as required.
- Open sections for waste receptacles.
- Open sections under sinks.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation A&B on drawing FS-300.

ITEM NO. 1.051: WASTE RECEPTACLE W/DOLLY

Quantity: Two (2) – by k.e.c.
Manufacturer: RUBBERMAID
Model: 2620/2640

Components:

- Manufacturer's standard components.
- Capacity 20 gallons (75.7 litres).
- Complete with 2640 dolly.
- All plastic, professional grade construction.
- Built-in handles and double ribbed base.
- Colour - Blue.

ITEM NO. 1.052: POT RACK, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: ADVANCED TABCO or equivalent by CUSTOM FABRICATED
Model: GW1-48

Components:

- Manufacturer's standard components.

ITEM NO. 1.053: CONDENSATE HOOD

Quantity: One (1) – by k.e.c.
Manufacturer: SPRING AIR or equivalent by HALTON
Model: SAN-C-3.25/3.25

Components:

- Manufacturer's standard components.
- 911mm long x 911mm wide.
- Complete with enclosure panels from top of hood to finished ceiling.
- Hood to be hung to allow for door of dish machine to open fully.

ITEM NO. 1.054: WAREWASHER, DOOR TYPE

Quantity: One (1) – by k.e.c.
Manufacturer: MEIKO or equivalent by HOBART
Model: DV 120.2

Components:

- Manufacturer's standard components.
- Higher than standard chamber.
- Straight through installation as per drawing.
- 208-230/60/3 single point electric connection.
- Provide contacts for rooftop exhaust fan control.
- Two (2) peg racks.
- Two (2) open racks.
- 140 degree incoming water temperature.
- 19mm hot water dishwasher connection.
- 19mm drain outlets for dishwasher.

ITEM NO. 1.055: WASTE RECEPTACLE W/DOLLY

Quantity: Two (2) – by k.e.c.
Manufacturer: RUBBERMAID
Model: 2620/2640

Components:

- Manufacturer's standard components.
- Capacity 20 gallons (75.7 litres).
- Complete with 2640 dolly.
- All plastic, professional grade construction.
- Built-in handles and double ribbed base.
- Colour - grey.

ITEM NO. 1.056: POT RACK, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: ADVANCED TABCO or equivalent by CUSTOM FABRICATED
Model: GW1-48

Components:

- Manufacturer's standard components.

ITEM NO. 1.057: S.S. POT WASH TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,710mm long x 2,190mm long x 762mm wide x 914mmhigh
Type: Custom fabricated S.S. construction in accordance with the Specification for this section

Components:

- 14ga S.S. top with dished and rolled edges as per Detail 401.
- Edge on left side to suit dishwasher.
- Three (3) 610mm wide x 406mm deep sinks complete with one (1) splash mount mixer faucets, swing spouts and S.S. apron.
- One (1) deck mount pre-rinse faucet Encore model, complete with K50Y-500 swivel arm support, K55-7012 add-on faucet and all attachments including wall brackets.
- Full length 300mm high x 100mm wide integral splash at back.
- Full length 300mm high x 50mm wide integral splash at left and right side.
- Leg and brace sets as required.
- Open sections for waste receptacles.
- Open sections under sinks.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation B&C on drawing FS-300.

ITEM NO. 1.058: SPARE NUMBER

ITEM NO. 1.059: SPARE NUMBER

ITEM NO. 1.060: POT FILLER – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.061: RANGE, RESTAURANT, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: G36-6R

Components:

- Manufacturer's standard components.
- S.S. sides.
- 6" levelling swivel casters with front brakes.
- Low profile 238mm backguard stainless steel front and sides.
- Rear gas connection.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.062: RANGE, RESTAURANT, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: G36-6R

Components:

- Manufacturer's standard components.
- S.S. sides.
- 6" levelling swivel casters with front brakes.
- Low profile 238mm backguard stainless steel front and sides.
- Rear gas connection.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.063: SALAMANDER BROILER, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: MIR-34C

Components:

- Manufacturer's standard components.
- Stainless steel main top.
- Brackets for wall mounting, and stainless steel bottom with heat shield.

ITEM NO. 1.064: OVEN, CONVECTION, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent BLODGETT
Model: MCO-GS-20-S

Components:

- Manufacturer's standard components.
- Stainless steel oven interior.
- 4" low profile casters with front brakes.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.065: OVEN, CONVECTION, GAS– NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.066: EXHAUST VENTILATOR

Quantity: One (1) comprised of two (2) sections – by k.e.c.
Manufacturer: SPRING AIR
Model: FCD-B-MP-9/3.92 and FCD-B-MP-8.50/3.92

Components:

- Manufacturer's standard components.
- Nominal size: 5334mm (one section at 2743mm and one section at 2591mm) x 1195mm wide x 610mm high.
- Refer to details shown on Drawing No. FS-400 to FS-403.
- Dry grease extractor type exhaust ventilator.
- UL/ULC listed and CGA approved with field adjustable variflow baffles.
- Built according to NFPA-96 standards.
- 18 ga. s.s. construction on all exposed surfaces.
- Full length inlet slot and centrifugal vortex chamber, variflow baffles and fire damper blades, bushings and edge seals fully accessible through front removable doors within the ventilator canopy.
- Model "D" butterfly type arrangement exhaust fire damper, constructed of s.s. with blade and edge seals.
- Fire damper activated by a fusable link.
- Fluorescent lights as per drawings FS-400 to FS-403.
- Duct collar as noted on drawing FS-400 to FS-403.
- Complete with s.s. removable enclosure panels from top of ventilator to underside of finished ceiling on all exposed sides.
- Complete with Spring Air supplied wet chemical surface and duct fire suppression system installed in accordance with NFPA-17A as specified with Item No. 1.067.

Typical Work By Other Trades:

Division 16 to provide power to fluorescent light inside of ventilator and interconnect light to wall switch (wall switch to be supplied, installed and wired by Division 16).

ITEM NO. 1.067: EXHAUST VENTILATOR CONTROL PANEL AND FIRE PROTECTION SYSTEM

Quantity: One (1) – by k.e.c.
Manufacturer: SPRING AIR
Model: WC-34-MW

Components:

- Manufacturer's standard components.
- ULC listed and CSA approved.
- S.S. control panel surface mounted on wall. Provide s.s. service chase from top of panel to underside of ceiling to enclose mechanical and electrical service from ceiling.
- Control panel to contain electrical circuits, relays that will operate the exhaust fan, make-up air system, fire suppression system, shunt switch, gas valve and remote pull station .
- Control panel to contain an electronic circuit for interconnection to the main building alarm panel.
- ULC listed wet chemical fire suppression system with
- Wet chemical cylinders.
- All necessary fire suppression system piping.
- DPDT Micro Switch
- One type K fire extinguisher (Item 1.067A on drawing FS-100)
- Refer to details shown on Drawing no. FS-400 to FS-403.

Typical Work By Other Trades:

Division 16 to provide and install shunt trip so as to shut down power and fuel to all cooking appliances in the event of a fire.

ITEM NO. 1.068: EXHAUST VENTILATOR

Quantity: One (1) comprised of two (2) sections – by k.e.c.
Manufacturer: SPRING AIR
Model: FCD-B-MP-10.50/3.92 and FCD-B-MP-7/3.92

Components:

- Manufacturer's standard components.
- Nominal size: 5334mm (one section at 3200mm and one section at 2133mm) x 1195mm wide x 610mm high.
- Refer to details shown on Drawing No. FS-400 to FS-403.
- Dry grease extractor type exhaust ventilator.
- UL/ULC listed and CGA approved with field adjustable variflow baffles.
- Built according to NFPA-96 standards.
- 18 ga. s.s. construction on all exposed surfaces.
- Full length inlet slot and centrifugal vortex chamber, variflow baffles and fire damper blades, bushings and edge seals fully accessible through front removable doors within the ventilator canopy.
- Model "D" butterfly type arrangement exhaust fire damper, constructed of s.s. with blade and edge seals.
- Fire damper activated by a fusable link.
- Fluorescent lights as per drawings FS-400 to FS-403.
- Duct collar as noted on drawing FS-400 to FS-403.
- Complete with s.s. removable enclosure panels from top of ventilator to underside of finished ceiling on all exposed sides.
- Complete with Spring Air supplied wet chemical surface and duct fire suppression system installed in accordance with NFPA-17A as specified with Item No. 1.067.

Typical Work By Other Trades:

Division 16 to provide power to fluorescent light inside of ventilator and interconnect light to wall switch (wall switch to be supplied, installed and wired by Division 16).

ITEM NO. 1.069: S.S. WORK TABLE

Quantity: One (1) – by k.e.c.
Nominal size: 2083mm long x 762mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 gauge s.s. top with boxed edges as per Detail SD 401 on drawing FS-500.
- Full length 150mm high x 50mm wide integral splash at back.
- Four (4) legs.
- Full length s.s. solid undershelf.
- One (1) drawer as per Detail SD 407 on drawing FS-500.
- Refer to Elevation D on Drawing No. FS-300.

ITEM NO. 1.070: FRYER

Quantity: Two (2) – by K.E.C.
Manufacturer: GARLAND or equivalent PITCO
Model: M35SS

Components:

- Manufacturer's standard components.
- S.S. rear.
- Gas connection from 1.071.
- Equipment to be banked with 1.070 and 1.071 – common front rail and 10" back guard.
- S.S. frypot cover.
- S.S. fish plate.
- Swivel casters with front brakes.

ITEM NO. 1.071: SPREADER

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: M17ES

Components:

- Manufacturer's standard components.
- S.S. rear and right.
- Equipment to be banked with 1.070 and 1.071 – common front rail and 10" back guard.
- Swivel casters with front brakes.
- Rear gas connection.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters.

ITEM NO. 1.072: POT FILLER – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.073: RANGE, RESTAURANT, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: G36-6R

Components:

- Manufacturer's standard components.
- S.S. sides.
- 6" levelling swivel casters with front brakes.
- Low profile 238mm backguard stainless steel front and sides.
- Rear gas connection.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.074: RANGE, RESTAURANT, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: G36-6R

Components:

- Manufacturer's standard components.
- S.S. sides.
- 6" levelling swivel casters with front brakes.
- Low profile 238mm backguard stainless steel front and sides.
- Rear gas connection.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.075: SALAMANDER BROILER, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: MIR-34C

Components:

- Manufacturer's standard components.
- Stainless steel main top.
- Brackets for wall mounting, and stainless steel bottom with heat shield.

ITEM NO. 1.076: GRIDDLE, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: GD-24GTH

Components:

- Manufacturer's standard components.
- Stainless steel sides.
- Stainless steel back and bottom.
- CS24 Stand complete with casters.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.077: GRIDDLE, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: GD-24GTH

Components:

- Manufacturer's standard components.
- Stainless steel sides.
- Stainless steel back and bottom.
- CS24 Stand complete with casters.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.078: BROILER, OVER-FIRED/GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: M100XRM

Components:

- Manufacturer's standard components.
- Stainless steel sides.
- Stainless steel main back.
- 19mm rear gas connection.
- End caps and covers.
- Swivel casters w/front brakes.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.079: SPARE NUMBER

ITEM NO. 1.080: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- One (1) 406mm wide x 508mm long x 305mm deep sinks complete with deck mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- S.S. solid under shelf c.w. 12 ga. Reinforcement below the rest of the table.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- One (1) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation F on drawing FS-300.

ITEM NO. 1.081: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation F on drawing FS-300.

ITEM NO. 1.082: SPARE NUMBER

ITEM NO. 1.083: SPARE NUMBER

ITEM NO. 1.084: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation G on drawing FS-300.

ITEM NO. 1.085: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- One (1) 208/60/1 junction boxes for item 1.087, final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation G on drawing FS-300.

ITEM NO. 1.086: SCALE, PORTION

Quantity: Six (6) – by k.e.c.
Manufacturer: GLOBE or equivalent by EDLUND
Model: GPS15

Components:

- Manufacturer's standard components.
- Complete with batteries.

ITEM NO. 1.087: MIXER, FLOOR

Quantity: One (1) – by k.e.c.
Manufacturer: HOBART or equivalent by GLOBE
Model: HL400

Components:

- Manufacturer's standard components.
- Standard accessory package.
- 208/60/1 power

ITEM NO. 1.088: SPARE NUMBER

ITEM NO. 1.089: SPARE NUMBER

ITEM NO. 1.090: MIXER, FLOOR

Quantity: One (1) – by k.e.c.
Manufacturer: HOBART or equivalent by GLOBE
Model: HL600

Components:

- Manufacturer's standard components.
- Standard accessory package.
- 208/60/3 power

ITEM NO. 1.091: SCALE, PORTION

Quantity: One (1) – by k.e.c.
Manufacturer: GLOBE or equivalent by EDLUND
Model: GPS15

Components:

- Manufacturer's standard components.
- Complete with batteries.

ITEM NO. 1.092: DEMO TABLE W/OVERHEAD MIRROR

Quantity: One (1) – by k.e.c.
Manufacturer: ADVANCED TABCO or equivalent by CUSTOM FABRICATED
Model: VSS-DT-366

Components:

- Manufacturer's standard components.
- K.E.C. to mount two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- K.E.C. to mount one (1) 208/60/3 junction boxes for item 1.090, final connection by electrical division.

ITEM NO. 1.093: BIN, INGREDIENT

Quantity: Three (3) – by k.e.c.
Manufacturer: CAMBRO or equivalent by RUBBERMAID
Model: IB27

Components:

- Manufacturer's standard components.

ITEM NO. 1.094: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 1,700mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- Full length 150mm high x 50mm wide integral splash at back.
- One (1) 406mm wide x 508mm long x 305mm deep sinks complete with splash mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- Open sections for waste receptacles.
- Leg and brace sets as required.
- Fabricator to dimension site.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation H on drawing FS-300.

ITEM NO. 1.095: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 3,000mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with boxed edges as per Detail 401.
- Full length 150mm high x 50mm wide integral splash at back and side.
- Leg and brace sets as required.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Provide three drawers unit as per detail 407.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation H&I on drawing FS-300.

ITEM NO. 1.096: MIXER, COUNTER

Quantity: Five (5) – by k.e.c.
Manufacturer: HOBART or equivalent by GLOBE
Model: N50

Components:

- Manufacturer's standard components.
- Stainless steel bowl.
- "B" flat beater.
- S.S. "B" flat beater.
- "D" wire whip.
- "E" dough hook

ITEM NO. 1.097: SINK, HAND, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: EAGLE or equivalent by TARRISON
Model: HAS-10-FDPS

Components:

- Manufacturer's standard components.

ITEM NO. 1.098: SPARE NUMBER

ITEM NO. 1.099: SPARE NUMBER

ITEM NO. 1.100: SINK, HAND, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: EAGLE or equivalent by TARRISON
Model: HAS-10-FDPS

Components:

- Manufacturer's standard components.

ITEM NO. 1.101: DISH RACK WALL MOUNT – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.102: WASTE BINS – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.103: S.S. POT WASH TABLE – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.104: CONDENSATE HOOD – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.105: WAREWASHER, DOOR TYPE – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.106: S.S. CLEAN DISH TABLE – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.107: POT RACK, WALL MOUNT – NOT IN CONTRACT

Quantity: One (1) – FUTURE ITEM

ITEM NO. 1.108: SPARE NUMBER

ITEM NO. 1.109: SPARE NUMBER

ITEM NO. 1.110: WASHING MACHINE – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.111: DRYER – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.112: LINEN STORAGE CABINET – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.113: DESK – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.114: COMPUTER – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.115: PHONE – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.116: FILE CABINET – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.117: FIRST AID KIT – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 1.118: SPARE NUMBER

ITEM NO. 1.119: ICE MAKER

Quantity: One (1) – by K.E.C.
Manufacturer: MANITOWOC or equal by HOSHIZAKI
Model: QW45

Components:

- Manufacturer's standard components.
- Complete with water filter system (Item 1.119A on FS-100).

ITEM NO. 1.120: SINK, HAND, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: EAGLE or equivalent by TARRISON
Model: HAS-10-FDPS

Components:

- Manufacturer's standard components.

ITEM NO. 1.121: EXHAUST VENTILATOR

Quantity: One (1) – by k.e.c.
Manufacturer: SPRING AIR
Model: FCD-B-MP-15/4.5

Components:

- Manufacturer's standard components.
- Nominal size: 4572mm x 1372mm wide x 610mm high.
- Refer to details shown on Drawing No. FS-400 to FS-403.
- Dry grease extractor type exhaust ventilator.
- UL/ULC listed and CGA approved with field adjustable variflow baffles.
- Built according to NFPA-96 standards.
- 18 ga. s.s. construction on all exposed surfaces.
- Full length inlet slot and centrifugal vortex chamber, variflow baffles and fire damper blades, bushings and edge seals fully accessible through front removable doors within the ventilator canopy.
- Model "D" butterfly type arrangement exhaust fire damper, constructed of s.s. with blade and edge seals.
- Fire damper activated by a fusable link.
- Fluorescent lights as per drawings FS-400 to FS-403.
- Duct collar as noted on drawing FS-400 to FS-403.
- Complete with s.s. removable enclosure panels from top of ventilator to underside of finished ceiling on all exposed sides.
- Complete with Spring Air supplied wet chemical surface and duct fire suppression system installed in accordance with NFPA-17A as specified with Item No. 1.126.

Typical Work By Other Trades:

Division 16 to provide power to fluorescent light inside of ventilator and interconnect light to wall switch (wall switch to be supplied, installed and wired by Division 16).

ITEM NO. 1.122: OVEN, CONVECTION, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent BLODGETT
Model: MCO-GS-20-S

Components:

- Manufacturer's standard components.
- Stainless steel oven interior.
- 4" low profile casters with front brakes.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 1.123: TILT SKILLET

Quantity: One (1) – by K.E.C.
Manufacturer: CLEVELAND or equivalent
Model: SGL-40-TR

Components:

- Manufacturer's standard components.
- Power tilt.
- Food strainer.
- Vegetable steamers
- Poaching pan.
- Sliding drain drawer with splash screen.
- Faucet mounting bracket.
- Hot and cold water pre-rinse spray head with hose.

ITEM NO. 1.124: KETTLE

Quantity: One (1) – by K.E.C.
Manufacturer: CLEVELAND or equivalent
Model: KGL-60-T

Components:

- Manufacturer's standard components.
- Kettle markings.
- Kettle accessory kit with CB, KW, DB, KP, KB AND KL.
- Spring assisted lid.
- Faucet mounting bracket.
- Heat deflector shield.
- 3" tangent draw-off valve with drain strainer.
- Food strainer.
- Hot and cold water faucet with swing spout.

ITEM NO. 1.125: S.S. FLOOR PAN

Quantity: One (1) – by K.E.C.
Nominal Size: Unit to be 2,620 mm long x 940mm wide x 150mm deep.
Type: Custom fabricated stainless steel construction in accordance
With the specification for this section.

Components:

- Honeycomb grating.
- Complete with One (1) 75mm drain tailpiece ready for final connection by Division 15.
- Fabricator to verify dimensions on-site prior to fabrication.

ITEM NO. 1.126: EXHAUST VENTILATOR CONTROL PANEL AND FIRE PROTECTION SYSTEM

Quantity: One (1) – by k.e.c.
Manufacturer: SPRING AIR
Model: WC-25-MW

Components:

- Manufacturer's standard components.
- ULC listed and CSA approved.
- S.S. control panel surface mounted on wall. Provide s.s. service chase from top of panel to underside of ceiling to enclose mechanical and electrical service from ceiling.
- Control panel to contain electrical circuits, relays that will operate the exhaust fan, make-up air system, fire suppression system, shunt switch, gas valve and remote pull station .
- Control panel to contain an electronic circuit for interconnection to the main building alarm panel.
- ULC listed wet chemical fire suppression system with
- Wet chemical cylinders.
- All necessary fire suppression system piping.
- DPDT Micro Switch
- Two type K fire extinguisher (Item 1.126A on drawing FS-100)
- Refer to details shown on Drawing no. FS-400 to FS-403.

Typical Work By Other Trades:

Division 16 to provide and install shunt trip so as to shut down power and fuel to all cooking appliances in the event of a fire.

ITEM NO. 1.127: SPARE NUMBER

ITEM NO. 1.128: SPARE NUMBER

ITEM NO. 1.129: SPARE NUMBER

ITEM NO. 1.130: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with boxed edges as per Detail 401.
- Full length 100mm high x 50mm wide integral splash at back and side.
- Leg and brace sets as required, provide a 75mm space from the architectural wall and the rear leg and bracing.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Provide three drawers unit as per detail 407.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation K on drawing FS-300.

ITEM NO. 1.131: CUTTER/MIXER, VERTICAL

Quantity: One (1) – by K.E.C.
Manufacturer: ROBOT COUPE or equivalent by HOBART
Model: R6VN

Components:

- Manufacturer's standard components.
- Free standing plate rack R 476.
- 32 additional processing plates.

ITEM NO. 1.132: MIXER/BLENDER

Quantity: One (1) – by K.E.C.
Manufacturer: ROBOT COUPE or equivalent by HOBART
Model: BLIXER 3

Components:

- Manufacturer's standard components.

ITEM NO. 1.133: WASTE RECEPTACLE W/DOLLY

Quantity: One (1) – by k.e.c.
Manufacturer: RUBBERMAID
Model: 2620/2640

Components:

- Manufacturer's standard components.
- Capacity 20 gallons (75.7 litres).
- Complete with 2640 dolly.
- All plastic, professional grade construction.
- Built-in handles and double ribbed base.
- Colour - Grey.

ITEM NO. 1.134: MIXER/BLENDER

Quantity: One (1) – by K.E.C.
Manufacturer: ROBOT COUPE or equivalent by HOBART
Model: MP 170 V.V

Components:

- Manufacturer's standard components.

ITEM NO. 1.135: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 2,300mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- Full length 100mm high x 50mm wide integral splash at back.
- Two (2) 406mm wide x 508mm long x 305mm deep sinks complete with splash mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- Open sections for waste receptacles.
- Leg and brace sets as required, provide a 75m0 space from the architectural wall and the rear leg and bracing.
- Fabricator to dimension site.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation K on drawing FS-300.

ITEM NO. 1.136: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 2,300mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- Full length 100mm high x 50mm wide integral splash at back.
- Two (2) 406mm wide x 508mm long x 305mm deep sinks complete with splash mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- Open sections for waste receptacles.
- Leg and brace sets as required, provide a 75m0 space from the architectural wall and the rear leg and bracing.
- Fabricator to dimension site.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation K on drawing FS-300.

ITEM NO. 1.137: WASTE RECEPTACLE W/DOLLY

Quantity: One (1) – by k.e.c.
Manufacturer: RUBBERMAID
Model: 2620/2640

Components:

- Manufacturer's standard components.
- Capacity 20 gallons (75.7 litres).
- Complete with 2640 dolly.
- All plastic, professional grade construction.
- Built-in handles and double ribbed base.
- Colour - Grey.

ITEM NO. 1.138: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with boxed edges as per Detail 401.
- Full length 100mm high x 50mm wide integral splash at back and side.
- Leg and brace sets as required, provide a 75mm space from the architectural wall and the rear leg and bracing.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Provide three drawers unit as per detail 407.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation K on drawing FS-300.

ITEM NO. 1.139: SPARE NUMBER

ITEM NO. 1.140: SINK, HAND, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: EAGLE or equivalent by TARRISON
Model: HAS-10-FDPS

Components:

- Manufacturer's standard components.

ITEM NO. 1.141: STAND, EQUIPMENT

Quantity: One (1) –by K.E.C.
Nominal size: 690mm long x 815mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with boxed edges as per Detail 401.
- Leg and brace sets as required.
- Four (4) casters – two (2) with brakes.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Refer to Elevation L on drawing FS-300.

ITEM NO. 1.142: SLICER

Quantity: One (1) – by K.E.C.
Manufacturer: HOBART or equivalent by GLOBE
Model: 2612

Components:

- Manufacturer's standard components.
- Product tray.
- Food chute.

ITEM NO. 1.143: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- One (1) 406mm wide x 508mm long x 305mm deep sinks complete with deck mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- S.S. solid under shelf c.w. 12 ga. Reinforcement below the rest of the table.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- One (1) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation L on drawing FS-300.

ITEM NO. 1.144: SCALE, PORTION

Quantity: Six (6) – by k.e.c.
Manufacturer: GLOBE or equivalent by EDLUND
Model: GPS15

Components:

- Manufacturer's standard components.
- Complete with batteries.

ITEM NO. 1.145: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation L on drawing FS-300.

ITEM NO. 1.146: SPARE NUMBER

ITEM NO. 1.147: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation L on drawing FS-300.

ITEM NO. 1.148: SPARE NUMBER

ITEM NO. 1.149: SPARE NUMBER

ITEM NO. 1.150: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation N on drawing FS-300.

ITEM NO. 1.151: S.S. PREP TABLE

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with boxed edges as per Detail 401.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Two (2) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation M on drawing FS-300.

ITEM NO. 1.152: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 2,500mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- One (1) 406mm wide x 508mm long x 305mm deep sinks complete with deck mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- S.S. solid under shelf c.w. 12 ga. Reinforcement below the rest of the table.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- One (1) 120/60/1 receptacles and junction boxes for final connection by electrical division.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation N on drawing FS-300.

ITEM NO. 1.153: FOOD PROCESSOR

Quantity: One (1) – by K.E.C.
Manufacturer: HOBART or equivalent by BERKEL
Model: FP150

Components:

- Manufacturer's standard components.
- Complete with 3-pack plate and wall rack.
- K.E.C. to mount rack onto stand

ITEM NO. 1.154: STAND, EQUIPMENT

Quantity: One (1) –by K.E.C.
Nominal size: 690mm long x 815mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the
specification for this section.

Components:

- K.E.C. to confirm prior to fabrication maximum dimensions.
- 14 ga. s.s. top with boxed edges as per Detail 401.
- Leg and brace sets as required.
- Four (4) casters – two (2) with brakes.
- S.S. solid under shelf c.w. 12 ga. Reinforcement.
- Refer to Elevation N on drawing FS-300.

ITEM NO. 1.155: SPARE NUMBER

ITEM NO. 1.156: SPARE NUMBER

ITEM NO. 1.157: SPARE NUMBER

ITEM NO. 1.158: SPARE NUMBER

ITEM NO. 1.159: SPARE NUMBER

ITEM NO. 2.001: DISPLAY CASE, REFRIGERATED – NOT IN CONTRACT

Quantity: One (1) – By Others

ITEM NO. 2.002: DISPLAY CASE, REFRIGERATED – NOT IN CONTRACT

Quantity: One (1) – By Others

ITEM NO. 2.003: SINK, HAND, WALL MOUNT

Quantity: One (1) – by k.e.c.
Manufacturer: EAGLE or equivalent by TARRISON
Model: HAS-10-FDPS

Components:

- Manufacturer's standard components.

ITEM NO. 2.004: OVEN, CONVECTION, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent BLODGETT
Model: MCO-GS-10-S

Components:

- Manufacturer's standard components.
- Stainless steel oven interior.
- Swivel casters with front brakes.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 2.005: SPREADER

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: M17ES

Components:

- Manufacturer's standard components.
- S.S. rear and right.
- Equipment to be banked with 2.005, 2.006 and 2.008 – common front rail and 10" back guard.
- Swivel casters with front brakes.
- Complete with dump station.
- Rear gas connection.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters.

ITEM NO. 2.006: FRYER

Quantity: Two (2) – by K.E.C.
Manufacturer: GARLAND or equivalent PITCO
Model: M35SS

Components:

- Manufacturer's standard components.
- S.S. rear.
- Gas connection from 2.005.
- Equipment to be banked with 2.005, 2.006 and 2.008 – common front rail and 10" back guard.
- S.S. frypot cover.
- S.S. fish plate.
- Swivel casters with front brakes.

ITEM NO. 2.007: SPARE NUMBER

ITEM NO. 2.008: SPREADER

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: M17ES

Components:

- Manufacturer's standard components.
- S.S. rear and right.
- Equipment to be banked with 2.005, 2.006 and 2.008 – common front rail and 10" back guard.
- Swivel casters with front brakes.
- Complete with dump station.

ITEM NO. 2.009: COFFEE MACHINE – NOT IN CONTRACT

Quantity: One (1) – By Others

ITEM NO. 2.010: BROILER, GAS, COUNTER

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: HEEE-36CL

Components:

- Manufacturer's standard components.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 2.011: REFRIGERATOR, SHORTY

Quantity: One (1) – by K.E.C.
Manufacturer: TRUE or equivalent by BEVERAGE AIR
Model: TRCB-72

Components:

- Manufacturer's standard components.

ITEM NO. 2.012: GRIDDLE, GAS

Quantity: One (1) – by K.E.C.
Manufacturer: GARLAND or equivalent SOUTHBEND
Model: GD-36GTH

Components:

- Manufacturer's standard components.
- Stainless steel sides.
- Stainless steel back and bottom.
- Complete with quick disconnect kit with gas regulator, restraining device and positioning docks for casters

ITEM NO. 2.013: EXHAUST VENTILATOR

Quantity: One (1) comprised of two (2) sections – by k.e.c.
Manufacturer: SPRING AIR
Model: FCD-B-MP-9.5/3.92 and FCD-B-MP-9/3.92

Components:

- Manufacturer's standard components.
- Nominal size: 5639mm (one section at 2896mm and one section at 2743mm) x 1195mm wide x 610mm high.
- Refer to details shown on Drawing No. FS-400 to FS-403.
- Dry grease extractor type exhaust ventilator.
- UL/ULC listed and CGA approved with field adjustable variflow baffles.
- Built according to NFPA-96 standards.
- 18 ga. s.s. construction on all exposed surfaces.
- Full length inlet slot and centrifugal vortex chamber, variflow baffles and fire damper blades, bushings and edge seals fully accessible through front removable doors within the ventilator canopy.
- Model "D" butterfly type arrangement exhaust fire damper, constructed of s.s. with blade and edge seals.
- Fire damper activated by a fusable link.
- Fluorescent lights as per drawings FS-400 to FS-403.
- Duct collar as noted on drawing FS-400 to FS-403.
- Complete with s.s. removable enclosure panels from top of ventilator to underside of finished ceiling on all exposed sides.
- Complete with Spring Air supplied wet chemical surface and duct fire suppression system installed in accordance with NFPA-17A as specified with Item No. 1.126.

Typical Work By Other Trades:

Division 16 to provide power to fluorescent light inside of ventilator and interconnect light to wall switch (wall switch to be supplied, installed and wired by Division 16).

ITEM NO. 2.014: MICROWAVE OVEN

Quantity: Two (2) – by K.E.C.
Manufacturer: AMANA or equivalent
Model: RFS12MPSA

Components:

- Manufacturer's standard components.

ITEM NO. 2.015: S.S. OVER CUPBOARDS

Quantity: One (1) –by K.E.C.
Nominal Size: 1,700mm long x 300mm wide x 610mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- All s.s. construction.
- Refer to Detail 420.
- Open section for microwave oven.
- Angled top fastened to wall and over cupboard.
- Refer to Elevation O on drawing FS-301.

ITEM NO. 2.016: S.S. PREP TABLE W/WORK SINKS

Quantity: One (1) –by K.E.C.
Nominal size: 1,700mm long x 760mm wide x 914mm high
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- 14 ga. s.s. top with dished and boxed edges as per Detail 401.
- One (1) 406mm wide x 508mm long x 305mm deep sinks complete with deck mount mixer faucet, swing spout and s.s. apron.
- S.S. slatted under shelf c.w. 12 ga. Reinforcement below sink.
- Leg and brace sets as required.
- Provide drawers unit side as per detail 407.
- Fabricator to dimension site.
- Fix feet of counter to floor with S.S. fasteners.
- Refer to Elevation O on drawing FS-301.

ITEM NO. 2.017: REFRIGERATOR, ROLL-IN

Quantity: One (1) – by K.E.C.
Manufacturer: TRUE or equivalent by BEVERAGE AIR
Model: TA1RRI-1S

Components:

- Manufacturer's standard components.
- Left hand hinged door.

ITEM NO. 2.018: SPARE NUMBER

ITEM NO. 2.019: CONVEYOR TOASTER

Quantity: One (1) – by K.E.C. (One unit shown on drawing FS-100 is future)
Manufacturer: HATCO or equivalent HOLMAN
Model: TQ800H

Components:

- Manufacturer's standard components.
- Automatic power save mode.
- Complete with cord and plug.

ITEM NO. 2.020: BUFFET/CAFETERIA, SNEEZE GUARD

Quantity: One (1) – by K.E.C.
Manufacturer: BRASS SMITH or equivalent by CUSTOM FABRICATED
Model: ZG9915

Components:

- Manufacturer's standard components.
- Brushed aluminium finish.
- mwu3 under counter mount flanges. Refer to Detail 792.
- Manufactured in one (1) sections, approximate overall length is 1750mm.
- Z Guard full service partition type assembly.
- 3/8" tempered glass x 14" wide.
- Two (2) end posts.

ITEM NO. 2.021: REFRIGERATOR, ROLL-IN

Quantity: One (1) – by K.E.C.
Manufacturer: TRUE or equivalent by BEVERAGE AIR
Model: TSSU-60-15M-B

Components:

- Manufacturer's standard components.

ITEM NO. 2.022: DISPLAY CASE, HEATED

Quantity: One (1) – by k.e.c.
Manufacturer: HATCO
Model: FDWD-1

Components:

- Manufacturer's standard components.
- Colour – black.
- Graphic Adhesive Decals.
- 4-shelf multi purpose rack.

ITEM NO. 2.023: BUFFET/CAFETERIA, SNEEZE GUARD

Quantity: One (1) – by K.E.C.
Manufacturer: BRASS SMITH or equivalent by CUSTOM FABRICATED
Model: ZG9915

Components:

- Manufacturer's standard components.
- Brushed aluminium finish.
- mwu3 under counter mount flanges. Refer to Detail 792.
- Manufactured in one (1) sections, approximate overall length is 2150mm.
- Z Guard full service partition type assembly.
- 3/8" tempered glass x 14" wide.
- Two (2) end posts.

ITEM NO. 2.024: DROP-IN, HOT WELLS, INSULATED

Quantity: One (1) – by k.e.c.
Manufacturer: HATCO or equivalent by WELLS
Model: HWBI-5MA

Components:

- Manufacturer's standard components.
- Surface mounting to counter top.

ITEM NO. 2.025: SERVICE COUNTER W/TRAY RAIL

Quantity: One (1) –by K.E.C.
Nominal size: Refer to drawing FS-100
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- Refer to drawing FS-100.
- Refer to elevation P & Q on drawing FS-301 and sections 1, 2 and 3 on drawing FS-301 for details.

ITEM NO. 2.026: MILLWORK MERCHANDISER

Quantity: One (1) – by k.e.c.
Manufacturer: HUBERT or equivalent by CUSTOM FABRICATED
Model: 47909 (PAGE 219 OF CATALOGUE)

Components:

- Manufacturer's standard components.
- Complete with baskets.

ITEM NO. 2.027: REFRIGERATOR, AIR CURTAIN TYPE

Quantity: One (1) – by K.E.C.
Manufacturer: TRUE or equivalent by BEVERAGE AIR
Model: TAC-72

Components:

- Manufacturer's standard components.
- Black exterior.
- Black interior liner.
- Pricing strips.
- Vandal panel.
- Black locking security cover.

ITEM NO. 2.028: MILLWORK MERCHANDISER

Quantity: One (1) –by K.E.C.
Nominal size: Refer to drawing FS-100
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- Refer to drawing FS-100.
- Refer to elevation R on drawing FS-301 and sections 4 and 5 on drawing FS-301 for details.

ITEM NO. 2.029: MILLWORK CASH STATION

Quantity: One (1) –by K.E.C.
Nominal size: Refer to drawing FS-100
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- Refer to drawing FS-100.
- Refer to elevation S & T on drawing FS-301 and sections 6 and 7 on drawing FS-301 for details.

ITEM NO. 2.030: CASH REGISTER – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 2.031: PHONE – NOT IN CONTRACT

Quantity: One (1) – By Owner

ITEM NO. 2.032: MILLWORK CASH STATION

Quantity: One (1) –by K.E.C.
Nominal size: Refer to drawing FS-100
Type: Custom fabricated s/s construction in accordance with the specification for this section.

Components:

- Refer to drawing FS-100.
- Refer to elevation S & T on drawing FS-301 and sections 6 and 7 on drawing FS-301 for details.

ITEM NO. 2.033: CASH REGISTER – NOT IN CONTRACT

Quantity: One (1) – By Owner

PART 3 - EXECUTION

3. EXECUTION

3.1 SITE INSPECTIONS

- .1 All dimensions shown on the Drawings or listed in this Section of the Specification are to be considered nominal and for guidance only. It is the responsibility of the Foodservice Equipment Sub-contractor to check dimensions on the site and to co-ordinate any adjustments which may be necessary for the proper fabrication and set-in-place of the foodservice equipment.
- .2 If significant variances are apparent to the General Contractor or Foodservice Equipment Sub-contractor which may require changes affecting the intent of the contract, immediately notify the consultant.
- .3 Fabricate equipment in sections that will allow easy access into the building and to final location within the foodservice area. Any damage to the building or the equipment will be the Foodservice Equipment Sub-contractor's responsibility.
- .4 Verify on the job site all actual dimensions of storerooms and walk-in refrigerators and freezers and adjust if necessary the size of shelving units specified in the item specification.
- .5 Verify all points of access into the job site and ensure that all pieces of equipment or fabricated items installed or relocated are able to pass through doors, hallways etc. in order to arrive at designated location on plans.

3.2 SAMPLES

- .1 If requested by the Consultant, submit samples of components or fabrication methods, materials or finishes, for review and approval before proceeding with that aspect of the work. Where necessary, request a shop inspection of an assembly which cannot be submitted for approval. Include in the base bid price, the cost of samples which may be rejected.
- .2 Samples must be the precise articles proposed to be furnished.
- .3 All samples must be supplied in the required quantity and all except one (1) will be returned.
- .4 Reviewed samples will become the standard of workmanship and material against which installed work will be checked.

- .5 Obtain from the Owner, all necessary samples of china, baskets, trays, etc. to determine proper sizes for openings, angle slides dispensers, dishmachines, etc.
- .6 Prior to ordering dishwashing equipment, obtain from the Owner a sample of all service wares, trays etc. and assure their compatibility with warewashing or cartwashing equipment.

3.3 DELIVERY STORAGE OF EQUIPMENT

- .1 The Foodservice Equipment Sub-contractor will coordinate deliveries of equipment in conjunction with construction activity and progress at the site and as dictated by the Owner.
- .2 The Foodservice Equipment Sub-contractor shall obtain and/or hold equipment ready for delivery in accordance with an agreed schedule which will permit completion of the work at the specific date.
- .3 Deliver, unpack and set in place all equipment in the designated position, ready for final connection of services, for units with electrical or mechanical connections.
- .4 Supply to the Owner, in sufficient time, any information or items of service, articles, components or equipment which requires building in or which may overlap or impede the work of others.
- .5 Provide all necessary information within adequate time and in proper sequence regarding the exact location of openings, chases and any attachments or other fittings required for foodservice equipment.
- .6 Supply and deliver to the site in sufficient time all inserts, anchors, bolts, sleeves, ferrules and similar items for attaching to, or building into, masonry, concrete and other work for the proper anchorage and fixing of the equipment. Include necessary templates, instructions, directions and/or assistance in the location and installation of all items by other Sub-contractors.

3.4. INSTALLATION

- .1 Supply to all other trades in sufficient time, any services, articles, or equipment that require “building-in” or overlapping coordination. Also notify exact locations of openings, chases, anchors, floor pan, etc., required for the foodservice equipment covered in this contract.
- .2 Caulk and seal equipment to walls, base pads, curbs, and adjacent equipment where required.
- .3 Leave installed work neat, cleaned and polished, well fitted into position, level, and in proper operating condition.
- .4 Promptly remove all rubbish and debris from the building and site as the work proceeds and on completion.
- .5 Activate, test and adjust all equipment and apparatus installed under this Contract. Refinish and repair any painted and finished surfaces damaged during erection and installation. Hand over the completed installation in first class condition and working order.
- .6 Ensure electrical equipment is accompanied by label or certification of approval by Canadian Standards Association, Hydro Electrical Power Commission or Local Authority.
- .7 Finished work must be perfectly true and plumb with no warping, buckling or open seams. All edges, hidden or exposed must be ground smooth and rounded. Rivet heads, weld marks, or other imperfections are not acceptable.
- .8 Cutting and repairs for the proper installation of services are part of the work in this Contract.
- .9 Obtain permits or special inspections. No allowance will be made for costs incurred.

- .10 Identify equipment with metal plates or labels permanently secured which include, where applicable:
 - Manufacturer's name or recognized trademark
 - Complete model identification
 - Model, serial number and CSA U.L.C. and NSF identifications
 - Electrical characteristics
 - Direction of drive
 - Controls
 - Circuits, lines, etc.
 - Specific operating instructions
- .12 Identify equipment with temporary labels showing location and Item number per Specifications.
- .13 After installation has been completed and all items checked and adjusted where necessary for satisfactory operation, arrange for inspection of equipment. If items are found unsatisfactory, make necessary corrections and adjustments.

3.5 PROTECTION AND CLEANING

- .1. Protect properly and efficiently all work against any damage. Repair without charge to the Owner any damage to equipment and/or building. Cooperate at all times to keep the area clean and free of all rubbish and debris. At the end, clean all equipment to permit immediate use by the Owner without further cleaning.
- .2. In areas where quarry tile is applied as a floor finish, ensure that no stainless steel is present if Muriatic Acid is being used to clean the tiles.

3.6 MAINTENANCE MANUALS

- .1. Supply four (4) sets of manuals, bound and labeled, incorporating operating and maintenance instructions, including spare parts list and optional accessories for all items specified.
- .2. Identify each item, arrange in proper sequence and ensure that the numbers correspond to the specifications and drawings.
- .3. Provide an itemized lead sheet at the front of the manual with a list of the contents and the name and phone number of the service company.

3.7 DEMONSTRATION

- .1. After completion of installation, cleaning, testing and final inspection, instruct the Owner or their authorized personnel in the correct operation and maintenance of the equipment.
- .2. A demonstration shall be made of each piece of equipment requested by the Consultant, and such demonstration shall be carried out by a competent representative of the manufacturer's equipment.
- .3. It is the responsibility of the General Contractor and/or Foodservice Equipment Sub-contractor to correct deficiencies and make adjustments to items which are not functioning properly at the time of demonstration.
- .4. The Contractor shall co-ordinate the schedule for equipment demonstrations with the Owner representative, with adequate time allowed for each demonstration.
- .5. Submit to the Foodservice Consultant three (3) weeks prior to completion of the installation, cleaning, final inspection and testing, a schedule of demonstration by the suppliers of purchased equipment. Indicate clearly the timing for each supplier to start up and demonstrate the proper use and maintenance of their equipment to the Owner.

- .6 The Consultant will inspect equipment on substantial completion of work and will issue a deficiency report immediately thereafter. A final inspection will also be made to verify corrected deficiencies.
- .7 The Owner reserves the right to inspect equipment at the factory of the Foodservice Equipment Sub-contractor, or at other locations as necessary.
- .8 Rejection of any item of equipment, components or fabrication will be based on degree of conformance to the Specification and Drawings, and is subject to the Conditions of the contract in any matter of dispute.

3.8 GUARANTEE

- .1 All new equipment shall be guaranteed for a minimum of one (1) year from the date of acceptance against defects in material, manufacture, assembly, labour and installation. Those items or components which have inherent guarantee periods beyond this minimum shall be sustained to the maximum time provided by the manufacturer.
- .2 This guarantee applies to new purchases and fabricated equipment specified under this Division. Repair and/or replace at no cost to the Owner, parts and labour included, any and all equipment covered in this contract, which proves defective within the guarantee period.
- .3 The one (1) year warranty shall include service, inspection, and maintenance for the fire extinguishing system as requested by the national and/or local authorities and N.F.P.A. - Code 96.
- .4 All mechanical refrigeration system components including compressors, condensing units, be supplied with a five (5) year replacement guaranteed including parts. All labour for mechanical refrigeration system components shall be supplied with a one (1) year guarantee.
- .5 If defects become apparent during the guarantee period they shall be made good by the Foodservice Equipment Sub-contractor/supplier or authorized service representative. The supplier means the manufacturer of the equipment item, but under all circumstances it is the responsibility of the General Contractor/Foodservice Equipment Sub-contractor to maintain the obligation of guarantee whether or not the supplier provides this service.
- .6 If defects identified at any time during the one (1) year warranty period are not corrected prior to expiration of the warranty period, the warranty period will automatically be extended until the defect is corrected to the "Owners" or "Consultants" satisfaction.

- .7 If deficiencies identified at the point of substantial completion of the food equipment installation or during the one (1) year warranty period are not corrected or resolved prior to the expiration of the one (1) year warranty period, the warranty period will automatically be extended until such time as the outstanding deficiency is corrected to the “Owners” or “Consultants” satisfaction.
- .8 The guarantee shall not apply where it can be clearly shown that a defect or malfunction is due to misuse or neglect by the Owner or their representatives.
- .9 The guarantee period shall commence upon acceptance of the equipment by the Owner, or such date(s) as may be mutually agreed upon after substantial completion of the work. In no event shall the period of guarantee begin later than the date upon which the lien holdback expires.

3.9 INSPECTION, REJECTION AND FACTORY TESTING

- .1 The Owner and Consultant reserve the right to inspect the fabrication of any items at the fabricating plant and they may reject any equipment which does not comply with Plans and/or Specifications. The Contractor will replace without charge all rejected material or equipment within (10) days of rejection.
- .2 Factory test and verify all items such as cold pans, refrigerated display cases, ice cream freezers, custom built refrigerators, etc., to be sure that they are in proper working order before shipment. Inform the Consultant of the date of these tests in advance in writing so that he may observe and inspect these items in the ship if necessary. Advise the Consultant when installation is complete and ready for inspection.

PART 4 ITEMIZED TENDER FORM

ITEM NO	EQUIPMENT CATEGORY	QTY	MANUFACTURE R	UNIT PRICE	TOTAL PRICE
1.001	Mobile Shelving Unit	2			
1.002	Mobile Shelving Unit	2			
1.003	Rack, Dunnage	1			
1.004	Cart, Utility	1			
1.005	Truck, Utility	1			
1.006	Mobile Shelving Unit	2			
1.007	Mobile Shelving Unit	2			
1.008	Rack, Dunnage	1			
1.009	Spare Number	1			
1.010	Walk-In Refrigerator	1			
1.011	Evaporator Coil	1			
1.012	Temperature Alarm	1			
1.013	Condenser Remote, Air-Cooled	1			
1.014	Mobile Shelving Unit	2			
1.015	Mobile Shelving Unit	2			
1.016	Rack, Dunnage	1			
1.017	Spare Number	1			
1.018	Spare Number	1			
1.019	Spare Number	1			
1.020	Walk-In Freezer	1			
1.021	Evaporator Coil	1			
1.022	Temperature Alarm	1			
1.023	Condenser Remote, Air-Cooled	1			
1.024	Mobile Shelving Unit	2			
1.025	Mobile Shelving Unit	2			
1.026	Rack, Dunnage	1			
1.027	Spare Number	1			
1.028	Spare Number	1			
1.029	Spare Number	1			
1.030	Walk-In Refrigerator	1			
1.031	Evaporator Coil	1			
1.032	Temperature Alarm	1			
1.033	Condenser Remote, Air-Cooled	1			
1.034	Mobile Shelving Unit	2			
1.035	Mobile Shelving Unit	2			
1.036	Rack, Dunnage	1			
1.037	Spare Number	1			
1.038	Spare Number	1			
1.039	Spare Number	1			
1.040	Walk-In Freezer	1			
1.041	Evaporator Coil	1			
1.042	Temperature Alarm	1			
1.043	Condenser Remote, Air-	1			

	Cooled			
1.044	Mobile Shelving Unit	2		
1.045	Mobile Shelving Unit	2		
1.046	Rack, Dunnage	1		
1.047	Spare Number	1		
1.048	Spare Number	1		
1.049	Spare Number	1		
1.050	S.S. Pot Wash Table	1		
1.051	Waste Bin W/Dolly	2		
1.052	Pot Rack, Wall Mount	1		
1.053	Condensate Hood	1		
1.054	Warewasher, Door Type	1		
1.055	Waste Bin W/Dolly	2		
1.056	Pot Rack, Wall Mount	1		
1.057	S.S. Pot Wash Table	1		
1.058	Spare Number	1		
1.059	Spare Number	1		
1.060	Filler, Pot	1		
1.061	Range, Restaurant, Gas	1		
1.062	Range, Restaurant, Gas	1		
1.063	Salamander Broiler, Gas	1		
1.064	Oven, Convection, Gas	1		
1.065	Oven, Convection, Gas	1		
1.066	Exhaust Hood	1		
1.067	Exhaust Hood Control Panel	1		
1.067A	Type K Fire Extinguisher	1		
1.068	Exhaust Hood	1		
1.069	S.S. Work Table	2		
1.070	Fryer	2		
1.071	Fryer, Dump Station	1		
1.072	Filler, Pot	1		
1.073	Range, Restaurant, Gas	1		
1.074	Range, Restaurant, Gas	1		
1.075	Salamander Broiler, Gas	1		
1.076	Griddle, Gas	1		
1.077	Griddle, Gas	1		
1.078	Broiler, Over-Fired/Gas	1		
1.079	Spare Number	1		
1.080	S.S. Prep Table W/Sink	1		
1.081	S.S. Prep Table	1		
1.082	Spare Number	1		
1.083	Spare Number	1		
1.084	S.S. Prep Table	1		
1.085	S.S. Prep Table	1		
1.086	Scale	6		
1.087	Mixer, Floor	1		
1.088	Spare Number	1		
1.089	Spare Number	1		
1.090	Mixer, Floor	1		
1.091	Scale	1		
1.092	Demo Table w/Overhead	1		

	Mirror			
1.093	Bin, Ingredient	3		
1.094	S.S. Prep Table W/Sink	1		
1.095	S.S. Prep Table	1		
1.096	Mixer, Counter	5		
1.097	Sink, Hand, Wall Mount	1		
1.098	Spare Number	1		
1.099	Spare Number	1		
1.100	Sink, Hand, Wall Mount	1		
1.101	Dish Rack Wall Mount	1		
1.102	KCL Trash Can	2		
1.103	S.S. Pot Wash Table	1		
1.104	Condensate Hood	1		
1.105	Warewasher, Door Type	1		
1.106	S.S. Clean Dish Table	1		
1.107	Pot Rack, Wall Mount	1		
1.108	Spare Number	1		
1.109	Spare Number	1		
1.110	Washing Machine	1		
1.111	Dryer	1		
1.112	Linen Storage Cabinet	1		
1.113	Desk	1		
1.114	Computer	1		
1.115	Phone	1		
1.116	File Cabinet	1		
1.117	First Aid Kit	1		
1.118	Spare Number	1		
1.119	Ice Maker w/ Bin	1		
1.119A	Filter System, Icemaker	1		
1.120	Sink, Hand, Wall Mount	1		
1.121	Exhaust Hood	1		
1.122	Oven, Convection, Gas	1		
1.123	Tilt Skillet	1		
1.124	Kettle, Steam Jacketed	1		
1.125	S.S. Trench Drain	1		
1.126	Exhaust Hood Control Panel	1		
1.126A	Type K Fire Extinguisher	2		
1.127	Spare Number	1		
1.128	Spare Number	1		
1.129	Spare Number	1		
1.130	S.S. Prep Table	1		
1.131	Cutter/Mixer, Vertical	1		
1.132	Mixer/Blender	1		
1.133	Waste Bin W/Dolly	1		
1.134	Mixer/Blender	1		
1.135	S.S. Prep Table W/Sinks	1		
1.136	S.S. Prep Table W/Sinks	1		
1.137	Waste Bin W/Dolly	1		
1.138	S.S. Prep Table	1		
1.139	Spare Number	1		
1.140	Sink, Hand, Wall Mount	1		

1.141	Stand, Equipment	1			
1.142	Slicer, Food	1			
1.143	S.S. Prep Table W/Sink	1			
1.144	Scale	6			
1.145	S.S. Prep Table	1			
1.146	Spare Number	1			
1.147	S.S. Prep Table	1			
1.148	Spare Number	1			
1.149	Spare Number	1			
1.150	S.S. Prep Table	1			
1.151	S.S. Prep Table	1			
1.152	S.S. Prep Table W/Sink	1			
1.153	Food Processor	1			
1.154	Stand, Equipment	1			
1.155	Spare Number	1			
1.156	Spare Number	1			
1.157	Spare Number	1			
1.158	Spare Number	1			
1.159	Spare Number	1			
2.001	Display Case, Refrigerated	1			
2.002	Display Case, Refrigerated	1			
2.003	Sink, Hand, Wall Mount	1			
2.004	Oven, Convection, Gas	1			
2.005	Fryer, Dump Station	1			
2.006	Fryer	2			
2.007	Spare Number	1			
2.008	Fryer, Dump Station	1			
2.009	Coffee Machine	1			
2.010	Broiler, Gas, Counter	1			
2.011	Refrigerator, Shorty	1			
2.012	Griddle, Heavy Duty, Gas	1			
2.013	Exhaust Hood	1			
2.014	Oven, Microwave	1			
2.015	S.S. Over Cupboards	1			
2.016	S.S. Prep Table W/Sinks	1			
2.017	Refrigerator, Roll-In	1			
2.018	Spare Number	1			
2.019	Toaster, Conveyor	2			
2.020	Buffet/Cafeteria, Sneeze Guard	1			
2.021	Refrigerator, Sandwich Prep	1			
2.022	Display Case, Heated	1			
2.023	Buffet/Cafeteria, Sneeze Guard	1			
2.024	Drop-In, Hot Wells, Insulated	1			
2.025	Service Counter W/Tray Rail	1			
2.026	Millwork Merchandiser	1			
2.027	Refrigerator, Air Curtain Type	1			
2.028	Millwork Merchandiser	1			
2.029	Millwork Cash Station	1			
2.030	Cash Register	1			

2.031	Phone	1			
2.032	Millwork Cash Station	1			
2.033	Cash Register	1			

SUB TOTAL FOOD SERVICE EQUIPMENT \$ _____

DELIVERY, UNCRATING AND SET-IN PLACE \$ _____

MISCELLANEOUS S.S. TRIM ETC. \$ 1500.00

APPLICABLE PROVINCIAL SALES TAX \$ _____

TOTAL FOOD SERVICE EQUIPMENT \$ _____

4.2 ACCEPTABLE ALTERNATIVE EQUIPMENT

The following are prices for alternative equipment listed hereunder. Such alternative equipment and amounts are NOT included in the base bid stipulated price.

ITEM NO.	DESCRIPTION	ALTERNATIVE MANUFACTURER	UNIT PRICE	ADDITION TO OR DEDUCTION FROM BASE TENDER PRICE
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4.3 OTHER PREAPPROVED ACCEPTABLE ALTERNATIVE MANUFACTURERS

The following are prices for alternative equipment listed hereunder that has been pre-approved. Such alternative equipment and amounts are NOT included in the base bid stipulated price.

ITEM NO.	DESCRIPTION AND MODEL NO.	ALTERNATIVE MANUFACTURER	UNIT PRICE	ADDITION TO OR DEDUCTION FROM BASE TENDER PRICE
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End of Document

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Benches, interior type.
- 1.2 SUBMITTALS
 - .1 Submit Product data sheets as specified in Section 01 33 00.
 - .2 Product Data: indicating sizes, shapes, finishes, materials, methods of anchorage, etc.
- 2 Products
- 2.1 MANUFACTURED ITEMS
 - .1 Bench, Type 1: 432 x 1,778 mm size, 762 mm high; powder coated steel frame with factory stained Ipe wood slats and timbers; Model MLB1050W by Maglin.
 - .2 Bench, Type 2: 432 x 1,778 mm size, 445 mm high; powder coated steel frame with factory stained Ipe wood timbers; Model MLB1050BW by Maglin.
- 2.2 FABRICATION
 - .1 Fabricate components to CAN/CSA-S136, and CSA S157.
 - .2 Fit and shop assemble in largest practical sections, for delivery to the Place of the Work.
 - .3 Grind exposed welds flush and smooth with adjacent finish surface.
 - .4 Make exposed joints butt tight, flush, and hairline.
 - .5 Supply components required for anchorage of metal fabrications.
- 3 Execution
- 3.1 INSTALLATION
 - .1 Install benches in accordance with manufacturer's printed instructions in areas designated on the Drawings.
 - .2 Install Products in a manner to ensure long life under hard use.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Vertical wheelchair platform lift.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-In-Place Concrete: concrete slab.
- 1.3 REFERENCES
 - .1 CSA B355-00 (R2005): Lifts for Persons with Physical Disabilities.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicate:
 - .1 Dimensions of required clearances.
 - .2 Arrangement of mechanisms, pumps and motors, operating station, showing names of manufacturers, type or style designations, part numbers, and HP and RPM of motor.
 - .3 Factory test data of operating system, containing complete information covering test.
 - .4 Details of electrical equipment.
 - .5 Shop Drawing must be stamped, dated and signed by the manufacturer's design engineer.
 - .3 Product Data: indicate unit dimensions, method of anchorage, and details of construction.
- 1.5 CLOSEOUT SUBMITTALS
 - .1 Submit operation and maintenance data as specified in Section 01 78 00.
 - .2 Operation and Maintenance Data: Complete description and sequence of operation together with wiring diagrams, manufacturer's instructions covering maintenance requirements, and parts catalogue giving complete list of repair and replacement parts with cuts and identifying numbers. Include a dimensioned drawing of platform lift as installed.
- 1.6 QUALITY ASSURANCE
 - .1 Manufacturer's Design Engineer: a professional engineer, experienced in the design of platform lift systems and licensed in the Place of the Work.
 - .2 Installer: company specializing in installation of automotive lift systems and approved by lift system manufacturer.
- 2 Products
- 2.1 MANUFACTURERS
 - .1 Manufacturers of vertical platform lifts having Product considered acceptable for use:
 - .1 Savaria Concord Lifts Inc.
 - .2 Garaventa.
 - .2 Substitutions: refer to Instructions to Bidders and Section 01 25 00.
- 2.2 DESIGN REQUIREMENTS
 - .1 Vertical Platform Lift: to CSA B355, and as follows:
 - .1 Platform Size: 915 x 1,220 mm;
 - .2 Clear Opening Cab Size: 890 x 1,220 mm.

- .3 Cab Enclosure: aluminum enclosure with clear glass inserts to 1,070 mm above upper landing , lower 2,292 mm high door and interlock;
- .4 Capacity: maximum 340 kg;
- .5 Travel Distance: maximum 1,050 mm;
- .6 Travel Speed: 0.07 metres per second;
- .7 Power Supply: 220VAC, 50 Hz, 10 amps;
- .8 Drive System: 1:2 Cable hydraulic with slack cable safety device;
- .9 Motor: 1 HP 24 VDC motor 2.61 lpm, max 15,857 kPa;
- .10 Control System: constant pressure user interface, solid state electronics with relay logic motor controls;
- .11 Standard Features: to CSA B355.
- .12 Optional Features: include for the following:
 - .1 Public building package, including emergency alarm, final mechanical stops and pit switch;
 - .2 Under platform safety prop and negative pressure switch;
 - .3 406 mm automatic flip-up entrance ramp; and
 - .4 Keyed ON/OFF control panel and hall stations.

2.3 MANUFACTURED ITEMS

- .1 Vertical Platform Lift: Enclosed design; P.A.L.-EN by Savaria Concord Lifts Inc.

2.4 FABRICATION

- .1 Fabricate vertical platform lifts to CSA B355, and in strict accordance with approved shop drawings.
- .2 Perform welding to CSA W59.

2.5 SHOP FINISHES

- .1 Tower and Mechanical Assembly: baked electrostatic polyester gloss powder finish; manufacturer's standard colour.
- .2 Hall Station: mylar membrane.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify anchor placement is acceptable.

3.2 PREPARATION

- .1 Provide integral anchors for placement by Section 03 30 00.

3.3 INSTALLATION

- .1 Install vertical platform lifts to CSA B355 and in strict accordance with manufacturer's instructions.
- .2 Set components plumb and square, properly aligned as set out in Shop Drawings.
- .3 Anchor units securely to building structural elements.
- .4 Install motors, controller units, pushbutton stations, relays and other equipment required for proper operation.

3.4 ADJUSTING

- .1 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of installation.
- .2 Adjust components to ensure a smooth operation.

3.5 DEMONSTRATION

- .1 Demonstrate operation and maintenance of equipment as specified in Section 01 79 00.
- .2 Conduct operating tests for approval of Owner, including:
 - .1 Operation to maximum limits in "UP", and "DOWN" directions.
 - .2 Demonstration of loading capacity.
 - .3 Any other test required by Consultant to ensure full compliance with specification requirements.

3.6 MAINTENANCE

- .1 Conduct adjustment and maintenance services for a period of one year following Substantial Performance of the Work.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Clearing and grubbing.
- 1.2 RELATED SECTIONS
 - .1 Section 31 23 16 - Excavation.
- 1.3 REGULATORY REQUIREMENTS
 - .1 Conform to applicable code for disposal of debris in accordance with authorities having jurisdiction.
- 1.4 EXISTING CONDITIONS
 - .1 Prevent damage to items scheduled to remain.
 - .2 Provide protective temporary fencing as required, placed at the dripline of trees to protect root systems against passage of heavy equipment.
 - .3 Where excavation must occur through a root system, excavate by hand, cut roots with sharp axe and seal cuts.
- 2 Products

Not Used
- 3 Execution
- 3.1 CLEARING
 - .1 Clear the Place of the Work of debris and vegetation.
 - .2 Remove trees and shrubs within marked areas.
 - .3 Cut off trees, shrubs, stumps and other vegetation to within 100 mm of original ground surface.
 - .4 Perform close-cut clearing so that existing insulation of fibrous material is not damaged.
 - .5 Cut off unsound branches and cut down dangerous trees overhanging area cleared.
 - .6 Cut off isolated trees designated for removal at a height of 300 mm above ground.
 - .7 Grub out isolated tree stumps.
 - .8 Grub out stumps and roots to not less than 300 mm below original grade.
 - .9 Grub out visible rock fragments and boulders, greater than 200 mm in greatest dimension, but less than 0.25 m³.
- 3.2 REMOVAL AND DISPOSAL
 - .1 Remove cleared and grubbed materials from the Place of the Work.
 - .2 Useable timber and rocks become property of the Contractor.

- .3 Leave ground surface in condition suitable for immediate earthwork operations, as specified in Section 31 23 16.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Remove and stockpile topsoil for later reuse and remove excess from the Place of the Work.
- .2 Excavate subsoil and stockpile for later reuse. Remove excess from the Place of the Work.
- .3 Grade and rough contour the Place of the Work..

1.2 RELATED SECTIONS

- .1 Section 31 23 16 - Excavation: Building excavation.
- .2 Section 31 23 23 - Fill: Building and site backfilling.
- .3 Section 31 23 33 - Trenching and Backfilling: Trenching and backfilling for utilities.
- .4 Section 32 11 23 - Aggregate Base Courses: sub-base and base courses below pavements and sidewalks.

1.3 REGULATORY REQUIREMENTS

- .1 Conduct additional chemical analyses of top soil and subsoil being exported from the Place of the Work to determine the disposal site requirements, as may be required the authorities having jurisdiction.

1.4 EXISTING CONDITIONS

- .1 Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.
- .2 Protect bench marks, existing structures, fences, roads, sidewalks, and paving and curbs.

2 Products

2.1 MATERIALS

- .1 Native Topsoil: Excavated material, graded free of roots, rocks larger than 25 mm, subsoil, debris, and large weeds.
- .2 Subsoil: Excavated material, graded free of lumps larger than 150 mm, rocks larger than 75 mm, and debris.
- .3 Erosion Control Blanket: Straw Blanket Type S75 by North American Green.
- .4 Silt and Sediment Fence: woven polypropylene fibre geotextile, 915 mm high, c/w wood posts spaced at 2,440 mm OC; 67 percent filter efficiency; eg. Terrafence by Terrafix Geosynthetics Inc.

3 Execution

3.1 PREPARATION

- .1 Identify required lines, levels, contours, and datum.
- .2 Identify known below grade utilities. Stake and flag locations.
- .3 Notify utility company to remove and relocate utilities.
- .4 Provide silt and sediment fence as indicated on Drawings.

3.2 TOPSOIL EXCAVATION

- .1 Excavate topsoil from areas to be further excavated, re-landscaped, or regraded and stockpile in area designated at the Place of the Work.
- .2 Stockpile topsoil to depth not exceeding 2.5 m.
- .3 Do not bury excess topsoil. Remove excess topsoil not being reused from the Place of the Work and dispose of in accordance with the requirements of the authority having jurisdiction.

3.3 SUBSOIL EXCAVATION

- .1 Excavate subsoil from areas to be re-landscaped or regraded and stockpile in area designated at the Place of the Work.
- .2 Stockpile subsoil to depth not exceeding 2.5 m.
- .3 Remove excess subsoil not being reused from the Place of the Work and dispose of in accordance with the requirements of the authority having jurisdiction.

3.4 ROUGH GRADING

- .1 Cut and fill to levels required.
- .2 Establish and maintain line and grade stakes for duration of grading operations.
- .3 Conform to grades indicated on Drawings. Uniformly slope grade between elevations indicated unless otherwise noted.
- .4 Do not exceed slopes of 1:4 unless indicated otherwise on Drawings.
- .5 Contour lines indicated on Drawings are approximate only, and may require minor adjustments at the Place of the Work.
- .6 Smoothly slope top and toe of slopes and banks.
- .7 Establish contours parallel to finished grades, and shape to provide adequate drainage.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Excavation for building foundations, slabs-on-fill, paving, landscaping, and site structures.
- 1.2 RELATED SECTIONS
 - .1 Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
 - .2 Section 31 23 23 - Fill.
 - .3 Section 31 23 33 - Trenching and Backfilling: Excavation for utility trenches.
- 1.3 DEFINITIONS
 - .1 Rock: defined as solid rock formation wherever found, as can be removed only by drilling and blasting more than one cubic metre in volume; and does not include glacial till or 'hardpan' or layered rock in its original location which, in the opinion of the Consultant, can be ripped by a single rear-mounted tooth on a D-8 crawler type tractor, or similar equipment.
- 1.4 REFERENCES
 - .1 ASTM D698-07e1: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .2 Geotechnical Investigation: as described in Section 00 31 00.
- 1.5 REGULATORY REQUIREMENTS
 - .1 Conduct additional chemical analyses of subsoil being exported from the site to determine the disposal site requirements, as may be required the authorities having jurisdiction.
- 1.6 TEST REPORTS
 - .1 Submit test reports as specified in Section 01 40 00.
 - .2 Test Reports: soil bearing capacity test reports, indicating specified and actual results for compaction, moisture content, suitability, and other required standards for sub-surface material.
- 1.7 EXISTING CONDITIONS
 - .1 For excavation purposes, determine the classification of existing soils as defined by the Occupational Health and Safety Regulations for Construction Projects.
- 2 Products
 - Not Used
- 3 Execution
- 3.1 PREPARATION
 - .1 Identify required lines, levels, contours, and datum.
- 3.2 EXCAVATION
 - .1 Excavate to lines, grades, elevations and dimensions indicated.
 - .2 Remove concrete, masonry, paving, walks, demolished foundations, lumped subsoil, boulders, rubble, and other obstructions encountered during excavation.

- .3 In the event that Rock is encountered within the limits of excavation, notify Consultant and await instructions before proceeding with its removal.
- .4 Existing field drains from previous farming operations may be encountered during excavation. Notify Consultant if drains are encountered.
- .5 Machine slope banks to angle of repose or less, until shored. Refer to geotechnical investigation report for recommended slope of excavations.
- .6 Excavation cut not to interfere with normal 45 degree bearing splay of foundation.
- .7 Stockpile excavated material in area designated at the Place of the Work.
- .8 Remove surplus and unsuitable excavated material from the Place of the Work.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Hand trim, make firm and remove loose material and debris from excavations.
- .11 Ensure bottoms of excavations are undisturbed soil, level, free from loose, soft, or organic matter.
- .12 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with lean concrete as specified in Section 31 23 23.
- .13 Grade top perimeter of excavation to prevent surface water from draining into excavation.
- .14 Correct areas over excavated by error. Refer to Section 31 23 23.

3.3 TRENCHING

- .1 Perform trenching as specified in Section 31 23 33.
- .2 Do not excavate more than 30 metres of trench in advance of installation operations.
- .3 Do not leave open more than 15 metres at end of day's operations.
- .4 Remove unsuitable material from trench bottom to extent and depth as directed by Consultant.

3.4 ABANDONED EXISTING ITEMS

- .1 Cut off and cap all abandoned piping.
- .2 Cut off and seal ends of tree roots encountered in the excavation.
- .3 Fill in all old drains, wells and cisterns, etc. encountered and not affecting the bearing of any footing. Use only clean earth from the excavation, well tamped and consolidated.

3.5 UNDERPINNING

- .1 Any excavation for underpinning or any other excavation likely to undermine existing footings is to be carried out with caution.
- .2 Install adequate shoring prior to such excavation.
- .3 Use tapes or similar devices to monitor any movement in existing walls.
- .4 Excavate in sections not exceeding 1,800 mm in length. Do not use heavy equipment underpinning work.

3.6 UNSUITABLE SUBSURFACE CONDITIONS

- .1 Where unsuitable subsurface conditions are encountered and confirmed by third-party testing, excavate to additional depth as necessary to achieve suitable conditions.
- .2 Arrange for representative of testing and inspection company to be present and oversee additional excavation.
- .3 Minimize additional excavation to that recommended by testing and inspection representative.
- .4 Request testing and inspection company to confirm and document the revised founding elevation.
- .5 Requests for additional payment resulting from additional excavation caused by unsuitable conditions shall include verification documentation from testing and inspection company.

3.7 FIELD QUALITY CONTROL

- .1 Notify Consultant when bottom of excavation is reached. Obtain Consultant review of completed excavation.
- .2 Conduct field inspection and testing as specified in Section 01 40 00.
- .3 Testing and inspection company will confirm suitable subsurface conditions when acceptable founding elevations are achieved.
- .4 Testing and inspection company will document site information necessary for verification of additional costs resulting from additional work required by unsuitable conditions.
- .5 Testing and inspection company will test and analyse soil bearing capacities. Perform testing in accordance with ASTM D698.

3.8 PROTECTION

- .1 Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- .2 Protect bottom of excavations and soil adjacent to and beneath foundation, from freezing.
- .3 Grade excavation top perimeter to prevent surface water run-off into excavation.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Building perimeter and site structure backfilling to subgrade elevations.
 - .2 Site filling and backfilling.
- 1.2 RELATED SECTIONS
 - .1 Section 03 30 00 - Cast-In-Place Concrete: concrete slab-on-fill.
 - .2 Section 31 23 16 - Excavation.
 - .3 Section 31 23 33 - Trenching and Backfilling: Filling of utility trenches.
 - .4 Section 32 11 23 - Aggregate Base Courses: sub-base and base courses below pavements and sidewalks.
 - .5 Section 32 91 19 - Landscape Grading: Finish grading.
- 1.3 REFERENCES
 - .1 ASTM D698-07e1: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .2 OPSS 1010: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
 - .3 Geotechnical Investigation: as described in Section 00 31 00.
- 1.4 SUBMITTALS
 - .1 Submit backfill test reports as specified in Section 01 40 00.
 - .2 Test Reports: Include specified and actual results for compaction, moisture content, suitability, and other required standards for sub-surface material.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 40 00.
 - .2 Samples: 4.5 kg sample of each type of fill to testing laboratory, in air-tight containers.
- 2 Products
- 2.1 FILL MATERIALS
 - .1 Fine Granular Fill: to OPSS 1010, crushed Granular Class A; moisture content within plus or minus 2 percent of the requirements of ASTM D698.
 - .2 Coarse Granular Fill: to OPSS 1010, crushed Granular Class B, Type II; moisture content within plus or minus 2 percent of the requirements of ASTM D698.
 - .3 Inorganic Soil Fill: Reused or imported, free of gravel larger than 75 mm size, and debris.
 - .4 Lean Concrete: minimum compressive strength of 7 MPa at 28 days.
- 2.2 SOURCE QUALITY CONTROL
 - .1 Inspect and test proposed backfill materials as specified in Section 01 40 00.
 - .2 Conduct tests on submitted verification samples described above.

- .3 Do not proceed with backfill operations until verification samples have been accepted.

3 Execution

3.1 PREPARATION

- .1 Generally, compact subgrade to density requirements for subsequent backfill materials.
- .2 Cut out soft areas of subgrade not capable of insitu compaction and compact.
- .3 Install perimeter and below-grade insulation in locations indicated on Drawings, and as specified in Section 07 21 00.
- .4 Proof roll subgrade prior to placement of backfill in presence of soils engineer. Correct soft areas and obtain soil engineer's acceptance of existing conditions prior to placing backfill.

3.2 BACKFILLING

- .1 Backfill areas to contours and elevations with unfrozen materials.
- .2 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- .3 Granular Fill: place and compact materials in continuous layers not exceeding 150 mm compacted depth.
- .4 Inorganic Soil Fill: place and compact material in continuous layers not exceeding 200 mm compacted depth.
- .5 Employ a placement method that does not disturb or damage utilities in trenches, and adjacent Work.
- .6 Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- .7 Slope grade away from building minimum 150 mm in 3 metres, unless noted otherwise.
- .8 Make grade changes gradual. Blend slope into level areas.

3.3 FIELD QUALITY CONTROL

- .1 Perform field inspection and testing as specified in Section 01 40 00.
- .2 Conduct tests and analysis of fill material in accordance with ASTM D698.
- .3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Excavate trenches for utilities to municipal utilities.
 - .2 Compacted bed and compacted fill over utilities to subgrade elevations.
- 1.2 RELATED SECTIONS
 - .1 Section 31 23 16 - Excavation.
 - .2 Section 31 23 23 - Fill.
 - .3 Section 32 11 23 - Aggregate Base Courses: sub-base and base courses below pavements and sidewalks.
 - .4 Section 32 92 23 - Sodding: top soil and finish grading.
 - .5 Section 32 93 00 - Trees, Shrubs, Groundcovers and Maintenance: top soil and finish grading.
- 1.3 REFERENCES
 - .1 ASTM D698-07e1: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .2 OPSS 1001: Material Specification for Aggregates - General.
 - .3 OPSS 1010: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- 1.4 SUBMITTALS
 - .1 Submit Shop Drawings as specified in Section 01 33 00.
 - .2 Shop Drawings: Indicating shoring, bracing and underpinning, complete with design and supporting data; prepared under the direct supervision of a registered professional engineer, and bearing the stamp and signature of the qualified professional engineer registered in the Place of the Work.
- 1.5 EXISTING CONDITIONS
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Shoring, Bracing and Underpinning: as specified in Section 01 50 00 and in accordance with applicable local regulations. Protect existing features.
 - .3 Existing Soil: For excavation purposes, verify classification of the existing soils, as defined by the Occupational Health and Safety Regulations for Construction Projects.
- 2 Products
- 2.1 MATERIALS
 - .1 Fine Granular Fill: to OPSS 1010, as specified in Section 31 23 23.
 - .2 Sand: to OPSS 1001, natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
 - .3 Select Inorganic Soil Fill: Reused and imported as required; free of gravel larger than 75 mm size, and debris; and having a moisture content less than optimum.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify foundation perimeter drainage installation has been inspected.
- .3 Confirm locations of buried utilities by careful test excavations.

3.2 PREPARATION

- .1 Identify required lines, levels, contours, and datum.
- .2 When necessary, compact subgrade surfaces to density requirements for backfill material.
- .3 Maintain and protect existing underground utilities and structures encountered. Obtain direction of Consultant before moving or otherwise disturbing existing utilities or structures.
- .4 Conduct condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires and paving, survey bench marks and monuments which may be affected by Work.

3.3 EXCAVATION

- .1 Excavate subsoil required for underground site service piping to municipal utilities.
- .2 Cut trenches sufficiently wide to enable installation of utilities and allow inspection.
- .3 Remove lumped subsoil, boulders, and rock up to 0.25 cubic metre, measured by volume. Remove larger material as specified in Section 31 23 16.
- .4 Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- .5 Fill over-excavated areas under pipe bearing surfaces in accordance with direction by Consultant.
- .6 Stockpile excavated material in area designated at the Place of the Work. Remove excess subsoil not being re-used.

3.4 BACKFILLING

- .1 Support pipe and conduit during placement and compaction of bedding fill.
- .2 Backfill trenches to contours and elevations.
- .3 Place and compact select fill materials in continuous layers not exceeding 200 mm loose depth.
- .4 Place and compact common fill material in continuous layers not exceeding 300 mm loose depth.
- .5 Maintain optimum moisture content of backfill materials to attain required compaction density.
- .6 Remove surplus backfill materials from the Place of the Work.

3.5 FIELD QUALITY CONTROL

- .1 Perform field inspection and testing as specified in Section 01 40 00.
- .2 Conduct tests and analysis of fill material in accordance with ASTM D698.
- .3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.6 RESTORATION

- .1 Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects noted by Consultant.

3.7 SCHEDULE

- .1 Bedding: Loosely place a 150 mm thick uncompacted layer of fine granular fill directly below pipe, allowing the bedding material to conform to the outside diameter of the pipe.
- .2 Granular Fill: Install fine granular fill around pipe from the level of the uncompacted granular bedding to 300 mm over and adjacent to the pipe; compact to 95 percent Standard Proctor maximum dry density.
- .3 Inorganic Soil Fill: Install well-dried native soil fill from 300 mm above pipe to the underside of the top soil layer specified in Section 32 93 00 or the underside of aggregate base courses specified in Section 32 11 23.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Sub-base courses.
 - .2 Base courses.
- 1.2 RELATED SECTIONS
 - .1 Section 31 23 16 - Excavation.
 - .2 Section 31 23 23 - Fill: building and site backfilling.
 - .3 Section 31 23 33 - Trenching and Backfilling: Backfilling of utility trenches.
- 1.3 REFERENCES
 - .1 ASTM D698-07e1: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .2 OPSS 1004: Material Specification for Aggregates - Miscellaneous.
 - .3 OPSS 1010: Material Specification for Aggregates - Base, Subbase, Select Subgrade and Backfill Material.
 - .4 Geotechnical Investigation Report: as described in Section 00 31 00.
- 1.4 SUBMITTALS
 - .1 Submit backfill test reports as specified in Section 01 40 00.
 - .2 Test Reports: Include specified and actual results for compaction, moisture content, suitability, and other required standards for sub-surface material.
- 1.5 SAMPLES
 - .1 Submit samples as specified in Section 01 40 00.
 - .2 Samples: 4.5 kg sample of each type of fill to testing laboratory, in air-tight containers.
- 2 Products
- 2.1 FILL MATERIALS
 - .1 Fine Aggregate Fill: to OPSS 1010, Granular Class A; as specified in Section 31 23 23.
 - .2 Coarse Aggregate Fill: to OPSS 1010, Granular Class B, Type II; as specified in Section 31 23 23.
- 3 Execution
- 3.1 PREPARATION
 - .1 Generally, compact subgrade to density requirements for subsequent backfill materials.
 - .2 Cut out soft areas of subgrade not capable of insitu compaction and compact.
 - .3 Proof roll subgrade prior to placement of backfill in presence of soils engineer. Correct soft areas and obtain soil engineer's acceptance of existing conditions prior to placing aggregate base courses.

3.2 INSTALLATION

- .1 Provide aggregate sub-base and base courses below concrete slabs-on-fill; concrete pavements, walks, curbs and gutters; and asphalt pavements; in accordance with the recommendations contained in the geotechnical investigation report.
- .2 Fill areas to contours and elevations with unfrozen materials.
- .3 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- .4 Place and compact materials in continuous layers not exceeding 150 mm compacted depth.
- .5 Employ a placement method that does not disturb or damage adjacent Work.
- .6 Make grade changes gradual. Blend slope into level areas.

3.3 FIELD QUALITY CONTROL

- .1 Perform field inspection and testing as specified in Section 01 40 00.
- .2 Conduct tests and analysis of fill material to ASTM D698.
- .3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Asphaltic concrete paving.
- 1.2 RELATED SECTIONS
 - .1 Section 32 11 23 - Aggregate Base Courses: compacted fill below asphalt paved areas.
 - .2 Section 32 17 23 - Pavement Markings.
- 1.3 REFERENCES
 - .1 ASTM D698-07e1: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .2 OPSS 310: Construction Specification for Hot Mix Asphalt.
 - .3 OPSS 1003: Material Specification for Aggregates - Hot Mix Asphalt.
 - .4 OPSS 1101: Material Specification for Performance Graded Asphalt Cement.
 - .5 OPSS 1103: Material Specification for Emulsified Asphalt.
 - .6 OPSS 1150: Material Specification for Hot Mix Asphalt.
 - .7 Geotechnical Investigation Report: as described in Section 00 31 00.
- 1.4 SUBMITTALS
 - .1 Submit test reports as specified in Section 01 40 00.
 - .2 Test Reports: Include specified and actual results for compaction, suitability, and other required standards for asphaltic material.
- 1.5 ENVIRONMENTAL REQUIREMENTS
 - .1 Do not perform work of this Section during rainy or inclement weather.
 - .2 Conform to OPSS 310.
- 2 Products
- 2.1 MATERIALS
 - .1 Asphalt Cement: to OPSS 1101.
 - .2 Aggregate for Binder Course Mix: 100 percent passing a 26.5 mm sieve, to OPSS 1003.
 - .3 Aggregate for Surface Course Mix: 100 percent passing a 16 mm sieve, to OPSS 1003.
 - .4 Primer, Tack and Sealer Coat: SS-1 asphaltic emulsion, to OPSS 1103.
- 2.2 ASPHALT PAVING MIXES
 - .1 Binder Course: ready mixed, hot laid asphaltic concrete, to OPSS 1150, Type HL8.
 - .2 Surface Course: ready mixed, hot laid asphaltic concrete, to OPSS 1150, Type HL3.

- 3 Execution
- 3.1 EXAMINATION
 - .1 Refer to Section 01 71 00.
 - .2 Verify that compacted granular base is dry and ready to support paving and imposed loads.
 - .3 Verify gradients and elevations of base are correct.
- 3.2 PREPARATION
 - .1 Shape finished subgrade parallel to proposed finished grades.
 - .2 Proof roll subgrade to 100 percent Standard Proctor maximum dry density.
- 3.3 ASPHALT PAVING
 - .1 Lay asphalt paving to OPSS 310, rolled to firm compaction.
 - .2 Conform to recommendations of geotechnical investigation report for thicknesses and compaction percentages of binder and surface courses.
 - .3 Lay mixture on dry aggregate base course, free from standing water.
 - .4 Spread mixture with a mechanical self-propelled power spreader capable of spreading the mixture to a line and grade.
 - .5 Before roller compaction is started, check the surface for inequalities, flat spots, etc. and adjust.
 - .6 Finished Surface: smooth and true to the established crown, free from depressions.
 - .7 Where paving is to extend existing surfaces, saw cut existing edges to form a neat joint between old and new work.
- 3.4 FIELD QUALITY CONTROL
 - .1 Perform field inspection and testing as specified in Section 01 40 00.
 - .2 Conduct tests and analysis of asphaltic concrete paving in accordance with ASTM D698.
 - .3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
- 3.5 ADJUSTING
 - .1 Repair low or defective areas by cutting out the course as required and replacing it with fresh, hot mixture, immediately compacted to conform to the surrounding area.
 - .2 Ensure 100 percent bond to existing adjacent paving.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Exterior reinforced concrete slabs and pavements.
 - .2 Exterior concrete sidewalks.
- 1.2 RELATED SECTIONS
 - .1 Section 03 10 00 - Concrete Forming and Accessories.
 - .2 Section 03 20 00 - Concrete Reinforcing: reinforcing mesh and bars.
 - .3 Section 03 30 00 - Cast-in-Place Concrete.
 - .4 Section 32 11 23 - Aggregate Base Courses: compacted fill below concrete paving.
- 1.3 REFERENCES
 - .1 ASTM A82/A82M-07: Standard Specification for Steel Wire, Plain, For Concrete Reinforcement.
 - .2 ASTM A185/A185M-07: Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .3 ASTM C309-07: Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .4 ASTM D1751-04: Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .5 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction.
 - .6 CAN/CSA-G30.18-M92 (R2002): Billet-Steel Bars for Concrete Reinforcement.
 - .7 OPSS 350: Construction Specification for Concrete Pavement and Concrete Base.
 - .8 OPSS 351: Construction Specification for Concrete Sidewalk.
 - .9 OPSS 1350: Material Specification for Concrete - Materials and Production.
- 1.4 TEST REPORTS
 - .1 Submit test reports as specified in Section 01 40 00.
 - .2 Test Reports: Include specified and actual results for compressive strength, air entrainment, and other required standards for concrete material.
- 1.5 QUALITY ASSURANCE
 - .1 Applicator: company specializing in commercial coloured concrete work, and having a minimum of 10 years documented experience.
- 1.6 PROJECT CONDITIONS
 - .1 Perform Work only when environmental conditions are as specified in Section 03 30 00.
 - .2 Ensure temporary heating is provided for cold weather work.

2 Products

2.1 MATERIALS

- .1 Concrete: to OPSS 1350; as follows:
 - .1 Compressive Strength: 32 MPa at 28 days;
 - .2 Water-to-Cement Ratio: 0.40;
 - .3 Air Entrainment: 7 to 10 percent.
- .2 Formwork: wooden forms, as specified in Section 03 10 00.
- .3 Release Agent: mineral type, non-staining, as specified in Section 03 10 00.
- .4 Reinforcing Steel: new billet steel, high bond deformed bars, to CAN/CSA-G30.18-M, Grade 400R; sizes as indicated on Drawings.
- .5 Welded Steel Wire Fabric: to ASTM A185/A185M, flat sheets; 152 x 152 MW 18.7 X MW 18.7 size.
- .6 Tie Wire: to ASTM A82/A82M, minimum 3 mm size, annealed type.
- .7 Chairs, Bolsters, Bar Supports, Spacers: adequate for strength and support of reinforcing construction conditions.
- .8 Expansion Joint Filler: to ASTM D1751, 10 mm thick, preformed asphalt-impregnated fibre board.
- .9 Curing and Sealing Compound: to ASTM C309, Type 1, Class B; transparent, non-yellowing; eg. CS-309 by W. R. Meadows of Canada Limited.
- .10 Concrete Sealer: eg. Sealtight HIAC acrylic concrete sealer by W. R. Meadows of Canada Limited.
- .11 Non-Slip Strips: 50 mm wide carborundum grit tape strip inserts, colours as selected by Consultant and to in accordance with barrier free requirements.
- .12 Joint Sealer and Saw Cut Filler: Lithoreal Joint Sealant by L. M. Scofield Company, multiple colours required, to match adjacent surfaces.

2.2 MIXING

- .1 Mix concrete to to OPSS 1350 and CSA A23.1.
- .2 Refer to Section 03 30 00.

3 Execution

3.1 EXAMINATION

- .1 Refer to Section 01 71 00.
- .2 Verify subgrade elevations.

3.2 PREPARATION

- .1 Shape finished subgrade parallel to proposed finished grades.
- .2 Proof roll subgrade to 95 percent Standard Proctor maximum dry density.

3.3 PLACEMENT

- .1 Construct concrete pavements to OPSS 350.

- .2 Construct concrete sidewalks to OPSS 351.
 - .3 Place reinforcement, supported on concrete chairs at mid-thickness of concrete slabs. Do not continue reinforcement through expansion joints.
 - .4 Place concrete to thicknesses indicated on Drawings, and vibrate to CSA A23.1.
 - .5 Unless scheduled otherwise, broom finish surfaces to a slight crown to shed water.
 - .6 Provide tooled edge and mark into panels not more than 1.5 metres in size.
 - .7 Saw cut concrete surfaces and fill as specified in Section 03 30 00.
 - .8 Provide an asphalt impregnated board expansion joint at maximum 7.5 metres OC.
 - .9 Cure and seal concrete pavements subject to the action of salt with approved curing and sealing compound in accordance with manufacturer's printed instructions.
 - .10 Apply an approved acrylic sealer to concrete cured for a minimum of 7 days, in accordance with manufacturer's printed instructions.
 - .11 Apply non-slip strips to concrete surfaces to barrier free ramp in pattern as indicated on Drawings. Ensure concrete surfaces are properly cured, smooth, dry, clean and free of foreign materials such as dust, paint, grease, and oils. Roll non-slip strips with J-hand roller to ensure proper bond with substrate.
- 3.4 FIELD QUALITY CONTROL
- .1 Perform field inspection and testing as specified in Section 01 40 00.
 - .2 Conduct tests and analysis of concrete to CSA A23.2.
 - .3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
- 3.5 PROTECTION
- .1 Protect concrete from harmful effects of sunshine, drying winds, and cold running of surface water for a minimum period of five days.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Concrete curbs and integral gutters.

1.2 RELATED SECTIONS

- .1 Section 03 10 00 - Concrete Forming and Accessories: formwork.
- .2 Section 03 20 00 - Concrete Reinforcing: reinforcing mesh and bars.
- .3 Section 03 30 00 - Cast-in-Place Concrete.
- .4 Section 32 11 23 - Aggregate Base Courses: compacted fill.
- .5 Section 32 13 13 - Concrete Paving: cast-in-place concrete sidewalks and pavements.
- .6 Section 32 17 23 - Pavement Markings.

1.3 REFERENCES

- .1 ASTM A82/A82M-07: Standard Specification for Steel Wire, Plain, For Concrete Reinforcement.
- .2 ASTM D1751-04: Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .3 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction.
- .4 CAN/CSA-G30.18-M92 (R2002): Billet-Steel Bars for Concrete Reinforcement.
- .5 OPSS 353: Construction Specification for Concrete Curb and Gutter Systems.
- .6 OPSS 1350: Material Specification for Concrete - Materials and Production.

1.4 SUBMITTALS

- .1 Submit test reports as specified in Section 01 40 00.
- .2 Test Reports: Include specified and actual results for compressive strength, air entrainment, and other required standards for concrete material.

2 Products

2.1 MATERIALS

- .1 Concrete: to OPSS 1350; as follows:
 - .1 Compressive Strength: 35 MPa at 28 days;
 - .2 Water-to-Cement Ratio: 0.40;
 - .3 Air Entrainment: 7 to 10 percent.
- .2 Formwork: wooden forms, as specified in Section 03 10 00.
- .3 Release Agent: mineral type, non-staining, as specified in Section 03 10 00.
- .4 Reinforcing Steel: new billet steel, high bond deformed bars, to CAN/CSA-G30.18-M, Grade 400R; sizes as indicated on Drawings.
- .5 Tie Wire: to ASTM A82/A82M, minimum 3 mm size, annealed type.
- .6 Chairs, Bolsters, Bar Supports, Spacers: adequate for strength and support of reinforcing construction conditions.

- .7 Expansion Joint Filler: to ASTM D1751, 10 mm preformed asphalt impregnated fibre board.
 - .8 Curing and Sealing Compound: eg. CS-309 by W. R. Meadows.
 - .9 Concrete Sealer: eg. Sealtight HIAC acrylic concrete sealer by W. R. Meadows.
- 3 Execution
- 3.1 EXAMINATION
- .1 Refer to Section 01 71 00.
 - .2 Verify subgrade elevations.
- 3.2 PREPARATION
- .1 Proof roll base to 95 percent Standard Proctor maximum dry density.
- 3.3 PLACEMENT
- .1 Erect formwork as specified in Section 03 10 00.
 - .2 Construct concrete curbs and gutters to OPSS 353.
 - .3 Place reinforcement, supported on concrete chairs at mid-thickness of concrete curbs. Do not continue reinforcement through expansion joints.
 - .4 Place concrete to required thicknesses and profiles, and vibrate to CSA A23.1.
 - .5 Provide an asphalt impregnated board expansion joint at maximum 7.5 metres OC.
 - .6 Cure and seal concrete with approved curing and sealing compound in accordance with manufacturer's printed instructions.
 - .7 Apply an approved acrylic sealer to concrete cured for a minimum of seven days, in accordance with manufacturer's printed instructions.
 - .8 Provide drop curbs in locations shown on Drawings.
- 3.4 FIELD QUALITY CONTROL
- .1 Perform field inspection and testing as specified in Section 01 40 00.
 - .2 Conduct tests and analysis of concrete to CSA A23.2.
 - .3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
- 3.5 ADJUSTING
- .1 Remove formwork no sooner than 24 hours after pouring.
- 3.6 PROTECTION
- .1 Protect concrete from harmful effects of sunshine, drying winds, and cold running of surface water for a minimum period of five days.

END OF SECTION

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Pavement marking.
- 1.2 RELATED SECTIONS
 - .1 Section 32 12 16 - Asphalt Paving.
 - .2 Section 32 13 13 - Concrete Paving.
 - .3 Section 32 16 13 - Concrete Curbs and Gutters.
- 1.3 REFERENCES
 - .1 CAN/CGSB-1.74-2001: Alkyd Traffic Paint.
 - .2 OPSS 532: Pavement Marking.
- 1.4 ENVIRONMENTAL REQUIREMENTS
 - .1 Do not perform work of this Section during rainy or inclement weather.
 - .2 Apply paint only when air temperature is above 10 degrees C, wind speed is less than 60km/h and no rain is forecasted.
 - .3 Conform to OPSS 532.
- 2 Products
- 2.1 MATERIALS
 - .1 Traffic Paint: alkyd traffic paint, to CAN/CGSB-1.74, Yellow 505-308 colour.
- 3 Execution
- 3.1 APPLICATION
 - .1 Lay out pavement markings as indicated on Drawings.
 - .2 Apply pavement markings to OPSS 532.
 - .3 Apply traffic paint evenly at rate of 3 L/m².
 - .4 Do not thin paint unless approved by Consultant.
 - .5 Symbols and lines to conform to dimensions indicated.
 - .6 Paint lines to be uniform colour and density with sharp edges.
 - .7 Thoroughly clean distributor tank before refilling with paint of different colour.
 - .8 Paint markings to be within plus or minus 12 mm of dimensions indicated.
 - .9 Make Good incorrect markings.
 - .10 Protect pavement markings until dry.

END OF SECTION

- 1 General
- 1.1 GENERAL
 - .1 Conform to Division 1, General Requirements
- 1.2 DELIVERY AND STORAGE
 - .1 Schedule deliveries in order to keep storage at job site to minimum without causing delays.
 - .2 Deliver sod to site within 24 hours of being lifted and lay sod within 36 hours of being lifted. Sod which has yellowed and/or heated in the roll will be rejected.
 - .3 Do not deliver small, irregular or broken pieces of sod.
 - .4 During hot weather protect sod from drying and water sod rolls as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod rolls will be rejected.
- 1.3 SCHEDULING
 - .1 Schedule sod laying to coincide with topsoil operations.
- 2 Products
- 2.1 MATERIALS
 - .1 Nursery Sod: Quality and source to comply with standards outline in Metric Guide Specifications for Nursery Stock, Section 17, 1984 Edition, published by Canadian Nursery Trades Association. Number One Kentucky Bluegrass sod grown from minimum mixture of Kentucky Bluegrass cultivars.
 - .2 Water: Potable.
- 3 Execution
- 3.1 LAYING OF SOD
 - .1 Obtain approval of topsoil grade and depth before sodding.
 - .2 Hand rake to eliminate minor surface irregularities.
 - .3 Lay sod during growing season.

- .4 Lay sod in rows, perpendicular to slopes, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
- .5 Provide close contact between sod and soil by means of light roller immediately after laying. Heavy rolling to correct irregularities in grade is not permitted, nor is rolling after watering.
- .6 Water immediately after sod laying and rolling to obtain moisture penetration through sod into top 100mm of topsoil.
- .7 Water as often thereafter as necessary to establish rooting.

3.2 ACCEPTANCE

- .1 Sodded areas will be accepted and turned over to the Owner only if:
 - .1 Sodded areas are established by being completely rooted and knit with the underlying soil.
 - .2 Sod is free of bare and dead spots without weeds.
 - .3 No surface soil is visible when grass has been cut to height of 50mm.
 - .4 Sodded areas have been cut on a regular basis, as part of this contract, for as long as is necessary until acceptance for maintenance by owner. A minimum of two cuts will be required.
 - .5 Sod is to be watered by the Contractor on an ongoing basis until acceptance by the Owner, to ensure a minimum of 25mm of water per week, to augment rainfall if necessary.

END OF SECTION

1 General

1.1 GENERAL

- .1 Conform to Division 1, General Requirements

1.2 SOURCE QUALITY CONTROL

- .1 Obtain approval of plant material at source.
- .2 Notify consultant of source of material at least seven (7) days in advance of shipment. No work under this section is to proceed without approval.
- .3 Acceptance of plant material at its source does not prevent rejection on site prior to or after planting operations.
- .4 Imported plant materials must be accompanied by necessary permits and import licenses. Conform to Federal and Provincial regulations.

1.3 SHIPMENT & PRE-PLANTING CARE

- .1 Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.
- .2 Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire which would damage bark, break branches or destroy natural shape of plant. Give full support to root ball of large trees during lifting.
- .3 Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, sawdust or other acceptable material to prevent loss of moisture during transit and storage.
- .4 Remove broken and damaged roots with sharp pruning shears.
- .5 Keep roots moist and protected from sun and wind. Heel in trees and shrubs, which cannot be planted immediately, in shaded areas and water well.

1.4 GUARANTEE

- .1 The Contractor hereby warrants that plant material as itemized on plant list will remain free of defects for two years.
- .2 End-of Warranty inspections will be conducted.

1.5 REPLACEMENTS

- .1 During warranty period, remove from site any plant material that has died or failed to grow satisfactorily as determined by consultant.
- .2 Replace any damaged or unsatisfactory plant materials in the next planting season.
- .3 Extend warranty on replacement plant material for a period equal to the original warranty period.
- .4 Continue such replacement and warranty until plant material is acceptable.

2 Products

2.1 MATERIALS

- .1 Water: Potable and free of minerals which may be detrimental to plant growth.
- .2 Stakes: T-bar steel stakes 50 x 50 x 6 x 2400mm, wood 50 x 50 x 2400mm.
- .3 Accessories: Factory galvanized cables, wire tighteners.
- .4 Guy wires: Steel wire strand to CSA G4-M1977 at the following sizes:
 - .5 Shrubs and trees less than 75mm caliper use 2.4mm wire.
 - .6 Trees 75 to 150mm caliper use 3mm wire.
- .7 Tree rings: Fabricated from 3mm galvanized wire encased in two-ply reinforced 12mm diameter rubber garden hose or equivalent.
- .8 Root ball burlap: 150g Hessian burlap.
- .9 Wire baskets: to be ungalvanized metal.
- .10 Mulch: Submit samples prior to shipping to site: Shredded bark mulch.
- .11 Topsoil: Triple mix for all shrub beds and tree pits.
- .12 Antidesiccant: Wax like emulsion to provide film over plant surfaces, reducing evaporation but permeable enough to permit transpiration.

2.2 PLANT MATERIAL

- .1 Quality and source: Comply with Metric Guide Specifications for Nursery Stock, 1984 Edition of Canadian Nursery Trades Association referring to size and development of plant material and root ball. Measure plants when branches are in their natural position. Height and spread dimensions refer to main body of plant and not branch tip to branch tip. Use trees and shrubs of Number 1 Grade.
- .2 Additional plant material qualifications:
 - .1 Plant material obtained from areas with milder climatic conditions from those of the subject site are acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in, in a protected area, until conditions are suitable for planting.
 - .2 Use trees and shrubs with strong fibrous root system, free of disease, insects, defects or injuries, and structurally sound. Use trees with straight trunks, well and characteristically branched for species. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
 - .3 Cold storage: Written approval from the consultant is required for use of plant material which has been held in cold storage.
 - .4 Container grown stock: Acceptable if containers are large enough for root development. Trees and shrubs must have been grown in container for minimum of one growing season, but not longer than two. Root systems must be able to “hold” soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
 - .5 Balled and burlapped: Coniferous and broad-leafed evergreens over 500mm tall must be dug with soil ball. Deciduous trees in excess of 3m height must have been dug with large ball. Root balls must include 75% of fibrous and feeder root system. Secure root balls with burlap and heavy twine, rope or a wire basket.
 - .6 Collected plant materials: Will not be permitted.
 - .7 Substitutions to plant material, as indicated on planting plan, are not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.

3 Maintenance

3.1 SCOPE OF WORK

- .1 The Contractor shall provide maintenance as specified for all landscaping and plant material, for a period of two (2) years from date of acceptance by the Owner.

3.1 PRODUCTS

- .1 Materials are not to be stored on the school site or in the school building.
- .2 Fertilizer: complete commercial synthetic slow release fertilizer with maximum 35% water soluble nitrogen.
- .3 Water: potable.
- .4 Herbicides and Pesticides: type as required.

3.2 EXECUTION

- .1 Program timing of operations to growth, weather conditions and use of site, taking extra caution during school days, recess, lunch, etc.
- .2 Rake sodded areas in spring and remove dead vegetation, leaves and debris.
- .3 Roll lightly areas where sod has lifted, or where surface irregularities exist.
- .4 Resod areas where turf has been killed by pedestrian traffic or salt damage.
- .5 Clean shrub borders and planters of debris material.
- .6 Apply 4:2:2 ratio fertilizer with minimum 40% slow release at rate of 0.5kg nitrogen/100m² for all sodded areas. Apply in early Spring as soon as frost is out of ground. Make supplementary application of 0.5 nitrogen/100m² towards end of August. Use calibration to ensure specified rate is spread evenly.
- .7 Apply ground injection of a liquid fertilizer of type specified for trees with a minimum 4:2:3 ratio (27-10-13) to be applied in April of each year of the maintenance contract.
- .8 The Owner will supply water required for watering purposes. Become familiar with location of water outlets.

- .9 Commence lawn mowing within 2 days upon request of Building Manager. Operation must be continuous and completed within reasonable period.
- .10 Lawn cutting operations include picking up and disposal of paper and refuse accumulated on landscaped areas prior to mowing.
- .11 Cut grass at height of 65mm. At no time cut more than 1/3 of the grass growth at a single cut. Use equipment in good working order and with sharp cutting blades. Mow grass on average of once every 10 days. Do not remove grass clippings from lawn unless volume is such as to be harmful to lawn or unsightly. Hand trim or use edger for grass adjacent to buildings, pavement, trees, and fences. Trim grass edges around planting beds neatly in lines as in original layout.
- .12 Apply herbicides and pesticides only by direct request from the Owner.
- .13 Only licensed sprayers are to apply herbicide or insecticide as per Pesticide Act and Ontario Regulations 615-74.
- .14 Remove weeds including their roots from shrub beds and tree pits, taking care not to damage roots or shrubs (no gap).
- .15 Collect and dispose of paper and refuse. Remove dead plants, leaves, branches, and seed pods.
- .16 Prune only dead branches unless directed otherwise by the Owner.
- .17 Rake and discard off site leaves after they have been shed by trees in the fall.
- .18 Spray stems of trees and shrubs with rodent repellent. Protect stems of trees with fine wire mesh up to expected height of snow cover.
- .19 Include in the maintenance contract the replacement of all plant material which dies during the maintenance period.

END OF SECTION